Research Day 2021 Program

Western Michigan University Homer Stryker M.D. School of Medicine

Follow this and additional works at: https://scholarworks.wmich.edu/medicine_research_day

Part of the Life Sciences Commons, and the Medicine and Health Sciences Commons

WMU ScholarWorks Citation
Homer Stryker M.D. School of Medicine, Western Michigan University, "Research Day 2021 Program" (2021). Research Day. 298.
https://scholarworks.wmich.edu/medicine_research_day/298

This Abstract is brought to you for free and open access by the WMU Homer Stryker M.D. School of Medicine at ScholarWorks at WMU. It has been accepted for inclusion in Research Day by an authorized administrator of ScholarWorks at WMU. For more information, please contact wmu-scholarworks@wmich.edu.
38th Annual
Kalamazoo Community Medical and Health Sciences

Virtual Research Day

Wednesday, April 21, 2021
8:00 a.m. – 12:00 p.m.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>4</td>
</tr>
<tr>
<td>KEYNOTE SPEAKER</td>
<td>6</td>
</tr>
<tr>
<td>SCHEDULE</td>
<td>7</td>
</tr>
<tr>
<td>ORAL PRESENTATIONS</td>
<td>8</td>
</tr>
<tr>
<td>ORAL ABSTRACTS</td>
<td>21</td>
</tr>
<tr>
<td>POSTER PRESENTATIONS</td>
<td>74</td>
</tr>
<tr>
<td>POSTER ABSTRACTS</td>
<td>89</td>
</tr>
</tbody>
</table>

The complete program including abstracts is available on the Western Michigan University Homer Stryker M.D. School of Medicine website: [http://med.wmich.edu/node/287](http://med.wmich.edu/node/287)
In support of improving patient care, Western Michigan University Homer Stryker M.D. School of Medicine is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team. Credit amount subject to change.

**IPCE Credit**
This activity was planned by and for the healthcare team, and learners will receive 3.5 Interprofessional Continuing Education (IPCE) credits for learning and change.

**Physicians**
Western Michigan University Homer Stryker M.D. School of Medicine designates this live activity for a maximum of 3.5 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

**Pharmacists & Pharmacy Technicians**
Western Michigan University Homer Stryker M.D. School of Medicine designates this activity for 3.5 contact hours for pharmacists and pharmacy technicians. Pharmacists and pharmacy technicians should claim only credit commensurate with the extent of their participation in the activity.

**DISCLOSURES**
Please contact Continuing Education for a listing of disclosure statements from today’s presenters.
INTRODUCTION

RESEARCH, EDUCATION, AND SCHOLARSHIP

The commitment and participation of Western Michigan University Homer Stryker M.D. School of Medicine (WMed), its faculty, and the Kalamazoo scientific community in “Research Day” continues on this day marking a 38th anniversary milestone. One-hundred forty-two abstracts were received and reviewed by a panel of 56 judges. One-hundred twenty from last year, combined with one-hundred forty-two abstracts been accepted for either oral or poster presentation.

Such success is due, of course to a large number of talented and dedicated people. We wish to acknowledge the participation of a group of faculty and thank them for volunteering their time and expertise to review the submissions. Each abstract was assigned based upon area of expertise. The judges’ evaluations were critical in determining the oral presentations and poster presentations for this year’s event.

In addition, it is my privilege to have worked with this year’s Research Day organizing committee. This committee worked diligently over an extended period of time to bring you an exceptional learning and networking opportunity. Members of this year’s committee were:

<table>
<thead>
<tr>
<th>Melinda Abernethy</th>
<th>Loyall Harris</th>
<th>Maureen Owens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adil Akkouch</td>
<td>Nichol Holodick</td>
<td>Courtney Puffer</td>
</tr>
<tr>
<td>Laura Bauler</td>
<td>Krishna Jain</td>
<td>John Spitsbergen</td>
</tr>
<tr>
<td>Steven Crooks</td>
<td>Erik Larson</td>
<td>Gregory Vanden Heuvel</td>
</tr>
<tr>
<td>Maria Demma Cabral</td>
<td>Liz Lorbeer</td>
<td>Peter Vollbrecht</td>
</tr>
<tr>
<td>Jack Dewey</td>
<td>Amy Lorber</td>
<td></td>
</tr>
</tbody>
</table>

We hope this year’s Research Day will inspire you to pursue your own research and to, as well, support the basic, medical and healthcare research of our Southwestern Michigan Community colleagues.

Gregory Vanden Heuvel, PhD
Chair 2021 Research Day
Thank you to the following WMed professionals who dedicated their time to participate as abstract scoring judges.

Melinda Abernethy, MD
Sara Allison, PhD
Syed Alam, MD
Fritz Allhoff, PhD
Hakima Bachimi-Aqel, MD
Joanne Baker, DO
Robert Baker, MD
Susan Bannon, MD
Daniel Barnas, MD
Laura Bauler, PhD
Timothy Bauler, PhD
Raymond Bayer, M2
Craig Beam, PhD
Thomas Blok, MD
Karen Bovid, MD
Theodore Brown, MD
Maria Demma Cabral, MD
Joseph Callas, MD
Sreenivasa Chandana, MD
Steven Crooks, PhD
Jack Dewey, M2
Christian Ertl, MD
Casey Fealko, M2
Rolbert Fischre, MD
Theotonius Gomes, DO
Lisa Graves, MD
Jeffrey Greene, PhD
Vishal Gupta, MD
David Hartman, MD
Nichol Holodick, PhD

Mariam Ischander, MD
Krishna Jain, MD
Keith Kenter, MD
Wendy Lackey, PhD
Erik Larson, PhD
Mark Loehrke, MD
Elizabeth Lorbeer, EdM
Aimee Madsen, M4
Joshua Mastenbrook, MD
Thomas Melgar, MD
Tracey Mersfelder, MD
Gitonga Munene, MD
Maureen Owens
Dilip Patel, MD
Kirsten Porter-Stransky, PhD
Courtney Puffer, MA
Kelly Quesnelle, PhD
Mark Schauer, MD
Neelkamal Soares, MD
John Spitsbergen, MD
Ruqiya Shama Tareen, MD
Timothy Trichler, MD
Gregory Vanden Heuvel, PhD
Timothy VanderKooy, MD
Peter Vollbrecht, PhD
Perry Westerman, MD
KEYNOTE SPEAKER

Ann Van Heest, M.D.

University of Minnesota
Shriners Children’s Twin Cities

Pediatric Orthopedic Hand Surgeon

Director, Residency Program for Orthopedic Surgery

Ann Van Heest, MD, is a pediatric orthopaedic hand surgeon at the University of Minnesota Department of Orthopaedics and Shriners Children’s Twin Cities. She is board certified by the American Board of Orthopedic Surgery with subspecialty certification in surgery of the hand. She received an undergraduate degree from St. Olaf College in Northfield, Minnesota, and earned a medical degree from the University of Minnesota Medical School. Dr. Van Heest completed an internship in general surgery at Hennepin County Medical Center in Minneapolis, and a residency in orthopaedic surgery at the University of Minnesota Hospital. She also completed a Harvard Hand and Upper Extremity Fellowship at Brigham and Women’s and Children’s Hospital in Boston, Massachusetts.

Dr. Van Heest is a member of the American Academy of Orthopaedic Surgeons, American Society for Surgery of the Hand and American Orthopaedic Association. Along with her services to Shriners Children’s Twin Cities, Dr. Van Heest serves as a professor in the department of orthopaedic surgery at the University of Minnesota, School of Medicine.

Credentials:

- Medical Degree, University of Minnesota Medical School, Minneapolis, Minn.
- Internship, Hennepin County Medical Center, Minneapolis, Minn., General Surgery
- Residency, University of Minnesota Hospital, Minneapolis, Minn., Orthopaedic Surgery
- Fellowship, Harvard hand and Upper Extremity, Brigham and Woman’s/Children’s Hospital, Boston, Mass.
## SCHEDULE

Wednesday, April 21, 2021  
8:00 a.m. – 12:00 p.m.

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30-9:30 am</td>
<td>Basic Science</td>
</tr>
<tr>
<td></td>
<td>Basic Science 2</td>
</tr>
<tr>
<td></td>
<td>Medical Education</td>
</tr>
<tr>
<td></td>
<td>Clinical Research 1</td>
</tr>
<tr>
<td></td>
<td>Clinical Research 2</td>
</tr>
<tr>
<td></td>
<td>Community and Public Health</td>
</tr>
<tr>
<td></td>
<td>Amuze Interactive!</td>
</tr>
<tr>
<td>9:30-9:45 am</td>
<td>BREAK</td>
</tr>
<tr>
<td>9:45-10:45 am</td>
<td>Basic Science –</td>
</tr>
<tr>
<td></td>
<td>Medical Engineering</td>
</tr>
<tr>
<td></td>
<td>Basic Clinical Science</td>
</tr>
<tr>
<td></td>
<td>Clinical Research 3</td>
</tr>
<tr>
<td></td>
<td>Clinical Research 4</td>
</tr>
<tr>
<td></td>
<td>Community and Public Health</td>
</tr>
<tr>
<td></td>
<td>Social and Behavioral Sciences</td>
</tr>
<tr>
<td></td>
<td>Amuze Interactive!</td>
</tr>
<tr>
<td>10:45-11:00 am</td>
<td>BREAK</td>
</tr>
<tr>
<td>11:00 am -12:00 pm</td>
<td>KEYNOTE SPEAKER</td>
</tr>
<tr>
<td></td>
<td>Amuze Interactive!</td>
</tr>
</tbody>
</table>
ORAL PRESENTATIONS
Basic Science 1  
8:30-9:00 am

ANATOMY OF THE NAVICULOCUNEIFORM JOINT George Borrelli, MD; Mossub Qatu, MD; Christopher Traynor, MD; Joseph Weistroffer, MD; James Jastifer, MD

MODULATION OF HIPPOCAMPAL GABAERIC NEUROTTRANSMISSION AND GEPHRYIN LEVELS BY DIHYDROMYRICENTIN IMPROVES ANXIETY Amy Shao, BS; Jing Liang, MD PhD

WHEN LIFE GIVES YOU GLUCOSE: DIFFERENCES IN GLUCOSE UPTAKE AND UTILIZATION SUGGEST ALTERED ASTROCYTE FUNCTION IN OBESITY MODELS Keenan Boulneour, BS; Kendall Smith, BA; Daniel Micheli, BS; Peter Vollbrecht, PhD
Basic Science 2  
8:30-9:08 am

IMMUNO-DETECTION OF G₄ DNA STRUCTURES FORMED FROM PKD₁ SEQUENCES IMPLICATES STRUCTURE FORMATION IN CYSTOGENESIS  Aimee Madsen, BS; Amy Lorber, BS; Kemin Su, PhD; Gloria Alvarado, PhD; Erik Larson, PhD

3D BIOPRINTED BARRIER CONSTRUCT FOR BONE HEALING IN SYSTEMIC INFLAMMATORY CONDITIONS  Zeena Qiryaqoz, BS; Adil Akkouch, PhD

THE ROLE OF IGM IN SELECTION OF THE MURINE B-1A CELL REPERTOIRE WITH INCREASING AGE  Peter Ewing, MS; Naomi Tsuji, MS; Nichol Holodick, PhD

DIFFERENTIAL GENE EXPRESSION IN AGED B CELLS: A ROLE FOR SEX  Brinda Ryali, BS; Nichol Holodick, PhD
TEACHER TRIAL: TEACHING EFFECTIVE CPR TO 4TH AND 5TH GRADE ELEMENTARY STUDENTS Cyle Rogotzke, MD; Sherrie Bencik, MD; Joseph Billian, MS; Maureen Ford, MD; Nathan Elg, DO; Cambrie Bencik; Joshua Mastenbrook, MD

BRAIN EXPLORERS: A NEUROSCIENCE-BASED OUTREACH FOR MIDDLE SCHOOL STUDENTS Ayman Shehadeh, BS; Alena Wurster, BS; Kaitlyn VanRiper, BS; Peter Beck, BS; Kirsten Porter-Stranksy, PhD; Peter Vollbrecht, PhD

GLOBAL EMERGENCY MEDICINE FELLOWSHIPS: A SURVEY OF CURRICULA AND PRE-FELLOWSHIP EXPERIENCES Elise Klesick, DO; Wael Hakmeh, DO

A NOVEL TASK TRAINER FOR BALLOON TAMPONADE OF GI HEMORRHAGE Richard Lammers, MD; Mark Williams, BA; Joshua Mastenbrook, MD

TECHNOLOGICALLY CHALLENGED OR JUST BURNED OUT? DIFFERING PERCEPTIONS ON THE VALUE OF ELECTRONIC HEALTH RECORDS (EHR) Tracy Frederick, BA; Francine Grey-Theriot, BS; Derek Deng, BS; Duncan Vos, MS; Maria Livaudais, PhD; Philip Kroth, MD
OUTCOMES OF MEDICAL VERSUS SURGICAL THERAPY FOR PERITONSILLAR ABSCESS  
Aaron Zebolsky, MS;  Emma Swayne, MS;  Seth Moffatt, BS;  Corbin Sullivan, MD

IS BLOODSTREAM INFECTION AN EPIPHENOMENON IN SURGICAL PATIENTS?  
Joslyn Jose, MD;  Robert Sawyer, MD

TO CULTURE OR NOT TO CULTURE: DOES MICROBIOLOGY AFFECT MORTALITY AFTER INTRA-ABDOMINAL INFECTION?  Laura Stearns, MD;  Sarah Khalil, MD;  Robert Sawyer, MD

OUTCOMES OF OPEN AND LAPAROSCOPIC APPROACH TO SPLENECTOMY ON HEMATOLOGIC DISORDERS  
Gordon Liu, BA;  John Dewey, BS;  Saad Shebrain, MD

RADIOGRAPHIC MEASUREMENTS OF THE 1ST TARSOMETATARSAL (TMT) JOINT FOLLOWING 1ST METATARSOPHALANGEAL (MTP) JOINT ARTHRODESIS  
Christopher Traynor, MD;  James Jastifer, MD
Clinical Research 2
8:30-9:06 am

UTILIZING SERUM BICARBONATE INSTEAD OF URINE KETONES TO TRANSITION FROM INTRAVENOUS TO TRANSITION FROM IV TO SQ INSULIN
Mohamed Elgendy, MD; Robert Beck, MD

REDEFINING BODY ADIPOSITY AND HEALTH RISKS Cameron Quon, BA; Grace Jun, BS; Macey Walker, BSN; Shamsi Berry, PhD

PRIMARY PYOMYOSITIS IN CHILDREN IN THE UNITED STATES- TRENDS AND ASSOCIATIONS FROM THE HEALTHCARE UTILIZATION PROJECT NATIONWIDE INPATIENT SAMPLE DATA Kathleen Jenkinson, DO; Anya Ring, DO; Naveen Emmanuel, DO; Rheanne Maravelas, MD; Duncan Vos, MS; Jayne Barr, MD; Sapna Sadarangani, MD; Thomas Melgar, MD

ENHANCED RECOVERY AFTER SURGERY (ERAS) IMPLEMENTATION FOR HYSTERECTOMIES IN A MICHIGAN COMMUNITY HOSPITAL Kelsy Schultz, BA; Kathryn Dominick, DO; Jessica Sassic, Rebekah Sharp, MD; Silvia Linares, MD

ASSESSMENT OF IMPLEMENTATION OF STANDARDIZED POST-CESAREAN SECTION PAIN MANAGEMENT ORDERS IN DECREASING THE MORPHINE MILLIGRAM EQUIVALENTS PRESCRIBED Lauren Piper, DO; Faryal Tahir, MD; Muhamid Asif, MD; Duncan Vos, MS; Melissa Sherfield, BS
SHORT INTERPREGNANCY INTERVALS ARE ASSOCIATED WITH POOR BIRTH OUTCOMES FOR WOMEN OF KALAMAZOO COUNTY
Rebecca Parr, MS; Duncan Vos, MS; Melissa Sherfield, BS; Catherine Kothari, PhD; Laura Bauler, PhD

INFANT MORTALITY IN KALAMAZOO COUNTY: A COMPARISON OF OUTCOMES ACCORDING TO SOCIOECONOMIC STATUS AND RACE
Emily Carroll, BA; Emily Beck, BS; Brittany Sullivan, BS; Elizabeth Corpuz, BA; Joi Presberry, MPH; Deb Lenz, MS; Brenda O'Rourke, RN, BSN; Terra Bautista, BA

ROLE OF PSYCHOSOCIAL RISK FACTORS IN MOTHERS' ENGAGEMENT IN SAFE SLEEP PRACTICES
Summer Chahin, MA; Kalani Gates, BA; Amy Damashek, PhD; Cheryl Dickson, MD; Debra Lenz, MA; Grace Lubwama, PhD; Terra Bautista, BA; Catherine Kothari, PhD

DISCRIMINATION, VIGILANCE, AND THE PATIENT-PROVIDER RELATIONSHIP
Drew Moss, BS; Megan Sandberg, BS; Silvia Linares, MD; Megan Deibel, DNP; Lynette Gumbleton, BA; Joi Presberry, MPH; Claudia Waters, BS; Catherine Kothari, PhD

TIME TO BREAK THE POWER HIERARCHY: LISTEN TO WOMEN
Megan Deibel, CNM, DNP; Silvia Linares, MD; Drew Moss, BS; Megan Sandberg, BS; Claudia Waters, BS; Lynette Gumbleton, BA; Joi Presberry, MPH; Cathy Kothari, PhD
HYPOXIA INITIATES THE REPROGRAMMING OF MUSCLE CELLS INTO MULTIPOTENT LIKE CELLS  
Nariaki Nakamura, BS; Haiying Pan, BS; Keith Kenter, MD; Yong Li, MD PhD

LOW OXYGEN CULTURE UPREGULATES PD-L1 EXPRESSION IN C2C12 MYOBLASTS  
Juliana Overbey, BA; Yong Li, MD PhD; Haiying Pan, MS

HYPOXIA STIMULATED EXOSOME RELEASE AND THE REGULATION OF MUSCLE CELL DIFFERENTIATION A PILOT STUDY  
Loyall Harris, BS; Haiying Pan; Yong Li, MD PhD

DAMAGED MOTOR NEURONS SECRETE FACTORS THAT INFLUENCE MYOGENIC DIFFERENTIATION  
Leah Liu, BS; Haiying Pan, MS; Yong Li, MD PhD
DELETION OF THE HOMEobox GENE CUX1 DECREASES CILIogenesis IN A MOUSE MODEL OF POLycystic Kidney Disease  Conner Holthaus, BS; Matthew Rumschlag, BS; Emmanuel Kumar, BA; Zhi Nee Wee, ; Melissa Pasillas, ; Greg Vanden Heuvel, PhD

THE CONTRIBUTION OF POSITIONAL ASPHYXIA TO OPIOID RELATED DEATHS Joyce deJong, DO; Jenelle Lee, BS; Cuyler Huffman, MS; Abigail Grande, MPH; Theodore Brown, MD; Chloe Bielby, MPH

IMPACT OF COVID-19 ON VETERANS AND THE OPIOID EPIDEMIC IN MICHIGAN VETERANS: A MEDICOLEGAL DEATH INVESTIGATION Aditya Mehta, BS; John Dewey, BS; John Frederick, BA; Tyler Gibb, JD, PhD
GOING VERTICAL: A PROSPECTIVE COMPARISON OF EXTRACTION TIMES FOR PRIORITY PATIENTS IDENTIFIED BY TRIAGE TAGS VS COLORED FLAGS DURING A SIMULATED MCI  Abigail Wen-Yu Cheng, BS; Patrick McCreesh, MS; Seth Moffatt, BS; Ryan Maziarz, BS; Duncan Vos, MS; Joshua Mastenbrook, MD

CARING FOR A DYING PATIENT: AN EMS PERSPECTIVE  Andrew Wenger, DO; Megan Potilechio, DO; John Auguilar, MD; Joshua Mastenbrook, MD; Joseph Billian, MS; Melissa Sherfield, BS

HIGHER INTRA-ARREST BLOOD GLUCOSE LEVELS ASSOCIATED WITH RETURN OF SPONTANEOUS CIRCULATION IN OUT-OF-HOSPITAL NON-TRAUMATIC CARDIAC ARRESTS  Jeffrey Feng, BS; Ayman Shehadeh, BS; William Selde, MD; Joseph Billian, MS; Joshua Mastenbrook, MD
PEDIATRIC SUPRACONDYLAR HUMERUS FRACTURES CAN BE SAFELY TREATED BY ORTHOPAEDIC SURGEONS WITH AND WITHOUT PEDIATRIC FELLOWSHIP TRAINING Kelly Harms, MD; Shannon South, BA; Karen Bovid, MD; Keith Kenter, MD

OUTCOMES OF EMERGENCY LAPAROSCOPIC VS. OPEN SURGERY FOR COMPLICATED ACUTE PEPTIC ULCER DISEASE Taylor Floth, BS; Conor Dilon, DO; Saad Shebraim, MD; Gitonga Munene, MD; Robert Sawyer, MD

COMPARISON BETWEEN HOSPITALIST AND TRAUMA SURGERY ADMITTING SERVICES IN HIP FRACTURE PATIENT MANAGEMENT Jeffrey Gilbertson, MD; Rachael Tolsma, BS; Adam Miseldine, BS; Cuyler Huffman, MS; Cameron Vanlaningham, MD

ABSORBABLE VERSUS NON-ABSORBABLE SUTURES FOR THE TREATMENT OF KNEE ARTHROSCOPY: A PROSPECTIVE COMPARISON OF PATIENT OUTCOMES AND SATISFACTION Donghoon Lee, BS; Joseph Brutico, BS; Ryan Paul, BS; Richard Gawel, BS; Shyam Brahmbhatt, MD; Michael Ciccotti, MD; Fotios Tjoumakaris, MD; Bradford Tucker, MD; Matthew Pepe, MD; Kevin Freedman, MD

GLOBAL OPIOID PRESCRIPTION PRACTICES AFTER SHOULDER ARTHROSCOPY: AN EXPANDED STUDY Kelsey Suggs, MS; Keith Kenter, MD
INCREASING HIV PATIENT ADHERENCE TO ART WITH A SMARTPHONE-BASED INCENTIVE INTERVENTION  Haily Traxler, MA; Amanda Devoto, MA; David Cosottile, MA; Anthony DeFulio, PhD

ASSESSING THE PREVALENCE OF FOOD INSECURITY IN A WALK-IN HIV TESTING CENTER  Rebecca Reardon, BA; Khusbu Patel, BA; Allison Balaj, BS; Melissa Olken, MD PhD

RACE AND CHRONIC KIDNEY DISEASE IN SOUTHWEST MICHIGAN  Rebecca Reardon, BA; Shibani Kanungo, MD

UNDERSTANDING THE AREA AGENCY ON AGING'S RESPONSE TO THE COVID-19 PANDEMIC  Rachel Zamihovsky, BA; Daniel Brauner, MD
BARRIERS TO SOCIAL DETERMINANTS OF HEALTH SCREENING AND LOW SES REINFORCE THE PATIENT-PROVIDER POWER DIFFERENTIAL Ashley Tang, BS; Tara Ballouz, BS; Khusbu Patel, BS; Joi Presberry, MPH; Terra Bautista, BA; Lynette Gumbleton, BA; Shanika Lucas, BAS; Komal Razvi, MPH

GEOGRAPHIC ACCESS TO PEDIATRIC CARE & PREVENTABLE ED VISITS FOR CHILDREN LIVING IN HIGH RISK NEIGHBORHOODS Catherine Kothari, PhD; Kathleen Baker, PhD; Cheryl Dickson, MD MPH; Jacob Baxter, BS; Winnie Long, BA; Amanjot Kaur, MS; Dennis Donkor, MS; Marine Bolliet, BS; Karin Rhodes, MD MS; Terra Bautistia, BA

ASSESSMENT OF AN EMR PROMPT TO CONSIDER EVALUATION FOR NON-ACCIDENTAL TRAUMA IN CHILDREN LESS THAN 2 YEARS OF AGE PRESENTING WITH FRACTURES Pooja Avula, MS; Jacob Baxter, BS; Sarah Brown, DO; Karen Bovid, MD

CORRELATION OF QUALITATIVE ANALYSIS OF OPEN-ENDED RESPONSES AND F-INDEX ON A BEHAVIOR RATING SCALE Megan Burke, MD; Amy Lorber, Neelkamal Soares, MD
ORAL ABSTRACTS
ANATOMY OF THE NAVICULOCUNEIFORM JOINT

George Borrelli, MD; Mousub Qatu, MD; Christopher Traynor, MD; Joseph Weistroffer, MD; James Jastifer, MD

Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine; Orthopaedic Surgery, Ascension Borgess Hospital

Introduction: The naviculocuneiform (NC) joint is implicated in numerous pathologies of the foot and ankle. Purpose: To describe the articular surface of the NC joint. We hypothesize that unique anatomic features of the cartilage surface are useful to guide operative planning.

Methods: The articular cartilage from twenty cadaver NC joints was quantified by calibrated digital imaging software.

Results: For the distal navicular articulation, 75.4% of the mean area was cartilage. The shape of the medial and middle facets was triangular (10/20 and 20/20 specimens, respectively). The fibrous component was at the plantar aspect of the facets. The lateral facet was quadrilateral (10/20) with fibrous tissue along the lateral and plantar borders. For the proximal medial, middle, and lateral cuneiform articulations, 69.6%, 75.7%, and 75.8% the mean areas were cartilage, respectively. The medial and middle facets were triangular (14/20 and 18/20, respectively), and the lateral facet oval (18/20). Mean dorsal-plantar height of the navicular facets was 18mm. The medial, middle, and lateral cuneiform facets were 15mm, 17mm, and 15mm, respectively. Mean length from the medial navicular facet to the middle facet was 41.3% the mean total length across all facets.

Conclusion: When preparing the NC joint for arthrodesis, the surgeon should know that the cartilage can extend 19mm dorsal to plantar. This ensures all cartilage is removed and aids to estimate screw length in subchondral bone. Additionally, the central third of the navicular, where most navicular stress fractures occur, lies in the inter-facet ridge between the medial and middle navicular facets.
Anxiety disorders are the most common mental illness in the U.S. and are estimated to consume one-third of the country's mental health spending. Although anxiolytic therapies are available, many patients exhibit treatment-resistance, relapse, or substantial side effects. An urgent need exists to explore the underlying mechanisms of chronic anxiety and to develop alternative therapies. Presently, we identified dihydromyricetin (DHM), a flavonoid that has anxiolytic properties in a mouse model of isolation-induced anxiety. Socially isolated mice demonstrated increased anxiety levels and reduced exploratory behavior measured by elevated plus-maze and open-field tests. Socially isolated mice showed impaired GABAergic neurotransmission, including reduction in GABAA receptor-mediated extrasynaptic tonic currents, as well as amplitude and frequency of miniature inhibitory postsynaptic currents measured by whole-cell patch-clamp recordings from hippocampal slices. Furthermore, intracellular ATP levels and gephyrin expression decreased in anxious animals. DHM treatment restored ATP and gephyrin expression, GABAergic transmission and synaptic function, as well as decreased anxiety-like behavior. Our findings indicate broader roles for DHM in anxiolysis, GABAergic neurotransmission, and synaptic function. Collectively, our data suggest that reduction in intracellular ATP and gephyrin contribute to the development of anxiety, and represent novel treatment targets. DHM is a potential candidate for pharmacotherapy for anxiety disorders.
WHEN LIFE GIVES YOU GLUCOSE: DIFFERENCES IN GLUCOSE UPTAKE AND UTILIZATION SUGGEST ALTERED ASTROCYTE FUNCTION IN OBESITY MODELS

Keenan Boulnemour, BS; Kendall Smith, BA; Daniel Micheli, BS; Peter Vollbrecht, PhD

MD Class of 2022, Biomedical Sciences
Western Michigan University Homer Stryker M.D. School of Medicine;

Obesity affects 93 million people in the United States, is responsible for annual medical costs of $175 billion, and is associated with health problems such as cardiovascular disease, mental illness and death. To elucidate the pathophysiological mechanisms that underlie obesity, we utilized two uniquely selected populations of rat models: obesity-prone (OP) and obesity-resistant (OR). Previous studies have reported astrocytosis in obesity models and in humans with obesity, with most of this work done in the hypothalamus and hippocampus. In an effort to understand behavioral comorbidities we are examining alterations in astrocyte function in reward circuitry. Objective Here we examine functional differences in glucose uptake and utilization in the nucleus accumbens (NAc) and examine the role of astrocytes using both microdialysis and western blotting techniques. Methods: 13C-labeled glucose or sucrose was administered to animals in conjunction with microdialysis sampling within the NAc allowing for real-time evaluation of glucose utilization. Standard western blotting methods were utilized to examine protein expression differences within the NAc. Results and Discussion Obesity-prone animals demonstrated reduced 13C-glucose uptake within the NAc compared to obesity-resistant animals. Obesity-prone animals had greater levels of 13C-labeled glutamate while having lower levels of 13C-GABA and glutamine. Protein expression studies are ongoing. Conclusion: Reduced glucose uptake, as well as lower radiolabeled GABA and glutamine levels, are indicative of altered astrocyte function. Continuing studies are examining differences in protein expression and function between obesity-prone and obesity-resistant rats in order to better understand the pathophysiology of obesity and its neurocognitive comorbidities.
A majority of Autosomal Dominant Polycystic Kidney Disease (ADPKD) cases are caused by inactivation of the PKD1 gene, where one pathogenic mutation is inherited from an affected parent and the second allele is inactivated somatically. Disruption of PKD1 results in loss of the protein product, polycystin-1, and the development of 1,000s of noncancerous cysts. It is currently unknown why PKD1 is prone to inactivating mutagenesis, but one pathway may be connected with the gene sequence itself. We have discovered that PDK1 encodes extensive structural motifs, consistent with the formation of DNA structures called G-quadruplex (G4) DNA. G4 DNA is four stranded and forms from tandem guanine repeats during transcription or replication that both regulate gene expression and increase the risk of mutagenesis. While generally associated with genetic instability, the types of sequences supporting G4 formation in the cell are diverse and largely uncharacterized. Therefore, we have investigated the ability of suspect G4 sequences in PKD1 to adopt G4 structures under physiological conditions. We developed and applied a new dot-blot detection method that depends on a G4-specific antibody for visualizing G4 formation. In contrast to controls, we found that G4 repeats in PKD1 form G4 structures in vitro. The ability of PKD1 sequences to form G4 DNA further connects structures with PKD1 gene inactivation. This is important for establishing the mutagenic pathways leading to loss of PKD1 and ADPKD, but may also help identify structural targets for ligands aimed at reducing the potential for somatic gene inactivation in at risk individuals.
Increased fracture non-union defects occur in several chronic inflammatory conditions, such as rheumatoid arthritis, inflammatory bowel disease, cystic fibrosis, chronic obstructive pulmonary disease and periodontitis. In such conditions, overexpressed pro-inflammatory cytokines such as TNF-α, IL-1 and IL-6 inhibit osteogenesis and bone formation. Delayed bone healing can be reversed by inhibiting inflammatory cytokines and by enhancing osteoblast activity. However, this process is too complicated and involves a plethora of biomolecules and signaling pathways. Controlling the microenvironment of bone defect may be a more efficient and feasible strategy.

In this study, we propose the use of a 3D bioprinted construct made by mineralized collagen and pre-osteoblasts to serve as 3D barrier to surrounding anti-osteogenic mediators such as GM-CSF, IL-12, IL-1α, IL-6, IL-8, MIP-1b, RANTES, or TNF-α. We prepared 3D constructs of collagen and hydroxyapatite without and with cells using 3D bioprinting. We used histology, SEM and TEM to characterize the constructs. Constructs were incubated with known standards of cytokines to measure adsorption. Finally, we assessed the cytotoxicity of this matrix for HEPM cells and assessed its effect on the production of chemokines and cytokines. The fabrication of the 3D construct using 3D bioprinting was not toxic and did not alter the viability, proliferation and cytokines expression of HEPM cells when compared to control. 3D construct did not absorb any of the cytokines measured GM-CSF, IL-12, IL-1α, IL-6, IL-8, MIP-1b, RANTES, or TNF-α. The 3D bioprinted barrier construct may be used in the treatment of delayed healing and non-unions caused by chronic inflammation.
Natural antibodies (NAbs) are present in serum in the absence of infection or intentional immunization and provide essential protection against infection. B-1a cells produce 80-90% of natural germline-like IgM. We previously demonstrated the availability of a protective B-1a cell derived natural IgM repertoire is determined by selection over time, and this selection is influenced by both the specificity and location of B-1a cells. Interestingly, lack of natural IgM has been shown to cause changes in repertoire of both follicular B cells as well as B-1 cells in young mice. Herein, we examined how serum IgM contributes to maintenance of protective natural IgM with age utilizing B cells from secretory IgM knockout mice (USKO). To assess age-related changes in B-1a cell repertoire, phosphatidylcholine (PtC) specific B-1a cells and total B-1a cells were harvested at 2-3 months and 18-24 months from both wild-type (WT) and USKO mice. Single cells were sorted and the variable heavy chain (VH) region was amplified by PCR and sequenced. Our results demonstrate significant differences in VH utilization between young WT and young USKO mice as well as between young USKO and aged USKO mice. We observed a significant increase in VH12 use and in germline status of IgM from aged USKO mice as compared to young USKO mice. These results demonstrate the natural IgM repertoire is significantly influenced by the presence of natural IgM over time and have implications for how protective IgM might be maintained throughout old age.
Streptococcus pneumoniae is the most common cause of pneumonia, leading to death in individuals over the age of 65 eight times more frequently than those aged 5-49. In both murine and human systems, there is a greater incidence of, and susceptibility to, pneumococcal infection in males; nevertheless, the factors contributing to this gender difference are unknown. Antibodies produced by B cells are an essential immune defense against S. pneumoniae by binding the pathogen and preventing infection of host cells. Yet, little is known regarding B cell maintenance and function/activation in the context of sex, particularly as this relates to the aged immune system. We utilized RT-PCR arrays to determine whether B cells obtained from young and aged, male and female mice display significant changes in expression of genes related to autophagy, estrogen signaling, and TLR activation pathways essential for B cells responses and subsequent protection from S. pneumoniae infection. We subsequently ran RT-PCR on specific genes of interest. Our results demonstrate significant changes in gene expression in all three pathways depending on age and/or sex. We observed reduced expression of Beclin1, an autophagy related gene, in B1a cells obtained from male aged mice as compared to young males; whereas this difference was not observed in aged versus young female mice. These findings will enable further studies into sex and age dependent B-lymphocyte responses to pneumococcal infection, which is of great importance when optimizing vaccination strategies, enhancing passive protection, and/or developing other treatments for mitigating infection in the aged population.
TEACHER TRIAL: TEACHING EFFECTIVE CPR TO 4TH AND 5TH GRADE ELEMENTARY STUDENTS

Cyle Rogotzke, MD; Sherrie Bencik, MD; Joseph Billian, MS; Maureen Ford, MD; Nathan Elg, DO; Cambrie Bencik, ; Joshua Mastenbrook, MD

Emergency Medicine, Other, Western Michigan University Homer Stryker M.D. School of Medicine; Harpers Heart Heroes

Background: Cardiac arrests are a leading cause of mortality in the US. Many states have CPR training requirements for high school graduation. There is a paucity of research on CPR education and assessment in elementary students. We hypothesized that 4th and 5th grade students could attain the knowledge of, and be physically equipped to provide, hands-only CPR.

Methods: Students were taught basic resuscitation physiology and hands-only CPR using videos and inflatable CPR manikins. Knowledge gain was assessed by a thirteen-question pre-test and 2-week post-test, at which time students also performed 1-minute of hands-only CPR on an adult manikin. CPR skills were assessed by an eleven-step checklist and manikin software analyzing compression effectiveness. A secondary analysis evaluated association between compression effectiveness and age, gender, and BMI.

Results: 358 students completed the study. On average, students answered 1.1 more questions correctly on the post-test than the pre-test (P<0.0001). Self-reported CPR knowledge increased from 45% to 97%. At least 8 resuscitation steps were completed by 72% (95% CI, 68-77%) of students. 76% (95% CI, 71-80%) of students were able to deliver at least half of their compressions effectively. Age, but not gender or BMI, was significantly associated with compression effectiveness (P<0.0001).

Conclusions: Most students were able to learn hands-only CPR and apply the knowledge in a simulated cardiac arrest and deliver effective chest compressions. Following the intervention, the students felt more prepared and were more willing to do CPR. It would be reasonable for older elementary students to be taught hands-only CPR.
BRAIN EXPLORERS: A NEUROSCIENCE-BASED OUTREACH FOR MIDDLE SCHOOL STUDENTS.

Ayman Shehadeh, BS; Alena Wurster, BS; Kaitlyn VanRiper, BS; Peter Beck, BS; Kirsten Porter-Stranksy, PhD; Peter Vollbrecht, PhD

MD Class of 2023, Biomedical Sciences
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Educational outreach events often fail to evaluate their own effectiveness. Brain Explorers is a neuroscience outreach program developed to increase student interest in STEM and for medical students to practice science communication skills. The purpose of this study was to assess the educational effectiveness Brain Explorers has on middle school students’ knowledge of neuroscience concepts.

Methods: Learning objectives were derived from the Next Generation Science Standards. Neuroscience topics were presented to the students through an introductory presentation followed by three hands-on application activities. To assess the level of learning, students were asked two free-response questions, both before and two weeks after the session. One question was covered in the content presented in the lesson and actively reinforced, while the control question was not a focus of the lesson. Investigators were given guidelines and rated deidentified responses on a scale of 0-5. Investigators were blind to whether the response was given before or after the session. Ratings were averaged and statistically analyzed using Students’ t-test to assess learning outcomes.

Results: Of the 71 students that took the pre-event quiz, 58 students completed the post-event quiz. Student scores for the question related to content discussed during the event significantly improved (p < 0.001), whereas scores for the control question did not.

Conclusion: The work presented here lays out a clear and assessable middle school neuroscience lesson plan. The results of this study demonstrate that participating students achieved learning advances from the session and demonstrate the educational effectiveness of this outreach program.
GLOBAL EMERGENCY MEDICINE FELLOWSHIPS: A SURVEY OF CURRICULA AND PRE-FELLOWSHIP EXPERIENCES

Elise Klesick, DO; Wael Hakmeh, DO

Emergency Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Lack of accreditation requirements affords Global Emergency Medicine (GEM) fellowships the flexibility to customize curricula and content. A paucity of literature exists describing the state of GEM fellowship programs.

Purpose: The purpose of this study is to describe the current state of GEM fellowship curricula, including which components are commonly included, and highlighting areas of greater variability. Methods: GEM fellowships were identified and invited to participate in a web-based survey. Descriptive statistical analysis was performed.

Results: Forty-six fellowship programs were invited to participate. Twenty-four responded; one duplicate response and one subspecialty program were excluded. Twenty-two remaining programs were included in the analysis. Nineteen programs (86%) offer a Masters in Public Health (MPH) and 36% require an MPH to graduate. Additionally, 13 programs (59%) offered graduate degrees other than MPH. Fellows average 61 clinical hours per month (95% CI = 53-68). Time spent overseas varies widely, ranging from 2 to 52 weeks per year over the course of the fellowship. The majority of programs offer courses in tropical medicine (range 2-24 weeks, median 4 weeks) and the Health Emergencies in Large Populations course. Only 32% of programs report offering formal ultrasound training. Fellows averaged 1.3 research projects prior to fellowship and median of 2.5 during fellowship (IQR 1.3). While the majority of GEM fellowship graduates work at US academic centers (59%), 24% work in US community hospitals, 9% work for non-profit organizations, and 9% work internationally in clinical practice.

Conclusion: Our results highlight the wide variability of curricular content and experiences offered.
A NOVEL TASK TRAINER FOR BALLOON TAMPONADE OF GI HEMORRHAGE

Richard Lammers, MD; Mark Williams, BA; Joshua Mastenbrook, MD

Emergency Medicine, Other, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Gastro-esophageal balloon tamponade (GEBT) of massive hemorrhage from esophageal varices is an infrequent and risky procedure performed on unstable patients. Such procedures are ideally learned on simulators. Unfortunately, no commercial trainer is available. Study Objectives: The primary objective was to determine if a new task trainer provides sufficient realism and enhances confidence among resident physicians learning GEBT. The secondary objective was to determine if integrating procedural training into a case simulation is educationally effective.

Materials and Methods: This was a cross-sectional study of Emergency Medicine residents from WMed who participated in a simulation exercise. An esophagus/stomach model allowing passage of a Sengstaken-Blakemore tube and inflation of balloons to therapeutic pressures was built into a mannequin. Teams of residents managed a simulated case of GI hemorrhage that required tube insertion and safe inflation of gastric and esophageal balloons, followed by debriefing. The procedure was incorporated into the scenario without prior training. Subjects completed an anonymous, online, 13-question survey. Results were analyzed using descriptive statistics.

Results Sixteen residents participated in the simulation and completed the survey. Only two subjects had prior clinical experience with the procedure. Most found the model (81%) and the case (94%) realistic. 94% said they acquired valuable knowledge and skills, and 63% reported that their confidence improved. 94% found contextual exposure to the procedure during a case simulation to be valuable. The educational methods that respondents thought were most motivating and efficient varied.

Conclusion: This novel gastro-esophageal balloon tamponade task trainer was realistic and educationally valuable.
TECHNOLOGICALLY CHALLENGED OR JUST BURNED OUT? DIFFERING PERCEPTIONS ON THE VALUE OF ELECTRONIC HEALTH RECORDS (EHR)

Tracy Frederick, BA; Francine Grey-Theriot, BS; Derek Deng, BS; Duncan Vos, MS; Maria Livaudais, PhD; Philip Kroth, MD

MD Class of 2023, MD Class of 2024, Biomedical Sciences, Biomedical Informatics Western Michigan University Homer Stryker M.D. School of Medicine; Department of Health Science California State University East Bay

Background: There is a common belief that age and gender influences clinicians' proficiency with EHR technology and the propensity for burnout. Insufficient evidence exists on the relationship between these variables, technological proficiency, and burnout.

Objective: To investigate how years of practice, gender, and burnout influence perceived impact of increased EHR use on quality, cost, and efficiency of care. Methods: We surveyed ambulatory primary care and subspecialty clinicians, measuring their opinions (positive, none, negative, don't know) on how EHR technology has impacted three attributes of healthcare: "Quality," "Cost," and "Efficiency of Care." We used Chi-square tests to analyze association between years of practice (≤10 years or 11+ years), gender, and burnout on the reported attributes. Bonferroni corrected $\alpha=0.0167$ was used to protect against Type I error among mult.
BACKGROUND: Peritonsillar abscess (PTA) is a relatively common deep neck space infection that may progress to airway compromise and sepsis if managed incorrectly. Surgical therapy (ST) such as incision and drainage is the mainstay of therapy for PTA, but recent data shows that medical therapy (MT) with antibiotics and steroids alone may be equivalent. Bronson Methodist Hospital is among several institutions that have shifted towards this approach.

OBJECTIVE: To evaluate the clinical characteristics and rate of treatment failure for MT and ST in patients presenting to the Bronson Emergency Department (ED) for PTA. Study Design: Retrospective Cohort

METHODS: All PTA diagnoses in the Bronson ED from 2012 to 2019 were identified via International Classification of Diseases codes 475 (9th edition) and J36 (10th edition). Failure rates for each group were calculated with a 95% confidence interval. Patient demographics, clinical presentation, and abscess size were summarized for each group.

RESULTS: 467 patients met inclusion criteria. 172 were randomly selected for preliminary analysis of which 126 (72%) underwent MT while 46 (28%) received ST. The rate of treatment failure was 7.1% [95% CI 3.3, 13.1] in the MT group and 8.7% [95% CI 2.4, 20.8] in the ST group.

CONCLUSION: Preliminary analysis supports the hypothesis that MT may be equivalent to ST in the management of PTA. This represents a major shift in the management of PTA, which could greatly decrease the healthcare cost and patient discomfort associated with surgical therapy for PTA.
IS BLOODSTREAM INFECTION AN EPIPHENOMENON IN SURGICAL PATIENTS?

Joslyn Jose, MD; Robert Sawyer, MD

Surgery; Western Michigan University Homer Stryker M.D. School of Medicine

Background: Bloodstream infection (BSI) is not uncommon in the ICU setting. It seems that rather than being another part of the milieu of critical illness in surgical ICU patients, BSI may be an important predictor of mortality.

Methods: Data on all infections treated between 1997 and 2017 in a single Surgical Intensive Care Unit (ICU) were prospectively collected. Patients were categorized by primary site of infection and presence or absence of associated BSI (same organisms grown from primary site and blood). Demographic and outcome variables were compared using Student’s t-test or Chi-square analysis. Logistic regression analysis was used to determine independent predictors of death, including the following variables: Age, sex, trauma vs. non-trauma, APACHE II score, days from admission to infection treatment, and presence or absence of BSI.

Results: Over 6,000 patients were studied during this 20 year period, and BSI was associated with increased mortality in patients with concurrent (detected within 72 hours) infections of the abdomen, lung, urine, and other primary site infections, as demonstrated in the attached table. Regression analysis demonstrated that even after correcting for the above variables, BSI was associated with increased mortality (OR = 1.51, 95% CI = 1.21-1.89).

Conclusion: This study demonstrates a statistically significant association that cannot be overlooked. BSI was an independent predictor of mortality, despite patients receiving a longer duration of therapy. Thus, surgeons may consider obtaining blood cultures promptly if a significant primary site infection is detected; this may lead to earlier initiation of treatment and improved outcomes.
Intra-abdominal infections (IAI) require both antibiotic therapy and source control for adequate treatment. Culture obtained at timing of source control can help to direct antimicrobial therapy. We hypothesize that availability of cultures for the management of IAI is associated with lower mortality. All IAI treated between 1997 and 2017 at a single institution were stratified by whether or not cultures were obtained during operation or drainage procedure. Demographics and in-hospital mortality were compared by Student’s t test and Chi-Square analysis, predictors of mortality by logistic regression (LR) analysis. A total of 2963 IAIs were treated, 1062 (35.8%) without culture and 1901 (64.2%) with cultures. The patients without culture had a significantly lower average APACHE II score (11.0 ± 0.2) compared to the culture group (13.4 ± 0.2) (p <0.0001). The no culture group also had a significantly lower percentage of healthcare associated infections compared to the culture group (51.4% versus 70.4%, p < 0.0001). Independent predictors of mortality included age, APACHE II score, and history of prior cellular transfusion during hospitalization, but not the availability of cultures (p = 0.26). The no culture group had a significantly lower duration of antimicrobial therapy than the culture group (10.2 ± 0.3 days versus 13.9 ± 0.3 days, p < 0.0001). In this study, we found no evidence that obtaining cultures improved survival following the treatment of IAI. These findings suggest that the practice of culturing IAI should be abandoned and further highlight the importance of source control for determining outcomes.
OUTCOMES OF OPEN AND LAPAROSCOPIC APPROACH TO SPLENECTOMY ON HEMATOLOGIC DISORDERS

Gordon Liu, BA; John Dewey, BS; Saad Shebrain, MD

MD Class of 2022; Surgery; Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Splenectomy plays therapeutic and palliative role in some hematologic disorders. This study aims to evaluate the outcomes of laparoscopic (LS) and open splenectomy (OS) in the management of 3 hematologic disorders including; Idiopathic thrombocytopenic purpura (ITP), hemolytic anemias (HA), and Leukemia/Lymphoma (LL).

Methods and Procedures: Using a large national, ACS-NSQIP database (2017), patients who underwent splenectomy for ITP, HA, and LL, were identified. The outcomes examined included 30-day mortality, morbidity, readmission rates, and reoperation.

Results: A total of 343 patients, 190 were females (55.4%), underwent splenectomy. Indications for splenectomy were ITP (198 patients, 57.7%), HA (58 patients, 16.9%), and LL (87 patients, 25.4%). LS was performed on 263 patients [(174 (88%) of ITP, 47 (81%) HA, and only in 42 (48.3%) LL]. The 30-day mortality were 10.3% in LL, and 1% in ITP. No mortality was noted in patients with HA. Overall morbidity was higher in patients who underwent splenectomy for leukemia and lymphoma (40.2%), hemolytic anemia (34.5%), and ITP (15.2%). Overall morbidity was higher in OS vs. LS (57.6% vs. 20.1%, p <0.001). No difference in readmission rate or reoperations between the three groups (ITP, HA, LL). The mortality rate was higher in the OS compared to the LS (7.5% vs. 1.9%, p=0.013).

Conclusion: Overall, the 30-day mortality and morbidity were higher in patients after palliative splenectomy. No mortality in patients with HA. LS was associated with lower morbidity and mortality; therefore, it should be attempted in patients with ITP, HA, LL, for both therapeutic and palliative indications.
RADIOGRAPHIC MEASUREMENTS OF THE 1ST TARSOMETATARSAL (TMT) JOINT FOLLOWING 1ST METATARSOPHALANGEAL (MTP) JOINT ARTHRODESIS

Christopher Traynor, MD; James Jastifer, MD
Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine; Orthopedic Surgery, Ascension Borgess Hospital

Background: Instability of the 1st tarsometatarsal (TMT) joint has been proposed as a cause of hallux valgus. While there is literature demonstrating how fusion of the TMT joint effects hallux valgus, there is little published on how correction of the hallux valgus impacts the 1st TMT joint alignment. Purpose: The purpose of this study was to determine if correction of hallux valgus impacts the 1st TMT alignment. Improvement in alignment would provide evidence that hallux valgus contributes to 1st TMT instability, not vice-a-versa. Our hypothesis was that correcting hallux valgus angle (HVA) would have no effect on the 1st TMT alignment.

Methods: Radiographs of patients who underwent 1st MTP joint arthrodesis for hallux valgus performed by the senior surgeon were retrospectively reviewed. The HVA, 1-2 intermetatarsal angle (IMA), medial cuneiform-1st metatarsal angle (MCMA), distal medial cuneiform angle (DMCA), relative cuneiform slope (RCS), and 1st metatarsal-medial cuneiform angle (MMCA) were measured and recorded for all patients preoperatively and postoperatively.

Results: Of the 37 patients that met inclusion criteria, statistically significant radiographic improvements were noted in HVA (mean difference 25.3 degrees, p<0.0001), IMA (mean difference 5.98 degrees, p<0.0001), MCMA (mean difference 5.70 degrees, p<0.0001), RCS (mean difference 3.25 degrees, p=0.04), and MMCA (mean difference 7.17 degrees, p<0.0001) comparing preoperative and postoperative radiographs.

Conclusions: Our findings suggest that the radiographic subluxation of the 1st TMT joint will reduce with isolated treatment of the 1st MTP joint. This provides evidence that change in the HVA causes changes in the first TMT joint, not vice-a-versa.
UTILIZING SERUM BICARBONATE INSTEAD OF URINE KETONES TO TRANSITION FROM INTRAVENOUS TO TRANSITION FROM IV TO SQ INSULIN

Mohamed Elgendy, MD; Robert Beck, MD

Pediatric and Adolescent Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Pediatrics, Bronson Methodist Hospital

Background: Standard therapy of diabetic ketoacidosis (DKA) in pediatrics involves intravenous (IV) infusion of regular insulin until correction of acidosis, followed by transition to subcutaneous (SC) insulin. It is unclear what laboratory marker best indicates correction of acidosis. We hypothesized that an institutional protocol changes to determine correction of acidosis based on serum bicarbonate level instead of urine ketones doesn’t shorten the duration of insulin infusion or decrease the number of pediatric intensive care unit (PICU) therapies.

Methods: We conducted a retrospective analysis of records for patients admitted with DKA to the PICU of Bronson children’s hospital before.
Obesity is related to higher prevalence of multiple diseases. Body Mass Index (BMI) is commonly used to determine risk for conditions like Type II diabetes mellitus (TIIDM) and cardiovascular disease. However, BMI has been shown to be an imperfect proxy as it is unable to distinguish between fat and lean muscle mass. Recent studies reveal adiposity volume or percent are better correlates for disease states. This research tests if the distribution of adipose tissue, ethnicity, race, age, and sex are related to individual health risk, which is measured as a binary variable, with or without TIIDM and/or cardiovascular disease. Full body CT scans (n=16) from the New Mexico Decedent Image Database were used to quantify visceral and subcutaneous fat distributions between vertebra T1 and L5 using 3D Slicer, an open-source three-dimensional visualization tool. The sample consists of an equal number of males and females, normal weight and obese, and presence and absence disease. A discriminant function was performed. Using BMI alone, presence of TIIDM and/or cardiovascular disease was classified correctly 50% and absence of disease correctly 55% of the time. Using imaging, presence of disease was classified correctly 62.5% and absence of disease 75% of the time. When demographics were added into the model, both presence and absence of disease were classified correctly 75% of the time. The proposed algorithm considers variables unaccounted for by BMI such as adipose tissue distribution and demographic data. This alternative method may provide a more detailed and accurate approach to fat analysis.
PRIMARY PYOMYOSITIS IN CHILDREN IN THE UNITED STATES- TRENDS AND ASSOCIATIONS FROM THE HEALTHCARE UTILIZATION PROJECT
NATIONWIDE INPATIENT SAMPLE DATA

Kathleen Jenkinson, DO; Anya Ring, DO; Naveen Emmanuel, DO; Rheanne Maravelas, MD; Duncan Vos, MS; Jayne Barr, MD; Sapna Sadarangani, MD; Thomas Melgar, MD

Medicine Pediatrics, Other, Western Michigan University Homer Stryker M.D. School of Medicine; Singapore National Centre for Infectious Disease

Introduction: Pyomyositis is a skeletal muscle infection that can lead to abscess formation and sepsis with a bimodal distribution peaking in early childhood. The purpose of this study is to identify characteristics, risk factors, and trends of pyomyositis in children in the United States.

Methods: This study is a retrospective review of the Healthcare Utilization Project Nationwide Inpatient Sample Database from 2002-2014. Infective myositis and/or tropical pyomyositis cases were systematically identified using ICD-9 codes. Rates of co-occurrence were obtained for various infections, risk factors, and bacterial diagnoses.

Results: During the study period, there were 18,919,261 pediatric discharges (<21 years), of which 3,193 patients were diagnosed with pyomyositis. Median age was 7.2 years (IQR 3.6, 12.1). The prevalence of pyomyositis was 0.006 - 0.117%. The prevalence appears to linearly increase during the study period. Patients with pyomyositis were more likely to have osteomyelitis, septic arthritis, type II diabetes, obesity, and organ transplantation. Bacteremia occurred in 15% and muscle abscess in 28% of patients. Fewer than half of patients had a bacterial organism identified, with MSSA and MRSA being the most common (59%, and 22% respectively). Other organisms identified were Streptococcus, Escherichia coli, and Pseudomonas.

Conclusions: There is a rapid increase in pediatric pyomyositis in the United States. This is similar to adult reports. Immunosuppression, obesity, diabetes mellitus are risk factors, and osteomyelitis and septic arthritis are potential complications. We identified causative microorganisms that may assist in optimizing empiric antibiotics as early diagnosis and treatment are key in the management.
ENHANCED RECOVERY AFTER SURGERY (ERAS) IMPLEMENTATION FOR HYSTERECTOMIES IN A MICHIGAN COMMUNITY HOSPITAL

Kelsy Schultz, BA; Kathryn Dominick, DO; Jessica Sassie; Rebekah Sharp, MD; Silvia Linares, MD

MD Class of 2022, MD Class of 2023, Medicine Obstetrics and Gynecology, Western Michigan University Homer Stryker M.D. School of Medicine;

ERAS protocols, developed to improve post-operative outcomes, have shown differing levels of success for various surgeries. Our study aimed to assess how length of stay and analgesic use changed after ERAS implementation for hysterectomies in a community hospital. Data was obtained using ICD-9/10 codes from Epic EMR to compare outcomes for patients with hysterectomies from 6/2017 to 6/2018, before ERAS, and from 1/2019 to 1/2020, after ERAS. The association between length of stay and ERAS status was assessed by T-test, chi-squares, and multiple linear regression controlling for age, ethnicity, BMI, and diabetes. In the post-ERAS group, there were more Hispanics (p=0.05) and patients with higher BMI (p=0.0043). There was no difference in age or diabetes between groups. Independent of ERAS status, length of stay was increased in diabetic patients (17.4 hours) and patients with a vaginal hysterectomy (24.6 hours, p = 0.0036), for every age-year increase there was a 0.29-hour longer stay for robot-assisted hysterectomy and oophorectomy patients (p=0.0063), and higher BMI patients had more analgesics prescribed (p=0.046). There was no difference in analgesic prescriptions between pre- and post-ERAS groups or in length of stay for minimally invasive surgeries (p>0.05). For abdominal hysterectomies with or without BSO, there was a 24-hour decrease in length of stay (0.0456) in the post-ERAS group independent of age, BMI, diabetes, and ethnicity. The implementation of an ERAS protocol appears to decrease patient's length of stay following abdominal hysterectomies. The cost-effectiveness of ERAS for minimally invasive hysterectomies needs to be further evaluated.
ASSESSMENT OF IMPLEMENTATION OF STANDARDIZED POST-CESAREAN SECTION PAIN MANAGEMENT ORDERS IN DECREASING THE MORPHINE MILLIGRAM EQUIVALENTS PRESCRIBED

Lauren Piper, DO; Faryal Tahir, MD; Muhamid Asif, MD; Duncan Vos, MS; Melissa Sherfield, BS

Family and Community Medicine, Biomedical Informatics, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Opioids are routinely used for acute pain following surgery. Given the growing opioid crisis in the U.S., all physicians have an obligation to be diligent in prescribing opioids.

Objectives: The primary objective was to determine change in MME prescribed at discharge after cesarean delivery following implementation of a new pain management protocol at Bronson Methodist Hospital (BMH) at Kalamazoo, MI. The secondary objective was to determine change in number of narcotic pills dispensed on discharge after implantation of the new protocol.

Methods: The intervention modified the existing Postpartum order set to include scheduled IV and PO NSAIDs and PO acetaminophen. Data for patient pain ratings and discharge opioid prescriptions was collected by manual chart review.

Results: The average discharge MME prescribed was 169.4 (SD 73.2) before and 122.1 (SD 54.9) after implementation of the new protocol. The average number of pills dispensed at discharge was 29.4 (SD 7.8) before and 16.6 (SD 6.8) after the new protocol. Both of these decreases are statistically significant. The mean patient pain rating was 6.7 (SD 1.7) before and 6.9 (SD 1.7) after implementation of the new protocol. This difference is not statistically significant.

Conclusion: Modification of postpartum order set to include multimodal pain control appears to correlate with prescription of fewer opioids. However the study is confounded by a new Michigan law implemented in 2018 which also decreased the opioids prescribed.
SHORT INTERPREGNANCY INTERVALS ARE ASSOCIATED WITH POOR BIRTH OUTCOMES FOR WOMEN OF KALAMAZOO COUNTY

Rebecca Parr, MS; Duncan Vos, MS; Melissa Sherfield, BS; Catherine Kothari, PhD; Laura Bauler, PhD

MD Class of 2023, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Short Interpregnancy intervals (IPI) contribute to poor birth outcomes (PBO), including preterm birth, low birth weight, and fetal/infant mortality. IPIs are more prevalent for women of color, low SES, and less educated mothers compared to their counterparts.

Objective: This study examines the impact of IPI on birth outcomes for women in Kalamazoo County, where there is a large disparity in birth outcome by race.

Methods: A retrospective cohort study was conducted using birth records from women in Kalamazoo County between 2006-2017. IPI was defined as the time between two births minus the gestational period of the second pregnancy. Poor birth outcomes measured were low birth weight <2500g and preterm birth of <37weeks.

Results: Between 2006-2017 there were 57,949 births, to 37,527 mothers; 14,348 mothers had at least two pregnancies. The prevalence of PBOs, including preterm birth and low birthweight, increased for IPIs less than 6 months and greater than 5 years compared to the 18-24 month interval (PTB: 12.19% and 11.16% compared to 7.48%; LBW: 8.4% and 8.44% compared to 5.5%, respectively). For women of color the prevalence of preterm birth was even higher compared to white mothers with IPIs less than six months (18.92% compared to 9.08%).

Conclusion: This suggests that pregnancy spacing is an important factor in improving the birth outcomes for mothers in Kalamazoo County, especially for women of color. Education and more effective contraceptive measures have been shown to decrease risk of pregnancy and increase IPI.
INFANT MORTALITY IN KALAMAZOO COUNTY: A COMPARISON OF OUTCOMES ACCORDING TO SOCIOECONOMIC STATUS AND RACE

Emily Carroll, BA; Emily Beck, BS; Brittany Sullivan, BS; Elizabeth Corpuz, BA; Joi Presberry, MPH; Deb Lenz, MS; Brenda O’Rourke, RN, BSN; Terra Bautista, BA

MD Class of 2023, MD Class of 2024, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine; MD Kalamazoo County Health & Community Services;

Introduction: FIMR (Fetal Infant Mortality Review) is an evidence-based community-level quality improvement process that utilizes multi-disciplinary teams to review infant death cases and produce system-level preventative recommendations. Kalamazoo County has a history of high infant mortality among poor and minority-race groups. Purpose: The purpose of this study is to examine differences in Kalamazoo County infant mortality and FIMR recommendations across racial and socioeconomic groups.

Methods: Kalamazoo County FIMR, one of five national mentor sites, met monthly since 2015, reviewed 104 fetal-infant deaths, and generated 468 recommendations. This team developed a multistep process for grouping and coding recommendations (design meetings, preliminary code creation, pilot application, code refinement, elicitation of FIMR review team feedback, and finalization). Secondary analysis integrated three databases (new recommendations database, case-level demographic database, exports from national FIMR database). SPSSv27 was used to calculate Pearson ChiSquare analyses (p value<0.05) statistical comparisons across race-income groups: white-infant/higher-income, white-infant/lower-income, infant-of-color/higher-income, infant-of-color/lower-income.

Results: Infants-of-color/higher-income are significantly more likely to die from prematurity; these deaths are more likely to be assigned family/community communication recommendations. In comparison, infants-of-color/lower-income are significantly more likely to die from sleep-related causes; these deaths are more likely to be assigned family/community communication and systems of care improvement recommendations. Of note, infants-of-color/low-income have the highest mean number of recommendations, while white-infants/higher-income have the least.

Conclusion: Statistically significant differences exist in infant mortality between racial and socioeconomic groups in Kalamazoo County. This necessitates targeted interventions to ensure equitable improvement in fetal care outcomes according to recommendations generated by the FIMR review team.
ROLE OF PSYCHOSOCIAL RISK FACTORS IN MOTHERS' ENGAGEMENT IN SAFE SLEEP PRACTICES

Summer Chahin, MA; Kalani Gates, BA; Amy Damashek, PhD; Cheryl Dickson, MD; Debra Lenz, MA; Grace Lubwama, PhD; Terra Bautista, BA; Catherine Kothari, PhD

Psychology, Western Michigan University; Pediatric and Adolescent Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; YWCA; Kalamazoo Health and Community Services Department; Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine

Infant mortality is a serious problem in the US (CDC, 2016). In Kalamazoo, sleep related deaths are a common cause of preventable infant mortality (Sleep-Related Infant Deaths in Kalamazoo County Fact Sheet, 2017). Such deaths can be largely prevented if caregivers follow the AAP safe sleep guidelines; however, many families experience barriers to following these guidelines. This study examined whether psychosocial risk factors act as barriers to mothers' engagement in safe sleep practices among a sample of Kalamazoo parents. Methods: Women (n = 244) were recruited from two hospitals in Kalamazoo County following the delivery of their infants. Demographic information was extracted from medical records, and women participated in a phone survey when their child was 2-4 months of age. The survey included questions about safe sleep practices and levels of depressive symptoms, substance use, and interpersonal violence. Results: Bivariate analyses indicated that mothers who were more depressed were more likely to indicate that they co-slept with their baby [t (265) = -2.1, p= 0.04]. Women who were experiencing a higher frequency of domestic violence indicated they were less likely to place their baby on a firm or hard mattress [t (34) = -2.9, p= 0.01]. Lastly, mothers who reported higher amounts of drug use reported that their infants were more likely to sleep in a crib [t (24) =-4.4, p=0.00].

Conclusion: Depression and domestic violence appear to put infants at a greater risk for sleep related death due to mother's lower likelihood of using safe sleep practices.
DISCRIMINATION, VIGILANCE, AND THE PATIENT-PROVIDER RELATIONSHIP

Drew Moss, BS; Megan Sandberg, BS; Silvia Linares, MD; Megan Deibel, DNP; Lynette Gumbelton, BA; Joi Presberry, MPH; Claudia Waters, BS; Catherine Kothari, PhD

MD Class of 2022, MD Class of 2023, Medicine Obstetrics and Gynecology, Epidemiology and Biostatistics, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine

Background: Everyday experiences of discrimination have far-reaching negative impacts, including hyper-vigilance in various situations and interactions. People of color and low income are disproportionately affected. Experiences of discrimination can derail the patient-provider relationship and trust in the medical system. Our study goal was to examine how discrimination outside clinic walls was associated with patient vulnerability and provider trust inside the clinic.

Methods: A prospective survey was conducted among a representative sample of 244 postpartum women in Kalamazoo County, MI. Validated scales measuring experiences of discrimination (30-point scale), vigilance (4-20 point scale), and patient-provider relationship (10-40 point scale) were included, as were questions related to self-identified race/ethnicity and income. Additionally, 12 focus groups were conducted with 57 survey participants to explore their provider experiences and recommendations. Interviews were audio-recorded, transcribed, and consensus-coded for themes.

Results: Of 244 women surveyed, approximately half (45.9%, n=112) reported experiencing discrimination regularly (monthly or more). Rates of discrimination experienced by women of color and low income (household income <$40,000) were higher than that of white higher-income women (means 7.2, 5.7, and 3.9 respectively). Discrimination was significantly related to vigilance (B 0.417 with CI 0.317,0.517, p<0.001). Furthermore, increasing vigilance was associated with significant worsening of patient-provider relationship (B 0.214 with CI 0.088,0.341, p=0.001).

Discussion: As healthcare strives to respond to social determinants of health and be patient-centric, it is important providers understand how patients’ experiences outside the clinic influence their vulnerability in ways that impact patient-provider relationship, communication, and the quality and effectiveness of medical care.
TIME TO BREAK THE POWER HIERARCHY: LISTEN TO WOMEN.

Megan Deibel, CNM, DNP; Silvia Linares, MD; Drew Moss, BS; Megan Sandberg, BS; Claudia Waters, BS; Lynette Gumbleton, BA; Joi Presberry, MPH; Cathy Kothari, PhD

Medicine Obstetrics and Gynecology, MD Class of 2023, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine;

Background: In Kalamazoo, women's voices from multiple venues (Fetal Infant Mortality Review interviews, maternal home visitation participants, and informal feedback from high-risk women) have consistently emphasized the importance of provider relationship to their healthcare satisfaction and their motivation for attending medical visits. Given the particularly crucial role that providers play during the perinatal period (ten-plus visits for health and social assessment, medical treatment, health promotion, and resource referrals), understanding women's experiences with their providers is critical to designing patient-centered care. Goal: The goal of this study was to elicit women's relationship experiences (positive and negative) with perinatal-care providers, their priorities regarding this relationship, and their feedback for how to improve it.

Methods: One-hundred-and-seventy-eight women were pre-recruited from the Mom's Health Experience Survey, and 57 participated in 12 focus groups. The face-to-face group discussions were led by a facilitator and a co-facilitator, using a semi-structured guide with open-ended questions and follow-up probes. Conversations were audio-taped, transcribed, and consensus-coded for themes.

Results: Dominant themes emerging from women, voiced across a diverse group of participants included: Feelings of vulnerability, lack of respect from their provider, and an uneven balance of authority. Many women have the sense that the provider, not them, owns "the room." Women offered practical suggestions for building partnerships with them.

Conclusion: Pregnancy creates an immense state of vulnerability for women. Prenatal care and improved birth outcomes cannot be imagined if women are made to feel disempowered and disenfranchised as they enter into the medical system.
HYPOXIA INITIATES THE REPROGRAMMING OF MUSCLE CELLS INTO MULTIPOTENT LIKE CELLS

Nariaki Nakamura, BS; Haiying Pan, BS; Keith Kenter, MD; Yong Li, MD PhD

Medical Engineering, Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine

Cellular reprogramming is a phenomenon in which fully differentiated cells are reprogrammed into pluripotent stem cells. This process is done through the activation of critical transcription factors Oct4, Sox2, and Nanog. Recent studies have indicated that the addition of hypoxia to culturing conditions increased the efficiency of cellular reprogramming by increasing the expression of Oct4, Sox2, and Nanog. In addition, cells exposed to hypoxia displayed enhanced stem cell behavior such as increased cell migration, cell proliferation, and the ability to multiply differentiate. Therefore, we hypothesize that hypoxia can impart the same effect on muscle cells and reprogram them back into muscle stem cells. We investigated this by culturing muscle cells, such as myoblasts (C2C12) and primary (Pax7 positive) muscle satellite cells under hypoxia and observing changes in the level of transcription factors (Oct4, Sox2, and Nanog) and changes in the expression of muscle development gene (Msx1). We discovered that hypoxia increased the expression levels of Oct4, Sox2, and Nanog after 24 hours of hypoxia. Additionally, after 4 hours, Msx1 increased in conjunction with hypoxia inducible factor (HIF)-1alpha suggesting that Msx1 plays a pivotal role during cellular reprogramming. Our results suggest that hypoxia stimulates the reprogramming of muscle cells into progenitor-like cells, which has implications for its role in tissue regeneration and muscle healing after injury or disease.
LOW OXYGEN CULTURE UPREGULATES PD-L1 EXPRESSION IN C2C12 MYOBLASTS

Juliana Overbey, BA; Yong Li, MD PhD; Haiying Pan, MS

MD Class of 2024, Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine

Background: Hypoxia has been found to enable the activity of the intracellular transcription factor hypoxia-inducible factor 1a (HIF 1-a), which can promote angiogenesis, apoptosis, and altered cell surface protein expression. In vivo hypoxic conditions within tumors can lead to excessive HIF-1a activity and altered immune checkpoint ligand (PD-L1) expression in tumor-infiltrating myeloid-derived suppressor cells.

Purpose: We hypothesized that PD-L1 expression can be upregulated following low oxygen culture, thus increasing immunosuppression and improving the survival rate of muscle cells after in vivo transplantation. Methods: Myoblasts were cultured in a normal and low oxygen (5% O2) conditions for 24, 48, and 72hrs. MHC-I, MHC-II, PD-L1, ICAM-1, and TLR3 and TLR7 expression was then analyzed by flow cytometry and Western Blot to identify PD-L1 protein expression. The myoblasts were also pre-labeled with LacZ and their survival rate after intermuscular injection into adult mice was tracked.

Results: Both Western Blot and Flow Cytometry analyses showed PD-L1 expression was significantly increased in the treated myoblasts compared to control. Other proteins were not found to be significantly different between hypoxia-treated and control myoblasts. Treated myoblasts also had a better survival rate compared to non-treated control myoblasts.

Discussion: Our study suggests that low oxygen stimulation can promote PD-L1 expression in muscle cells, which could promote increased CD8+ T cell exhaustion and allow improved transplanted cell survival. This technique has translational applications to increase efficacy of cell therapies through decreased host immune response against donor cells and increased donor cell survival.
HYPOXIA STIMULATED EXOSOME RELEASE AND THE REGULATION OF MUSCLE CELL DIFFERENTIATION: A PILOT STUDY

Loyall Harris, BS; Haiying Pan; Yong Li, MD PhD

MD Class of 2023, Medical Engineering Western Michigan University Homer Stryker M.D. School of Medicine

Background: Myogenic differentiation and cellular reprogramming are vital to the repair of injured skeletal muscles. Studies suggest that localized hypoxia after muscle injury induces the formation of a population of cells termed injury-induced muscle stem cells that display faster and more extensive myogenic differentiation. While a link between hypoxia and muscle repair has been established, the exact mechanisms are not fully understood, particularly the intercellular signaling pathways involved. One possible intercellular pathway regulating muscle repair is that of exosomes. We hypothesized that hypoxia regulates muscle cell release of exosomes that can stimulate increases in myogenic differentiation, proliferation, and muscle repair.

Methods: To test our hypothesis, primary murine myoblasts were cultured under hypoxic conditions (5% O2) for 48 hours. Exosomes were isolated from the conditioned media and examined by Western blot for confirmation of exosome release. Exosome isolates from hypoxia stimulated cells were then used to treat non-hypoxia stimulated cells to evaluate their biologic function.

Results: Exosome release and isolation was confirmed by the presence of TSG-101 via Western blot. Additionally, cells treated with exosomes isolated from hypoxia stimulated cells showed increased myogenic differentiation and a significant increase in large myotube formation compared to cells treated with exosomes isolated from control, non-hypoxia stimulated cells.

Discussion: Our results indicate that hypoxia stimulation results in exosome release that increases myogenic differentiation in vitro. This suggests that exosomes may play an important role in signaling of muscle repair and that understanding this role may lead to novel treatments for muscle injury and degenerative diseases.
Background: Neurogenic muscle atrophy is the loss of muscle mass and function due to denervation caused by injury or disease of the peripheral nerves. Denervation can lead to profound structural changes that prevent full functional recovery. Several pathways of protein degradation have been implicated in the processes of atrophy, including the IGF-Akt and MAPK pathways. However, how these pathways are modulated by denervation remains unclear. We hypothesize that damaged motor neurons release factors that initiate signaling cascades to mediate changes in myogenic differentiation that promote muscle atrophy and inhibit future muscle regeneration.

Objective: We aim to determine whether motor neurons damaged by stretched or chemical injury produce factors to (1) initiate muscle atrophy and (2) modulate myogenic differentiation.

Methods: To determine whether muscle atrophy is induced by factors released by damaged motor neurons we treated muscle stem cells (MuSCs) and myoblasts with damaged motor neuron extracts and monitored cell proliferation for 4 days. We next evaluated MuSC differentiation after treatment by immunofluorescent staining of DAPI and MyoD to calculate the fusion index and visualize myotube formation, respectively. We also screened for transcriptional changes associated with differentiation by qPCR.

Results: Treatment with damaged motor neuron extracts did not significantly affect MuSC or myoblast proliferation. Immunofluorescent staining showed that the treated MuSCs had fewer and smaller myotubes with less nuclei. Treated MuSCs also significantly upregulated Myf5 expression.

Conclusion: Our results suggest that damaged motor neurons release factors that directly influence structural and functional changes in skeletal muscle.
DELETION OF THE HOMEBOX GENE CUX1 DECREASES CILIogenesis IN A MOUSE MODEL OF POLYCYSTIC KIDNEY DISEASE

Conner Holthaus, BS; Matthew Rumschlag, BS; Emmanuel Kumar, BA; Zhi Nee Wee; Melissa Pasillas; Greg Vanden Heuvel, PhD

MD Class of 2020, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine; Biology, Kalamazoo College

Autosomal Dominant Polycystic Kidney Disease (ADPKD) is one of the most common inherited disorders affecting the kidney. Renal cyst development in ADPKD results from mutations in the PKD1 or PKD2 genes, which encode the proteins polycystin1 (PC1) and polycystin2 (PC2). PC1 and PC2 proteins are localized to primary cilia where they are proposed to form a receptor channel complex that detects flow transmitting a calcium-mediated signal. Primary cilia are critical to the pathogenesis of ADPKD, which is one of many ciliopathies that exhibit renal cystic disease. Cux1 is a cell cycle dependent transcriptional repressor that regulates the cyclin kinase inhibitor p27. Cux1 is highly and ectopically expressed in mice carrying a collecting duct (CD) specific mutation of Pkd1 (Pkd1 knockout) and in human ADPKD cells. Mice carrying mutations in both Cux1 and Pkd1 have reduced cystic disease and an increased life span. To begin to determine whether Cux1 regulates ciliogenesis we evaluated cilia morphology and the expression of the ciliary protein OFD1 in kidneys isolated from Pkd1 knockout and Pkd1/Cux1 double knockout mice. Cilia in Pkd1/Cux1 double knockout kidneys were significantly shorter than cilia in the Pkd1 knockout kidneys alone, consistent with previous studies showing that decreased cilia length corresponds to decreased cystic disease. In addition, expression of OFD1, an inhibitor of cilia formation was significantly increased in Pkd1/Cux1 double knockout kidneys compared to Pkd1 knockout kidneys alone. Taken together, our results suggest a novel role for Cux1 in regulating ciliogenesis in polycystic kidney disease.
THE CONTRIBUTION OF POSITIONAL ASPHYXIA TO OPIOID RELATED DEATHS

Joyce deJong, DO; Jenelle Lee, BS; Cuyler Huffman, MS; Abigail Grande, MPH; Theodore Brown, MD; Chloe Bielby, MPH

Pathology, MD Class of 2022, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Diagnostic criteria for positional asphyxia are multiple and include finding the decedent in a position that does not allow for adequate respiration and an inability to extricate oneself from the position due to various conditions. Objective: Our primary objective is to assess whether airway compromise is a contributing factor to death due to the toxic effects of opioids.

Methods: We evaluated 225 deaths where the death scene investigation documented possible airway obstruction and performed a Pearson Chi Square test to determine whether the proportion of deaths found in an airway compromising position is higher when the death was caused by opioid toxicity.

Results: With an associated p-value of <.0001, the proportion of decedents found in a potentially airway compromising position is greater when the death was related to opioid use. After removing the maybes [Yes (27%) vs No (11.29%)], there was also sufficient evidence, with a p-value of 0.0021, that the proportion of decedents found in a definite airway compromising position is greater in deaths related to opioid use. Other results included a higher proportion of facial compression in the opioid-related deaths (28% vs 13%, p-value 0.0057), and at least one position decedents were found in may have an increased prevalence in opioid-related deaths.

Discussion: Carefully documenting the position in which the decedent is initially found should be a significant factor in accurate reporting and may help guide future harm reduction efforts to decrease the opioid mortality rate.
COVID-19 has placed unique challenges on individuals living with a variety of mental health disorders. In particular, substance use disorder is uniquely affected because a significant number of substance use therapy groups and clinics were limited with in-person therapy. A particularly susceptible group to have been negatively implicated were military veterans as they often face unique circumstances placing them at higher risk opioid prescription, opioid use disorder, and fatal overdose. Between the current opioid epidemic and now the COVID-19 pandemic, this study examines the rates of medicolegally-investigated opioid-related deaths among veterans in 12 counties in Michigan since 2008 and examines how rates changed with COVID-19. Our initial analysis consisted of the 14 commonly discovered opioids on post-mortem toxicology. We analyzed the rate of deaths between 2008-2019. Opioid related deaths peaked in 2018. In 2020, the year of the COVID-19 pandemic and associated socio political changes, there were even fewer opioid related deaths. The decrease in deaths may be suggestive of a new wave of addressing the opioid pandemic. This new data from 2020 suggests newer implementation of telemedicine and social distancing policies may have helped in preventing a rebound in opioid related deaths. Given these rather surprising findings, determining a more causal relationship as to how policies implemented during COVID-19 limited opioid-related deaths is imperative in addressing future crises that may arise. We believe this study offers a compelling new direction in addressing the opioid endemic, especially in our high-risk population of our military veterans.
GOING VERTICAL: A PROSPECTIVE COMPARISON OF EXTRACTION TIMES FOR PRIORITY PATIENTS IDENTIFIED BY TRIAGE TAGS VS COLORED FLAGS DURING A SIMULATED MCI

Abigail Wen-Yu Cheng, BS; Patrick McCreeesh, MS; Seth Moffatt, BS; Ryan Maziarz, BS; Duncan Vos, MS; Joshua Mastenbrook, MD

MD Class of 2022, Other, Western Michigan University Homer Stryker M.D. School of Medicine

Background: Triage is the process of sorting patients based on illness severity and is used during mass casualty incidents (MCIs) for prioritizing treatment and transport. On average, 10% of MCI patients are identified as priority (Immediate/Red). Outcomes for these patients are highly dependent on rapid identification, treatment, and transport. Several methods exist to mark [priority] patients for rapid extraction to a casualty collection point, but there is no gold standard. We hypothesized that identifying MCI patients with a vertical cue, triage flag (TF), would result in faster extraction times than those with a wrist triage tag (TT) alone.

Methods: BDLS-trained first-year medical students were recruited for this prospective randomized cross-over study. Two 1,568 square-foot fields (TTs or TTs plus TFs) were each arranged with 32 randomly placed, triaged, pre-marked manikins (10-red, 17-yellow, 5-black). The total time for participants to report the TT barcode number via radio of only the priority manikins, a proxy for the extraction process, was recorded.

Results: Eighty-two students participated. The average (SD) completion times for the "tags" and "flags" arms were 94.5s (16.4) and 70.7s (13.2), respectively, with an average decrease of 23.8s (p<0.0001), or a 25.2%-time reduction, favoring the "flags" arm.

Conclusion: Using a vertical cue, such as a triage flag, may decrease the time to extract high priority patients. A portable, rapidly deployable, and visually apparent triage marker may allow faster identification, by extraction teams, of specific patients across a field of multiple victims of varying injury severity, than a flat horizontal triage tag.
CARING FOR A DYING PATIENT: AN EMS PERSPECTIVE

Andrew Wenger, DO; Megan Potilechio, DO; John Auguilar, MD; Joshua Mastenbrook, MD; Joseph Billian, MS; Melissa Sherfield, BS

Emergency Medicine, Family and Community Medicine, Biomedical Informatics, Western Michigan University Homer Stryker M.D. School of Medicine

Background: Emergency Medical Services (EMS) providers frequently encounter patients in end-of-life situations. These situations can become ethically challenging depending on the nature of the event, availability of advanced directives, and overall understanding of the situation by the patient and caregivers. This is particularly true for patients who are enrolled in Hospice, a specific form of end-of-life care available to patients with a terminal illness and expected lifespan of less than six months.

Objective: This study aims to survey Michigan EMS providers regarding encounters with Hospice patients to better understand challenges caring for this population and any need for additional educational curriculum.

Methods: An electronic survey was distributed via a statewide listserv to Michigan EMS providers and responses were collected via RedCap. An analysis was performed by a WMed statistician.

Results: Of 142 respondents, 98% percent had cared for a hospice patient, with 67% having greater than 10 encounters. 87% of respondents answered that they are interested in additional training regarding caring for hospice patients. Notable areas of difficulties among providers were pressure from family for more aggressive treatment (60%), inaccessible advanced care documents (79%), and difficulty contacting hospice personnel (56%).

Discussion: EMS providers are interacting with Hospice patients with increasing frequency though most have had little to no formal training in caring for this unique patient population. The results of this study indicate an educational gap that would be helpful to fill across Michigan’s diverse EMS regions.
HIGHER INTRA-ARREST BLOOD GLUCOSE LEVELS ASSOCIATED WITH RETURN OF SPONTANEOUS CIRCULATION IN OUT-OF-HOSPITAL NON-TRAUMATIC CARDIAC ARRESTS

Jeffrey Feng, BS; Ayman Shehadeh, BS; William Selde, MD; Joseph Billian, MS; Joshua Mastenbrook, MD

MD Class of 2023, Emergency Medicine, Biomedical Informatics, Western Michigan University Homer Stryker M.D. School of Medicine

The annual incidence of non-traumatic out-of-hospital cardiac arrest (OHCA) in the United States is greater than 350,000. Diabetes is a major risk factor for adverse cardiac events; however, little is known about the impact that intra-arrest blood glucose (BG) levels have on the probability of achieving prehospital ROSC. We hypothesized that there is an association between measured intra-arrest blood glucose and ROSC. A retrospective study where a review of de-identified patient records within the past 2.5 years of a large midwestern county was conducted. All patients were documented by EMS personnel to have received Advanced Life Support (ALS). Data collected from each patient record included age, sex, initial BG level, whether bystander CPR was preformed prior to EMS arrival, and known diabetic history including medications. 314 patients met inclusion criteria. 147 (46.8%) patients achieved ROSC. The point difference between medians of the BG level of the patient who achieved ROSC (Median=160; n=147) was 33 mg/dL (95% CI: 13 - 51; P=0.001) greater than the patients who did not achieve ROSC (Median=127; n=167). Initial analysis shows patients who achieved ROSC had a significantly higher BG level when compared to patients who did not achieve ROSC. While this is statistically significant, additional studies are needed to clarify and support the clinical significance of these findings. Further research utilizing a larger sample is indicated to discern whether a correlation can be made between the probability of achieving ROSC and intra-arrest BG level categorizations of hypoglycemia, euglycemia, and hyperglycemia.
PEDIATRIC SUPRACONDYLAR HUMERUS FRACTURES CAN BE SAFELY TREATED BY ORTHOPAEDIC SURGEONS WITH AND WITHOUT PEDIATRIC FELLOWSHIP TRAINING

Kelly Harms, MD; Shannon South, BA; Karen Bovid, MD; Keith Kenter, MD

Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine; Kalamazoo College

Introduction: The purpose of this study was to compare the outcomes of pediatric patients who were surgically treated for a supracondylar humerus fracture by pediatric fellowship-trained orthopaedic surgeons (PFT) to the outcomes of those surgically treated by orthopaedic surgeons without pediatric fellowship training (NPFT). We hypothesized that there would be no differences in patient outcomes.

Methods: A retrospective review of pediatric patients who underwent surgical treatment for a supracondylar humerus fracture with closed reduction and percutaneous pinning or open reduction and percutaneous pinning at a regional level 1 trauma center over a 5-year period was performed. Exclusion criteria were inadequate follow up or absence of postoperative radiographs.

Results: A total of 201 patients met the inclusion criteria. PFT group treated 15.9% of patients. The measured demographic variables were similar between groups. The average age was 5.4 years and 49.3% were female. There was no statistically significant difference in carrying angle, Baumann's angle, or lateral rotation percentage at final follow up between PFT and NPFT groups.

Conclusion: In this study, there was no difference in radiographic outcomes for patients with supracondylar humerus fractures surgically treated by either group. This suggests that this injury may be appropriately treated in communities without a pediatric-fellowship trained orthopaedic surgeon without compromised outcomes. This surgical technique can be considered a general orthopaedic surgery procedure and should be emphasized as part of an orthopaedic residency. This approach could minimize unnecessary costs and delays to treatment in this patient population.
OUTCOMES OF EMERGENCY LAPAROSCOPIC VS. OPEN SURGERY FOR COMPLICATED ACUTE PEPTIC ULCER DISEASE

Taylor Floth, BS; Conor Dilon, DO; Saad Shebrain, MD; Gitonga Munene, MD; Robert Sawyer, MD
MD Class of 2023, Surgery, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Acute perforation and bleeding are serious complications associated with peptic ulcer disease (PUD). This study aims to evaluate the 30-days outcomes of laparoscopic and open approach in patients presented with acute PUD, bleeding and perforation.

Methods and Procedures: Using the ACS-NSQIP database (2017), patients who presented with acute complication of PUD were identified and divided into two groups: laparoscopic group (LG) and open group (OG). The outcomes examined included 30-day mortality, morbidity, readmission rates, re-operation, operative time, and total length of hospital stay (LOS).

Results: Study group comprised of 1206 patients, 138 patients (11.4%) presented with bleeding, and 1068 patients (88.6%) with perforation. LG included 124 patients (10.3%) and OG included 1082 (89.7%). Overall, both groups had similar demographic characteristics. There were no differences in 30-day mortality between LG and OG (4.9 % vs.7.1% , p=0.364). LG was associated with lower overall morbidity (49.9% vs. 54%, p=0.011). Ventilatory support > 48 hours was slightly higher in the OG (12.7% vs. 6.5%, p=0.044). LG had decreased mean hospital LOS, but increased mean total operative time. There were no differences between LG and OG in reoperation (5.6% vs. 6.8%, p= 0.615), and readmission rate (8.1% vs. 9.0%, p=0.73).

Conclusion: No differences in 30-day mortality were noted between LG or OG. However, those who underwent an open approach tended to be have higher serious morbidity, overall morbidity, increased LOS. The laparoscopic approach should be attempted in all patients with acute complications of PUD unless patient instability requires the most expeditious procedure.
COMPARISON BETWEEN HOSPITALIST AND TRAUMA SURGERY ADMITTING SERVICES IN HIP FRACTURE PATIENT MANAGEMENT

Jeffrey Gilbertson, MD; Rachael Tolsma, BS; Adam Misseldine, BS; Cuyler Huffman, MS; Cameron Vanlaningham, MD

Orthopaedic Surgery, MD Class of 2023, Epidemiology and Biostatistics, Western Michigan University Homer Stryker M.D. School of Medicine; Orthopaedics, Ascension Borgess Hospital

Introduction: Expeditious operative management of patients with hip fractures reduces mortality, hospitalization length, complications, and has cost implications. At our institution, a change in admitting service was made from the hospitalist service to the trauma surgery service.

Objective: To compare time to surgery, length of stay, in hospital mortality rate, and 30 day readmission rate pre and post-implementation of admitting service change in management of elderly patients with hip fractures.

Methods: We retrospectively reviewed all patients 65 and older admitted with a hip fracture one year before and after the change in admitting service. Collected data included demographics, fracture type, surgery type, American Society of Anesthesiologists Classification (ASA Class), time to surgery, perioperative consults, length of stay, mortality, and readmission rates. Quantitative patient characteristics were compared using a two sample t test, and nominal characteristics were compared using a Chi-square test.

Results: A total of 254 patients were included, 137 before and 117 after the change in admitting service. Time to surgery was not statistically different between the services. The length of stay decreased from 5.8 days on the hospitalist service to 4.4 days on the trauma surgery service (p=0.0007). There were no significant differences in demographics, perioperative consults, mortality, and readmission rates. ASA Class distribution was similar between the groups.

Conclusion: The change from a hospitalist-based admitting service to a trauma surgery-based service resulted in a similar time to surgery, but a decreased length of stay for elderly hip fracture patients. There was no difference in mortality or readmissions.
ABSORBABLE VERSUS NON-ABSORBABLE SUTURES FOR THE TREATMENT OF KNEE ARTHROSCOPY:
A PROSPECTIVE COMPARISON OF PATIENT OUTCOMES AND SATISFACTION

Donghoon Lee, BS; Joseph Brutico, BS; Ryan Paul, BS; Richard Gawel, BS; Shyam Brahmbhatt, MD; Michael Ciccotti, MD; Fotios Tjoumakaris, MD; Bradford Tucker, MD; Matthew Pepe, MD; Kevin Freedman, MD

MD Class of 2022, Western Michigan University Homer Stryker M.D. School of Medicine; Rothman Orthopaedic Institute

Introduction: Knee arthroscopy is one of the most common orthopaedic procedures performed. Closure of arthroscopic surgical incisions utilizes either non-absorbable or absorbable sutures. Some surgeons prefer non-absorbable sutures, citing easier knot tying, lower likelihood of breaking, and minimal elicitation of inflammation. Conversely, some surgeons prefer absorbable sutures due to decrease in patient anxiety, discomfort, and time saved in suture removal.

Materials and Methods: This is a prospective, randomized trial evaluating the use of nylon (non-resorbable) vs. monocryl (resorbable) sutures in portal closure for patients undergoing primary knee arthroscopy. Exclusion criteria includes workman's compensation claims, age <18, meniscal repair, or ligament reconstruction. Patient Scar Assessment Scale, 10-point VAS pain scale, VAS cosmesis scale, and 4 customized satisfaction questions were administered at 2-, 6-, and 12-weeks post-operative.

Results: 177 patients (97 monocryl, 80 nylon) were enrolled. At 2-weeks, patients in both groups reported similar satisfaction with the surgical incision, scar itching, scar stiffness, and scar appearance. However, they reported a significant difference in pain. The nylon group reported a higher mean pain score 2.88 +/- 2.21 vs. the monocryl group 2.11 +/- 1.87, (p=0.012). By the 6-week follow-up, this difference resolved and was not present at 12-weeks.

Conclusion: There is a small short-term increase in pain with the use of nylon sutures to close arthroscopy portal incisions as opposed to monocryl. These differences resolve by 6-weeks post-operative. Both absorbable and non-absorbable sutures are suitable for closure of knee arthroscopies.
GLOBAL OPIOID PRESCRIPTION PRACTICES AFTER SHOULDER ARTHROSCOPY: AN EXPANDED STUDY

Kelsey Suggs, MS; Keith Kenter, MD

MD Class of 2022, Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Opioid overdoses are a leading cause of injury-related death in the U.S. with prescription opioids largely contributing to cases of abuse. Orthopedic surgeons are among the highest prescribers of opioids with prescriptions often in excess of pills. This may be a result of the lack of education regarding pain management. We hypothesize that there is no standard pain management prescribing regimen after shoulder arthroscopy with U.S. surgeons and this will be similar to when compared to other countries. Furthermore, we believe that orthopedic surgeons, in general, do not receive adequate training or guidelines in postoperative pain management regimens.

Methods: We implemented a survey of Magellan Society for Orthopedic Surgeons members. Questions regarding postoperative pain management regimens following shoulder arthroscopy were recorded. Also asked was their educational experience or where they learned this regimen.

Results: 120 orthopedic surgeons from 26 countries responded. 88.3% of respondents report no formal training regarding post-operative pain management. 58.3% report trial and error/experience as their method of learning their current regimen. 60.2% prescribe 20 tablets or more with great variability between regimens for the same operation regardless of country.

Conclusions: Our study confirms the lack of training regarding postoperative pain management in orthopedic surgery in the U.S., but also illuminates that this is not uniquely a U.S. problem. Our data underscores the need for further research to understand the relationship between pain management training and differences in opioid abuse in the U.S. compared to populations in other countries.
INCREASING HIV PATIENT ADHERENCE TO ART WITH A SMARTPHONE-BASED INCENTIVE INTERVENTION

Haily Traxler, MA; Amanda Devoto, MA; David Cosottile, MA; Anthony DeFulio, PhD

Psychology, Western Michigan University

Background: Antiretroviral therapy (ART) improves life expectancy and quality of life for individuals living with HIV. ART adherence of >95% drastically decreases the likelihood of transmission to others, but many people with a history of drug use do not maintain this level of adherence. Purpose: The purpose of this study was to develop a mobile contingency management (CM) intervention for promoting medication adherence in people with a history of drug use.

Methods: Fifty participants with a history of opioid or cocaine use were enrolled in the study for six months and randomly assigned to either a control (n=25) or treatment (n=25) group. Treatment group participants received a smartphone loaded with a CM intervention app that allowed for (1) direct observation of medication consumption through video selfies, (2) easy tracking of incentive earnings, (3) easy access to adherence-related resources, and (4) a dosing reminder texting system.

Results: The proportion of individuals who achieved 95% adherence increased over time in the treatment group and decreased over time in the control group, and was significantly different in the final study month (55% vs. 19%; p=0.015).

Conclusion: Usage data showed a high levels of intervention engagement and correct usage, and self-reports showed a high level of intervention acceptability.
ASSESSING THE PREVALENCE OF FOOD INSECURITY IN A WALK-IN HIV TESTING CENTER

Rebecca Reardon, BA; Khusbu Patel, BA; Allison Balaj, BS; Melissa Olken, MD PhD

MD Class of 2022, MD Class of 2023, MD Class of 2024, Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Food insecurity, or the lack of reliable access to food, predominates in people of low socioeconomic status, people of color, and LGBTQ+ communities. This cluster of identities closely reflects those historically at risk of contracting HIV. This study aims to understand the prevalence of food insecurity among patients at CARES, a walk-in HIV testing and resource center in Southwest Michigan.

Methods: This study utilized a validated two-question screener (the Hunger Vital Signs questionnaire) to identify CARES clients in Kalamazoo and Benton Harbor, MI experiencing food insecurity. This questionnaire is 97% sensitive and 86% specific for detecting food insecurity. Frequency and 95% confidence interval of those who were food insecure was reported.

Results: The data included responses from 193 patients at CARES between June 2018 and September 2020. The 193 patients ranged from 18 to 79 years old and were an average age of 42 years. 75% were male, 23% female, and 2% transgender. Responses to the validated two-question food insecurity screening tool indicated that 48.7% (95% CI 41.5, 56.0) were food insecure. This is compared to 10.7% of the general US population, as reported by the USDA.

Conclusions: Food insecurity is highly prevalent among patients with HIV who visited CARES, which may suggest systemic unmet needs to already vulnerable communities. This study will provide CARES with more information on how to better serve food insecure communities and may inform clinicians to more mindfully assess for social determinants of health.
RACE AND CHRONIC KIDNEY DISEASE IN SOUTHWEST MICHIGAN

Rebecca Reardon, BA; Shibani Kanungo, MD

MD Class of 2022, Pediatric and Adolescent Medicine Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Literature on chronic kidney disease (CKD) in the US acknowledges an "epidemiologic paradox" between Black and non-Black populations: prevalence of CKD is higher in the White population while prevalence of end-stage renal disease (ESRD), the most severe entity on the CKD spectrum, is higher comparatively in the Black population. The Healthy People 2020 initiative expanded the CKD definition to capture earlier stages of kidney dysfunction and found that prevalence in the Black population does in fact surpass that of the White population. Further investigations demonstrate that relative prevalence rates between Black and non-Black populations differ significantly based on geography.

Objective: To identify the prevalence of chronic kidney disease and its variations between racial groups in the patient population served by the medical centers in southwest Michigan. Methods: This study was a cross-sectional analysis utilizing one year of EHR lab and demographic data to calculate renal function in adults. This data was then used to analyze the geodemographic relationship between CKD and race.

Results: The sample included 97,601 patients. Of these, 20.2% had CKD stages 3-5. Accounting for race, 14% of Black and 21% of non-Black patients had CKD stages 3-5. Discussion: Previous studies suggest the prevalence of CKD stages 3-5 in the US ranges from 8% to 14%, or 10% in Black and 18% in non-Black populations. Our data shows a more serious burden of CKD in SW Michigan, with a similar variation in burden between races. Geospatial analysis of these differences is to follow.
UNDERSTANDING THE AREA AGENCY ON AGING'S RESPONSE TO THE COVID-19 PANDEMIC

Rachel Zamihovsky, BA; Daniel Brauner, MD

MD Class of 2023, Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Background: The Area Agencies on Aging (AAAs) provide older adults with community resources and in-home services that are aimed at promoting independence and well-being to those aged 60 and older [1]. AAAs provide a variety of services including social work, nursing, care management, meal delivery, and transportation. The COVID-19 pandemic has been particularly devastating for older adults as stay-at-home orders prevented access to many social activities such as congregate meal sites and day centers, leading to increased risk of loneliness and isolation [2]. The AAAs were tasked with facing issues such as connecting clients to vital resources, preventing social isolation, and providing effective case management. In this paper we will look at how the AAAs addressed these issues.

Methods: This data was gathered through semi-structured interviews with AAA staff and a client. Data from the interview was coded to create several categories which were then used to identify major themes in the data.

Results: Three major themes were identified: risk of social isolation, risk of insecurity, and difficulties in providing effective case management in a remote environment. Interview statements supporting the themes will be discussed.

Conclusions: The AAAs successfully adapted to a remote work and care environment by implementing programs such as the Friendly Reassurance program, which placed phones calls to older adults in need of social support and partnering with local food shelters to provide meal delivery services. It will be necessary to continue interviewing agency members and clients to better understand their perspectives.
BARRIERS TO SOCIAL DETERMINANTS OF HEALTH SCREENING AND LOW SES REINFORCE THE PATIENT-PROVIDER POWER DIFFERENTIAL

Ashley Tang, BS; Tara Ballouz, BS; Khusbu Patel, BS; Joi Presberry, MPH; Terra Bautista, BA; Lynette Gumbleton, BA; Shanika Lucas, BAS; Komal Razvi, MPH

MD Class of 2023, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine; Healthy Babies-Healthy Start; YWCA-Kalamazoo

Introduction: Social determinants of health (SDOH) screening has become more commonplace in healthcare as a means of providing resources and support to improve patient health. However, barriers to effective screening, heightened by low SES, lead to strained patient-provider relationships. This study aims to elucidate perspectives on SDOH screenings and how these, in relation to SES, can impact patient-provider relationships and provide suggestions for screening improvement.

Methods: This IRB-approved mixed methods study adopted an explanatory-sequential design. A representative sample of 244 postpartum women completed phone surveys for SDOH needs and a validated Provider Relationship scale. The relationship between these was analyzed using multiple correspondence analysis and linear regression. Twenty-three women were subsequently interviewed about their screening experiences and recommendations. Transcripts were broad coded using Atlasti and thematic analysis was completed using consensus approach.

Results: Survey participants clustered into three SDOH levels: Adequate (44.7%), On-the-edge (47.1%), Deep-poverty (8.2%). Statistical analysis revealed a stepwise relationship: a higher SDOH level was associated with a better self-reported relationship with providers (-1.51 Beta coefficient, CI -2.31 & -0.703, p<.001), and greater provider support. In the focus groups, lower income women were 25% more likely to make negative comments regarding screening. Themes of stigma, vulnerability and the power differential between women and their providers emerged.

Conclusion: Barriers to effective SDOH screening, exacerbated by low SES, could be improved by building trust with providers, maintaining longitudinal care, increasing transparency, and improving follow-up. Successful patient-provider relationships can enhance effectiveness of SDOH screenings and lead to better patient outcomes.
GEOGRAPHIC ACCESS TO PEDIATRIC CARE & PREVENTABLE ED VISITS FOR CHILDREN LIVING IN HIGH RISK NEIGHBORHOODS

Catherine Kothari, PhD; Kathleen Baker, PhD; Cheryl Dickson, MD MPH; Jacob Baxter, BS; Winnie Long, BA; Amanjot Kaur, MS; Dennis Donkor, MS; Marine Bolliet, BS; Karin Rhodes, MD MS; Terra Bautistia, BA

Biomedical Sciences, Pediatric and Adolescent Medicine, MD Class of 2021, MD Class of 2022, Western Michigan University Homer Stryker M.D. School of Medicine; Geography, Western Michigan University; Zucker School of Medicine at Hofstra/Northwell; Kalamazoo County Health & Community Services

Background/Intro: Children with greater access to pediatric care have fewer emergency department (ED) visits. Geographic accessibility is a key feature of pediatric access. Nationally, however, there is a shortage of primary care practices in low-income, high-risk neighborhoods.

Objective/Purpose: The goal of this study was to examine (1) the degree to which geographic access to pediatric care varied by neighborhood risk-level, and (2) whether geographic access reduced preventable ED visits by low-income children.

Methods. This secondary analysis combined census data, pediatric location, individual-level demographic and ED-utilization data. The sample was 10,570 low-income children, ages 0-5, in Kalamazoo County. Geographic access was operationalized as travel time to nearest pediatrician. Neighborhood risk factors included income, education, insurance, crime, and racial-equity. Preventable ED-visit was defined using the NYU ED-visit-severity algorithm. Geospatial analysis (ArcGIS) generated travel-time estimates. Mixed model regression analyzed fixed and random effects, controlling for clustering within neighborhood (SAS 9.4).

Results: Adjusting for individual risk factors, low-income children's geographic access to pediatric care varied significantly by their neighborhood risk level ($F_{261.92}, p<.0001$). Geographic access to pediatric care, when taken alone, reduced preventable ED visits ($aOR_{0.993}(CI 0.987,0.999)$). However, geographic access did not mediate the relationship of neighborhood-level or individual-level risk with preventable ED visits: geographic-access $aOR_{1.001}(CI 0.995,1.008)$, neighborhood-risk $aOR_{1.140}(CI 1.015,1.280)$, individual-risk $aOR_{1.358}(CI 1.247,1.478)$.

Conclusion: Low-income children living in high-risk neighborhoods have reduced geographic access to pediatric care and higher rates of preventable ED visits, compared to their low-income counterparts living in lower-risk neighborhoods.
ASSESSMENT OF AN EMR PROMPT TO CONSIDER EVALUATION FOR NON-ACCIDENTAL TRAUMA IN CHILDREN LESS THAN 2 YEARS OF AGE PRESENTING WITH FRACTURES

Pooja Avula, MS; Jacob Baxter, BS; Sarah Brown, DO; Karen Bovid, MD

MD Class of 2021, Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine; Pediatrics, Bronson Methodist Hospital

Introduction: Nearly 700,000 children are victims of non-accidental trauma (NAT) every year in the US. Skeletal survey (SS) imaging is indicated to screen for occult fractures in pediatric patients who are at risk for NAT. Consensus guidelines have been published for appropriate screening in patients under 2 years of age. Failure to diagnose NAT may result in repeated trauma or escalation of injuries.

Objective: Evaluate compliance with SS guidelines in patients at risk of NAT before and after implementation of an electronic medical record (EMR) alert regarding screening guidelines and resources. Methods. To facilitate appropriate screening across our regional health system, an electronic alert was built into the EMR for patients under 2 years of age with a fracture diagnosis in emergency departments and urgent care clinics. Data were extracted from the medical record and radiographs for two years before and 2 years after implementation to determine adherence to consensus guidelines.

Results. A total of 284 patient visits were analyzed. Prior to implementation of the EMR prompt, 45/148 patients met indications for SS and 19 (42%) had SS performed. After implementation 50/136 patients met indications for SS and 33 (66%) underwent SS. Following the provider alert implementation, the rate of appropriate utilization of SS significantly increased (p=0.0201).

Conclusion. Continued improvement needs to be made in adhering to guidelines to identify patients whose injuries are the result of NAT. This EMR prompt was a low cost, durable intervention requiring a relatively small number of person hours.
CORRELATION OF QUALITATIVE ANALYSIS OF OPEN-ENDED RESPONSES AND F-INDEX ON A BEHAVIOR RATING SCALE

Megan Burke, MD; Amy Lorber; Neelkamal Soares, MD

Pediatric and Adolescent Medicine, MD Class of 2023, Western Michigan University Homer Stryker M.D. School of Medicine

Background: Clinicians use the Behavioral Assessment System for Children-Third Edition (BASC-3) to screen children/adolescents for behavioral problems. BASC-3 prompts forced-choice and open-ended responses. T-scores, generated from forced-choice responses, identify clinically significant externalizing and internalizing behaviors. The infrequency scale (F-index) identifies negative responses to maladaptive behaviors, with interpretations from acceptable to extreme caution.

Objective: Understand association between F-index and T-scores of composite behavior subscales, sentiment and response word count of BASC-3. Methods: Retrospective study of 178 patients with completed BASC-3s, who were referred to academic behavioral health clinic. Two raters scored the sentiment of open-ended responses on 7-point Likert-type scale, followed by descriptive and graphical analysis. We used ANOVA testing for differences in word count and T-score across F-index categories, and Chi-square testing for association between sentiment and F-index. We used SAS v9.4 for processing and analysis (significance of alpha=.05).

Results: F-indices of caution or extreme caution (n=45) had higher T-scores for externalizing behaviors (p<.0001), internalizing problems (p=.0072) and behavioral symptoms (p<.0001). Excluding neutral category (due to small cell counts), there isn't significant association (p=.3036) between "concerns" sentiment and F-index. Word count distribution didn't significantly differ across F-index category for "concerns" (p=.7960).

Conclusion: This clinic-referred population had higher F-indices than the community standardization sample and higher T-scores on behavioral composites. Observed frequencies suggest that, with greater power, an association between differences in proportion of sentiment rating by F-index may be detected. Clinicians shouldn't be skeptical that high F-index is "faking bad" but instead it may indicate higher levels of child psychopathology.
POSTER PRESENTATIONS
OVEREXPRESSION OF THE HOMEBOX GENE CUX1 IN TRANSGENIC MICE INCREASES CILIogenesis IN THE KIDNEY Emmanuel Kumar, BA; Matthew Rumschlag, BS; Conner Holthaus, BS; Zhi Nee Wee; Melissa Pasillas; Greg Vanden Heuvel, PhD iPoster 8

DEVELOPMENT AND FUNCTIONAL CHARACTERIZATION OF ANTI-PHOSPHORYLCHOLINE ANTIBODIES AGAINST STREPTOCOCCUS PNEUMONIAE Naeem Khan, PhD; Alexander Ludlow, BS; Xiaoti Guo, PhD; Angela Brightwell, MS; Thomas Rothstein , MD PhD iPoster 10

ANOTHER PIECE TO THE PUZZLE OF SAMPLE HANDLING: EVALUATION OF PREANALYTICAL HOMOGENIZATION ON POSTMORTEM BLOOD SPECIMENS Deon Turner, BS; Julie Ianni, BS; James Ciaramitaro, BS; Paul Moorman, BS; Prentiss Jones, PhD iPoster 12

A STUDY OF NEURONAL DIFFERENTIATION OF HYPOXIA-INDUCED REPROGRAMMING MUSCLE CELLS IN VITRO Rachael Tolsma, BS; Haiying Pan, MS; Nariaki Nakamura, BS; Yong Li, MD PhD iPoster 15

EPIGENETIC REGULATIONS IMPLICATE MUSCLE HEALING PROCESSES AFTER INJURIES Haiying Pan, BS; Nariaki Nakamura, MS; Keith Kenter, MD; Yong Li, MD PhD iPoster 18

CHARACTERIZATION OF IMMUNOGLOBULIN M IN B CELL-DERIVED EXTRACELLULAR VESICLES Michael Gutknecht, PhD; Nichol Holodick, PhD; Thomas Rothstein, MD PhD iPoster 29

EVALUATION OF THE ANTI-INFLAMMATORY EFFECTS OF LOW-DOSE NALTREXONE (LDN) IN MICROGLIAL CELLS Hannah Millard, ; Jenny Lamberts , PhD; Hannah Millard, iPoster 30

SYNTHESIS OF A GO/PEDOT-DMSO ELECTROACTIVE NANOCOMPOSITE FOR TISSUE ENGINEERING APPLICATION Mitchell Kenter, BA; Adil Akkouch, PhD iPoster 44

DESIGN AND FABRICATION OF A KNEE-ON-A-CHIP MICRODEVICE USING 3D PRINTING Letty Thottathil, BS; Adil Akkouch, MSc, PhD iPoster 47

WISCHNEWSKY SPOTS AND BLACK ESOPHAGUS IN DEATHS INVOLVING DIABETIC KETOACIDOSIS: A CASE SERIES Ricardo Kaempfen, MS; Joseph Praehlow, MD; Amanda Fisher-Hubbard, MD iPoster 51

ACCURACY OF TORQUE LIMITERS IN ORTHOPAEDIC SURGERY Jeffrey Gilbertson, MD; James Jastifer, MD iPoster 69

QUANTITATIVE ANALYSIS OF BONE FORMATION BY MICRO-COMPUTED TOMOGRAPHY Shaan Manawar, BS; Adil Akkouch, PhD iPoster 73

A BIOINFORMATIC APPROACH TO IDENTIFYING SITES OF INSTABILITY IN PKD1 John Dewey, BS; Erik Larson, PhD iPoster 74
AWARENESS AND ACCESSIBILITY OF CONTRACEPTION  David Lee, MD;  Abigail Cheng, BS;  Alexis Jones, BA;  Emma Swayze, MS;  Kathryn Jones, MS;  Monica Ellis, BS;  Gisella Newbery, BA;  Arushi Tripathy, BS;  Erica Myrick, MS;  Debra Taubel, MD;  Kelsy Schultz, BA;  Alyssa Woodwyk, MS, CAPM iPoster 1

VIRTUAL REALITY USE FOR SYMPTOM MANAGEMENT IN PALLIATIVE CARE: A PILOT STUDY TO ASSESS USER PERCEPTIONS Tracy Johnson, BA;  Laura Bauler, PhD;  Duncan Vos, MS;  Alan Hifko, MD;  Mohammad Ahmed, BS;  Paras Garg, MS;  Michael Raphelson, MD iPoster 4

CASE SERIES OF EASTERN EQUINE ENCEPHALITIS VIRUS IN WESTERN MICHIGAN Adam Ladzinski, DO;  Matthew Rumschlag, MS;  Aditya Mehta, MD;  Eric Edewaard, MD;  Larry Morgan, DO;  Brett Jagger, MD PhD iPoster 7

GENERAL VS LOCAL AND REGIONAL ANESTHESIA FOR RECURRENT GROIN HERNIAS: AN OUTCOME STUDY FROM AN AMERICAN COLLEGE OF SURGEON-NSQIP DATABASE Kendall Smith, BA;  Kent Grosh, MD;  Vinayak Dewoolkar, MD;  John Collins, MD;  Saad Shebrain, MBBC, MMM iPoster 11

BRAT 1 MUTATION: RAPID WHOLE GENOME SEQUENCING AS AN EARLY DIAGNOSTIC TOOL IN A NEWBORN WITH ANTIEPILEPTIC RESISTANT SEIZURES Estefani Hee Chung, MD;  Julia Frueh, MD;  Angela Lai, MD;  Andrea Scheurer, MD iPoster 13

BILATERAL FACIAL NERVE PALSY IN A PREGNANT ACUTE HIV PATIENT Neil Hughes, MD;  Muhammad Ebad Rehman, MD;  Michael Baumgartner, MD;  Thomas Melgar, MD iPoster 14

RETINAL HEMORRHAGES IN A 6-MONTH-OLD CHILD RELATED TO DISSEMINATED INTRAVASCULAR COAGULATION Maria Magidenko, BA;  Amanda Fisher-Hubbard, MD;  Joseph Prahlow, MD;  Theodore Brown, MD iPoster 17

TENSION HEMOPNEUMOTHORAX IN THE SETTING OF MECHANICAL CPR DURING PREHOSPITAL CARDIAC ARREST: A CASE REPORT Dustin Rowland, MS;  Nicholas Vryhof, MD;  David Overton, MD;  Joshua Mastenbrook, MD iPoster 19

A QUALITY IMPROVEMENT PROJECT: UTILITY AND USABILITY OF A DIABETES MEDICATION POSTER IN AN INTERNAL MEDICINE/MEDICINE-PEDIATRIC CLINIC Wasif Shamsi, MD;  Nirmal Muthukumarasamy, MD;  Loren Weber, DO;  Russell Van Maele, DO;  Emilee SurVance, DO;  Kevin Kavanaugh, MD;  Tracey Mersfelder, PharmD iPoster 20

HYPERGLYCEMIA DURING REFEEDING SYNDROME IN SEVERE ANOREXIA NERVOSA: A CASE REPORT Maria Demma Cabral, MD;  Ethel Clemente, MD;  Corey Lager, MD;  Nital Murthi, MD;  Cheryl Roberts, RD iPoster 21

PROPHYLACTIC ENOXAPARIN ADJUSTED BY ANTI-FACTOR XA PEAK LEVELS IN SURGICAL ONCOLOGY PATIENTS. Katherine Kramme, MD;  Paya Sarraf, MS;  Gitonga Munene, MD iPoster 24
PULMONARY EMBOLISM: A RARE COMPLICATION OF MYCOPLASMA PNEUMONIAE Khadijah Hussain, BS; Prasanth Pillai, DO; Mariam Ischander, MD iPoster 25

ACUTE EXPOSURE AND SUBSEQUENT DEATH VIA INTRACORPOREAL CONCEALMENT OF METHAMPHETAMINE IN TWO UNRELATED CASES Ernest Morton, MS; Elizabeth Douglas, MD; Prentiss Jones Jr., PhD iPoster 26

TUMEFACTIVE DEMYELINATION: MULTIPLE SCLEROSIS PRESENTING AS A SINGLE RING-ENHANCING LESION Eric Edewaard, MD; Vishal Deepak, MD; Prashant Patel, DO iPoster 27

BROKEN BONES AND AN ADRENAL MASS Khadijah Hussain, BS; Graham McLaren, MD; Saad Shebrain, MD iPoster 28

LAPAROSCOPIC RESECTION OF A PHEOCHROMOCYTOMA (PARAGANGLIOMA) OF THE ORGAN OF ZUCKERKANDL IN A PEDIATRIC PATIENT Katherine Kramme, DO; Robin Fountain, MD; Michael Leinwand, MD iPoster 34

GROWING TERATOMA SYNDROME: AN EXTREMELY RARE FINDING IN TESTICULAR CANCER Jack Stover, BA; Kevin Herzog, MD; Kirk Payne, MD iPoster 35

ROBOTIC-ASSISTED LAPAROSCOPIC SURGERY AS THERAPEUTIC APPROACH FOR SEVERE INGUINODYNIA AFTER LAPAROSCOPIC INGUINAL HERNIA REPAIR Ayman Shehadeh, BS; Cole Kircher, DO; Saad Shebrain, MD iPoster 36

TOWARD STANDARDIZATION OF HOSPITALIZATION FOR ADULTS WITH DECOMPENSATED DISORDERED EATING: A CASE SERIES AND LESSONS LEARNED Maria Demma Cabral, MD; Nic Helmstetter, MD; Anya Ring, DO iPoster 37

ROBOTIC EXCISION OF TYPE IV CHOLEDOCHAL CYST WITH HEPATICODUODENOSTOMY Sarah Khalil, MD; Kyra Folkert, MD; Michael Leinwand, MD iPoster 39

NON-ISCHEMIC CARDIOMYOPATHY AS A RARE ADVERSE EFFECT OF CLOZAPINE Abhinav Garg, MD; Anandbir Bath, MD; Jagadeesh Kalavakunta, MD iPoster 40

CASE STUDY: INCIDENTAL FINDING OF MULTIPLE MYELOMA IN PATIENT WITH BACK PAIN Rubina Baig, MD; Mahmoud Kassir, MD; Wesley Eichorn, DO iPoster 41

CLINICAL OUTCOMES IN DIABETIC PATIENTS WITH AMBULATORY CARE PHARMACIST INTERVENTION: AMBULATORY CARE AND THE PHARMACIST'S ROLE IN DIABETES MANAGEMENT Elizabeth Graham, ; Jessica Prociv, PharmD; Dean Van Loo, PharmD iPoster 42

DETERMINING DRUG-SEEKING BEHAVIOR IN THE EMERGENCY DEPARTMENT: PROVIDER PERSPECTIVES Joshua White, BS; Natasha Trainer, BS; Parker Crutchfield, PhD; Duncan Vos, MS iPoster 43
UNINTENTIONAL DROWNING WITH THE CONTRIBUTING FACTOR OF CARBON MONOXIDE INTOXICATION Raymond Bayer, BS; Joseph Prahlow, MD iPoster 45

5-FLUORACIL CAUSING ACUTE CORONARY THROMBOSIS Ricardo de Castro, MD; Michelle Helbig, MD; Mike Francisco, PA; Mridul Parmar, MD; Mohammad Omaira, MD; William Nichols, DO iPoster 48

THE PHANTOM OF LACTIC ACIDOSIS DUE TO METFORMIN IN A PATIENT WITH HEART FAILURE. Ricardo De Castro, MD; Neiberg Lima, MD; Mridul Parmar, MD; Vishal Deepak, MD; William Nichols, DO; Susan Bannon, MD iPoster 49

IMPROVING DOCUMENTATION OF LONG-ACTING, REVERSIBLE CONTRACEPTIVE MEDICATION AND PROCEDURE COUNSELING Andrew Luciano, MD; Alison Radigan, MD; Rebecca Kaminski, DO; William Scott Humphrey, MD iPoster 52

NOVEL MIDDLE EAR MALFORMATION CAUSING CONGENITAL HEARING LOSS: A CASE REPORT AND LITERATURE REVIEW Aaron Zebolsky, MS; Corbin Sullivan, MD iPoster 53

UNUSUAL CASE OF SPLENIC RUPTURE FROM UNDIAGNOSED HYPERCOAGULABILITY DISORDER Allison Zheng, BS; Elizabeth Douglas, MD iPoster 54

A LITERATURE REVIEW ON THE ASSOCIATION BETWEEN VITAMIN D DEFICIENCY AND MULTIPLE SCLEROSIS Mariyam Sheidu, BS; Maria Cabral, MD iPoster 55

INDUCED METHEMOGLOBINEMIA CAUSED BY BENZOCAINE SPRAY. Ricardo De Castro, MD; Neiberg Lima, MD; Mridul Parmar, MD; Vishal Deepak, MD; William Nichols, DO; Susan Bannon, MD iPoster 56

STATIN-ASSOCIATED NECROTIZING AUTOIMMUNE MYOPATHY Ricardo De Castro, MD; Abbas Jowkar, MD iPoster 57

SECONDARY ORGANIZING PNEUMONIA IN A 5-YEAR-OLD PATIENT WITH DOWN SYNDROME AND T CELL DEFICIENCY Minh Nguyen, DO; Roua Azmeh, MD; Mariam Ischander, MD iPoster 58

AROUND THE WORLD: A SHORT CASE SERIES OF ATYPICAL INTRACRANIAL BULLET TRACKS Keenan Boul nemour, BS; Joseph Prahlow, MD iPoster 60

BRUGADA SYNDROME MIMICKING ACUTE CORONARY INFARCT Ricardo De Castro, MD; Neiberg Lima, MD; Stela Sampaio, MD; Susan Bannon, MD iPoster 61

METHEMOGLOBINEMIA AND VAGINAL BENZOCAINE. Ricardo De Castro, MD; Neiberg Lima, MD; Marcos Madeiro, MD; Susan Bannon, MD iPoster 62

EVALUATION OF PROPHYLACTIC AMIODARONE USE IN CORONARY ARTERY BYPASS GRAFT PATIENTS Catherine Wilson, ; Julie Schmidt, PharmD; Dean Van Loo, PharmD iPoster 63
LANGERHANS CELL HISTIOCYTOSIS (LCH) OF GI TRACT IN A 6-MONTH-OLD FEMALE Megan Potilechio, DO; Anya Ring, DO iPoster 64

EMOTIONAL LABILITY IN AN ATYPICAL ACUTE LYMPHOBlastic LEUKEMIA PATIENT WITH METHOTREXATE-INDUCED LEUKOENCEPHALOPATHY Keenan Boul nemour, BS; Laura Bauler, PhD; Alyssa Erskine, DO; Mark Schauer, MD iPoster 67

OPIOID SYSTEM IMPLICATED IN TREATMENT OF DEPRESSION Jay Patel, MD; Bruce Ruekberg, MD; Kathleen Gross, MD iPoster 68

EAR SWELLING AND AN UNUSUAL DIAGNOSIS OF CUTANEOUS LEISHMANIASIS Ricardo De Castro, MD; Neiberg Lima, MD; Adam Ladjinski, DO; Davi Leitao, MD; Benjamin Avner, MD iPoster 71

SPONTANEOUS SPLENIC RUPTURE DUE TO INFECTIOUS MONONUCLEOSIS Megan Burke, MD; Mekala Neelakantan, BS; Karan Pandher, BS; Dilip Patel, MD iPoster 72

FACTORS ASSOCIATED WITH READMISSION FOLLOWING SHOULDER ARTHROPLASTY Emma Swayze, MS; Christine Bowman, MD; Mark Sytsma, MD iPoster 75

DOES COLONOSCOPY NEED TO BE DONE NOW?: QUANTITATING THE VALUE OF CLINICAL HISTORY IN DIAGNOSING DIVERTICULAR HEMORRHAGE Fariah Ahmad, MD; Iftiker Ahmad, MD; Barbara Pawlaczyk, MD iPoster 76

COMPARISON OF PRE-HOSPITAL ROSC RATES FOR MANUAL-ONLY VS MECHANICAL-ASSISTED CPR USING THE LUCAS-2: A RETROSPECTIVE STUDY Raphael Szymanski, BS; Joshua Mastenbrook, MD; Duncan Vos, MS; Kristina Le, BS; Ronald Slagell, EMT-P; Cheryl Dickson, MD iPoster 77

A 34-YEAR-OLD RECOVERING ALCOHOLIC WITH ACUTE LIVER FAILURE Sravani Alluri, MD; William Humphrey, MD; Dalal Kassir, MD; Megan Potilechio, DO; Laura Marsh, DO; Susan Jevert-Eichorn, DO; kristi vanderkolk, MD iPoster 79

SUDDEN DEATH AFTER BOUNCE HOUSE - A LATE COMPLICATION OF CONGENITAL DIAPHRAGMATIC HERNIA Kendall Smith, BA; Brandy Shattuck, MD; James Elliott, iPoster 81

PROPHYLAXIS THERAPY USING ADJUNCTIVE AZITHROMYCIN WITH STANDARD CEPHALOSPORIN VS. CEPHALOSPORIN ALONE FOR CESAREAN DELIVERY AT BRONSON HOSPITAL Dean Van Loo, PharmD; Sylvia Wasson, iPoster 84

HOSPITAL ADMISSIONS FOR MITRAL STENOSIS IN PREGNANCY IN THE UNITED STATES. A TWELVE-YEAR ANALYSIS Neiberg Lima, MD; Carol Lima, MD; Ricardo de Castro Jr, MD; Cuyler Huffman, MS; Mireya Diaz, PhD; Silvia Linares, MD; Mark Schauer, MD; Thomas A Melgar, MD iPoster 2
AN INTERVENTION DESIGNED TO INCREASE POST-PARTUM VISIT ATTENDANCE RATES AT A FEDERALLY QUALIFIED HEALTH CENTER Megan Potilechio, DO; Dalal Kassir, MD; Angela Barreto, MD; Mahmoud Kassir, MD; Michael Mattia, MD; Tabish Naz, MD; Lauren Piper, DO; Joseph Billian, MS; Jennifer Moubray, BS iPoster 5

CHAGAS HEART DISEASE IN THE UNITED STATES - A THIRTEEN YEAR ANALYSIS. Neiberg Lima, MD; Duncan Vos, BS; Ricardo De Castro, MD; Adam Ladzinski, DO; Carol Lima, MD; Thomas Melgar, MD iPoster 9

VETERANS AND THE OPIOID EPIDEMIC: MEDICOLEGAL DEATH INVESTIGATION OF OPIOID-RELATED DEATHS OF MICHIGAN VETERANS John Frederick, BA; John Dewey, BS; Aditya Mehta, BS; Tyler Gibb, PhD iPoster 16

IMPACT OF PATIENT PROVIDER RELATIONSHIP ON POST-PARTUM CONTRACEPTION CHOICE Lydia Hillier, BSN; Serena Smith, BS; Laura Bauler, PhD; Catherine Kothari, PhD iPoster 23

RACE AND INTERSECTIONALITY: WOMEN'S STORIES OF POWERLESSNESS AND INVISIBILITY IN HEALTHCARE Elissa Allen, PhD; Yvonne Jackson, EdD; Evelyn Ainsley McWilliams, BA; Anmol Hans, BS; Terra Bautista, BA; Elishae Johnson, PhD; Fernando Ospina, MA; Joi Presberry, MPH; Lynette Gumbleton, BA; Catherine Kothari, PhD iPoster 38

TEN CASES OF VALERYL FENTANYL IN SOUTHWEST MICHIGAN Christine Stevens, BS; Erinn Ton, BS; Michael Markey, MD; Prentiss Jones, PhD iPoster 80

"THE QUICKER THEY COULD BE DONE WITH ME, THE BETTER": WOMEN'S PERSPECTIVES ON TIME, EQUITY, AND QUALITY PERINATAL HEALTHCARE Pamela Wadsworth, PhD; Abigail Duerst, BS; Catherine Kothari, PhD iPoster 83

INTRODUCING MINDFULNESS INTO THE UME CURRICULUM: ASSESSING THE UTILITY OF A STUDENT-FACILITATED EXPERIENTIAL APPROACH. Maria Magidenko, BA; Allison Zheng, BS; Adrienne Aardema, BS; Melissa Pellman, MS; Megan Sandberg, BS; Daniel Micheli, BS; Karen Horneffer-Ginter, PhD iPoster 6

IDENTIFYING THE PRESENCE OF SECONDARY TRAUMATIC STRESS SYMPTOMS AMONG EMERGENCY MEDICINE RESIDENTS AT WMU HOMER STRYKER MD SCHOOL OF MEDICINE Elise Klesick, DO; Paige Neaterour, MD; Clay Mishler, MD; Brenton Kinker, MD; Jon Parker, DO; Wesley Turner, DO; Alexander Brech, MD; Raxit Parikh, DO; Richard Lammers, MD; Tendeukai Warren, MD iPoster 22

REDCAP AND RSHINY TOGETHER TO SURVEY AND DELIVER PERSONALIZED FEEDBACK OF A WELL-BEING ASSESSMENT Duncan Vos, MS; Anita F. Bell, BS; Richard Brandt, BS; Karen Horneffer-Ginter, PhD iPoster 31

WHAT GOES IN, MUST COME OUT: SUPERIOR VENA CAVA SYNDROME IN RETAINED LONG-TERM IMPLANTED PORTS Dilpat Kumar, MD; Muhammad Rehman, MD; Vishal Deepak, MD; Prashant Patel, DO iPoster 59
MAKING OUTBREAK INVESTIGATIONS REAL TO MEDICAL STUDENTS Mireya Diaz, PhD iPoster 65

DEVELOPMENT OF SOFT TISSUE SIMULATORS FOR BIOPSY AND SUTURING TRAINING AMONG STUDENTS AND RESIDENTS Aniruddha Paranjpe, MD; Thomas Melgar, MD; Carleigh Zahn, MD iPoster 70

A SURVEY OF OPIOID PRESCRIPTION PRACTICES AND PAIN MANAGEMENT EDUCATION IN ORTHOPEDIC SURGEONS Kelsey Suggs, MS; Keith Kenter, MD iPoster 78

A SACROILIAC JOINT SIMULATOR FOR ULTRASOUND GUIDED SI JOINT INJECTIONS TRAINING Thomas Melgar, MD; Aniruddha Paranjpe, MD; Carleigh Zahn, DO iPoster 82

EVALUATION OF MEDICAL STUDENT FACTORS THAT MAY INFLUENCE THE DECISION TO PURSUE A CAREER IN ORTHOPAEDIC SURGERY Lucy Meyer, BA; Symone Brown, ; Kevin Black, MD; Ann Van Heest, MD; Lisa Cannada, MD; Keith Kenter, MD; Mary Mulcahey, MD iPoster 3

SENTIMENT ANALYSIS OF INITIATING MESSAGES POSTED AROUND A BRAIN CANCER DIAGNOSIS IN A MODERATED CANCER ONLINE COMMUNITY Ka Sam, BS; Melissa Sherfield, BS; Mireya Diaz, PhD iPoster 33

DEATH REGISTERS: HOW HOSPICE PROFESSIONALS USE FUTURE-ORIENTED LANGUAGE TO MANAGE THE EXPECTATIONS OF PATIENTS' FAMILIES Maya Giaquinta, BS; Daniel Menchik, PhD iPoster 46

UNDERREPRESENTATION OF WOMEN IN CLINICAL RESEARCH AND ITS OUTCOME Charlene Lin, BA; Tyler Gibb, JD, PhD iPoster 50

EVALUATION OF A CONTINGENCY MANAGEMENT SMARTPHONE-SMARTCARD PLATFORM IN A COMMUNITY CLINIC Mark Rzeszutek, MS; Anthony DeFulio, PhD iPoster 66

SEX INFLUENCES ORGAN-SPECIFIC DIFFERENCES IN THE PRODUCTION AND ACTIVATION OF PLASMACLASTS AND PLASMA CELLS. KimAnh Pioli, MPH; Michael Crone, BS; Matthew Kornas, BS; Patrick Renner, BS; Peter Pioli, PhD iPoster 97

CONTROLLED-ASSEMBLY OF CHONDROCYTE SPHEROIDS USING 3D PRINTED MOLDS Shelby Chaney, MS; Zeena Qiryaqoz, BS; Adil Akkouch, PhD iPoster 108

EBOLA VIRUS PATHOGENESIS: COULD PROTEASE-ACTIVATED RECEPTORS BE THE POTENTIAL LINK BETWEEN THE IMMUNE RESPONSE AND COAGULOPATHY? Karley Lujan, MS; Laura Bauler, PhD iPoster 110
LXR AND INSIG ACT AS DIFFERENTIATORS IN THE REGULATION OF THE
GENE EXPRESSION OF G6PDH AND FAS UNDER INSULIN RESISTANT
CONDITIONS Jaafar Hachem, BS; Susan Stapleton, PhD
iPoster 129

FABRICATION OF PLLA/PDS-PEDOT NANOSCAFFOLDS USING 3D MELT
ELECTROWRITING FOR BONE REGENERATION Mitchell Kenter, BA; Adil Akkouch,
PhD iPoster 136

EXERCISE TO THE RESCUE: EFFECTS OF AGING AND LONG-TERM EXERCISE
ON STRUCTURAL PLASTICITY OF MOTOR NEURONS AND GDNF EXPRESSION
IN SPINAL CORD Alberto Cintron-Colon, MS; John Spitsbergen, PhD iPoster 140

"COOL AIN'T COOL- INTRAVENOUS FLUIDS AND THEIR IMPACT ON BODY
TEMPERATURE" Abigail Harrelson, DO; Oreste Romeo, MD iPoster 85

FEMORAL HEAD OSTEONECROSIS 3 MONTHS AFTER INTRAARTICULAR
STEROID INJECTION: A CASE REPORT Brandon Manderle, MD; Hira Khan, MD;
Wesley Eichorn, DO; Bernard Roehr, MD iPoster 86

FLECAINIDE TOXICITY: A CASE REPORT Kenny Hoang, MD; Phillip Pazderka, MD
iPoster 87

PRISM CORRECTION OF HOMONYMOUS HEMIANOPSIA BY DISPLACEMENT
FIELD TECHNOLOGY. Sorabh Singhal, BS; Peter Colquhoun, MD iPoster 89

CLOSURE OF ATRIOVENTRICULAR CANAL PATCH DEFECT WITH AMPLATZER
PFO OCCLUDER DEVICE Lucas Rich, BS; Keshav Patel, MS; Joel Reinoehl, MD;
Christopher Rogers, DO iPoster 90

THE IMPORTANCE OF PATIENT ADVOCACY IN FOREIGN BODY
IDENTIFICATION AND MANAGEMENT: A CASE SERIES Jessica Ziccarello, BS; Laura
Bauler, PhD; Joshua Mastenbrook, MD iPoster 92

AN UNSUSPECTED CASE OF PEDIATRIC MYOCARDITIS Aditya Mehta, BS; Joshua
Mastenbrook, MD; Evan Pixley, DO; Laura Bauler, PhD iPoster 93

SQUAMOUS CELL CARCINOMA OF THE NECK: AN UNLIKELY STROKE MIMIC
Vera Obinwanne, MS; Laura Bauler, PhD; Dylan Bergeon, DO; Tim Trichler, MD iPoster 94

A NOVEL PRESENTATION OF CHILDHOOD SYSTEMIC LUPUS
ERYTHEMATOSUS IN A 6-YEAR-OLD CHILD Alena Wurster, BS; Laura Bauler, PhD;
Colleen Howing, MD; Maureen Ford, MD iPoster 95

STATUS CATAPLECTICUS: A NIGHT AND DAY SHIFT DIAGNOSIS Drew Moss, BS;
Lucas Rich, BS; Nicholas Helmstetter, MD iPoster 96

A CURIOUS CASE OF GUTTATE PSORIASIS Casey Fealko, BS; Mahesh Shrestha, MD;
Natalie Behrle, MD iPoster 99
UTILIZING PERCUTANEOUS CHOLECYSTOSTOMY TUBE AS A TEMPORARY APPROACH FOR ACUTE CHOLECYSTITIS DURING 3RD TRIMESTER OF A HIGH-RISK PREGNANCY Yvonne Hojberg, BA; Mahmuod Abdeljaber, PharmD; Saad Shebrain, MD iPoster 100

TWO SISTERS WITH A UNIQUE CFTR MUTATION, P.I1328T, RESULTING IN CYSTIC FIBROSIS TRANSMEMBRANE CONDUCTANCE REGULATOR-RELATED METABOLIC SYNDROME Matthew Sila, BS; Laura Bauler, PhD; Mariam Ischander, MBChB iPoster 101

USE OF A BANG STICK FOR SUICIDE: A RARELY USED WEAPON Robert Welch, BS; Laura Bauler, PhD; Brandy Shattuck, MD iPoster 102

MY WATCH SAVED ME!"-SMARTWATCH DETECTION OF VENTRICULAR TACHYCARDIA Ricardo De Castro, MD; Melissa Lessa, MD; Colleen Howing, MD; Kelsey Burson, DO; Aditya Mehta, MD; Matthew Rosssing, MD iPoster 103

CARDIAC FIBROMA WITH CARDIAC ARREST: A RARE CLINICAL PRESENTATION OF GORLIN SYNDROME IN AN 8-MONTH-OLD INFANT. Mohammad Baidoun, MD; Mohamed Elgendy, MD; James Loker, MD iPoster 104

SARS-COV-2 INFECTION ASSOCIATED SEVERE DILATED CARDIOMYOPATHY IN A 4 WEEK OLD INFANT Mohammad Baidoun, MD; Mohamed Elgendy, MD; Robin Fountain, MD iPoster 105

INCIDENTAL DIAGNOSIS OF AN ASYMPTOMATIC PAPILLARY RENAL CELL CARCINOMA Steven Jones, BS; Laura Bauler, PhD; Michael Baumgartner, MD; Mark Schauer, MD iPoster 106

ATRAUMATIC LUNATE DISLOCATION IN THE SETTING OF RHEUMATOID ARTHRITIS: A SMALL CASE SERIES AND LITERATURE REVIEW Guston Zervoudakis, MD; Mahmoud Abdeljaber, MS; Mayron Lichterman, DO iPoster 109

A CASE OF PENILE CARCINOMA PRESENTING AS SCROTAL PAIN AND SWELLING Nga Nguyen, MD; Kristi VanDerKolk, MD iPoster 111

THE EFFECT OF PRESCRIBING PATTERNS ON UTILIZATION OF OPIOID MEDICATION IN ACL RECONSTRUCTION: A RANDOMIZED, PROSPECTIVE TRIAL Donghoon Lee, BS; Joseph Brutico, BS; Richard Gawel, BS; Ryan Paul, BS; Matthew Pepe, MD; Bradford Tucker, MD; Kevin Freedman, MD; Fotios Tjoumakaris, MD iPoster 112

MENISCAL ROOT REPAIRS: FUNCTIONAL OUTCOMES AND PROGRESSION TO TOTAL KNEE ARTHROPLASTY Donghoon Lee, BS; Ryan Kovacik, BS; Richard Campbell, MD; Morgan Leider, MD; Matthew Pepe, MD; Fotios Tjoumakaris, MD iPoster 113

PREDICTORS OF PATIENT EXPECTATIONS FOR FUNCTIONAL OUTCOMES FOLLOWING HYALURONIC ACID INJECTIONS Donghoon Lee, BS; Brandon Smith, BS; Ryan Paul, BS; Richard Campbell, MD; Morgan Leider, MD; Kevin Freedman, MD; Bradford Tucker, MD; Matthew Pepe, MD iPoster 114
SYSTEMATIC REVIEWS IN ORTHOPAEDIC SPORTS MEDICINE: AN UPDATE
Donghoon Lee, BS; Ryan Paul, BS; Adam Lencer, BS; Fotios Tjoumakaris, MD; Kevin Freedman, MD iPoster 115

SUPRAGLOTTIC AIRWAY DEVICE USE AMONG EMERGENCY MEDICAL RESPONDERS WITHIN A SOUTHWEST MICHIGAN
Sarah DiMezza, MD; Joshua Mastenbrook, MD; Michael Bentley, MPA, CCEMTP, IC; William Fales, MD iPoster 116

A RARE CASE OF PLUMMER-VINSON SYNDROME IN AN AFRICAN AMERICAN WOMAN
Keshav Patel, MS; Mahmoud Kassir, MD; Wesley Eichorn, DO iPoster 117

REPAIR OF A GIANT PARAESOPHAGEAL HERNIA
James Le, BS; Mohamed Rahal, BS; Saad Shebrain, MD iPoster 119

INTEGRATED MULTIDISCIPLINARY AFTER VISIT SUMMARIES: A TOOL TO IMPROVE PATIENT ENGAGEMENT IN CYSTIC FIBROSIS CLINIC
Carolina Herrera, RRT; Debbie Wells-Schmidt, RN; Kristi Homan, Pharmacy Technician; Teresa Bailey, PharmD; Nicole Vess, RN; Julie Hovey, Medical Assistant; Sally Bohnema, RD; Sheryl Lozowski, PhD; Niecia Anjorin, Social Worker; Mariam Ischander, MD iPoster 120

PAPILLARY FIBROELASTOMA IN A PATIENT PRESENTING WITH MULTIFOCAL STROKE
Collin Vasseur, BS; Laura Bauler, PhD; Prashant Patel, DO iPoster 121

BILATERAL LIPOMA ARBORESCENS IN A PEDIATRIC PATIENT WITH OBLIGATE PATELLAR INSTABILITY AND JUVENILE IDIOPATHIC ARTHRITIS: A CASE REPORT
Khusbu Patel, BA; Guston Zervoudakis, MD; Karen Bovid, MD iPoster 123

OUT OF SYNC, TICK-START MY HEART: A CASE OF LYME CARDITIS
Lucas Rich, BS; Ryan Khalil, BS; Ricardo de Castro, MD; Prashant Patel, DO iPoster 125

TWO TEENS WITH VAPING ASSOCIATED LUNG INJURY IN A COMMUNITY CHILDREN'S HOSPITAL
Gisel Rivera, MD; Naveen Emmanuel, DO; Joseph Fakhoury, MD; Mariam Ischander, MD iPoster 127

SYNTHESIS OF A NOVEL GO/DMSO-DOPED PEDOT ELECTROACTIVE NANOCOMPOSITE FOR BIOELECTRICAL STIMULATION
Mitchell Kenter, BA; Adil Akkouch, PhD iPoster 128

DIAGNOSIS OF ECZEMA HERPETICUM AMIDST TELEDERMATOLOGY SURGE
Jay Patel, BS; Ryan Jones, DO; Thomas Flynn, MD iPoster 130

ASSESSMENT OF IMPLEMENTATION OF STANDARDIZED POST-CESAREAN SECTION PAIN MANAGEMENT ORDERS ON MORPHINE MILLIGRAM EQUIVALENTS (MME) IN THE POST-OPERATIV
Lauren Piper, DO; Hira Khan, MD; Mahmoud Kassir, MD; Cameron Stump, MD; Duncan Vos, MS; Melissa Sherfield, BS iPoster 131

OUTCOMES OF SPLENECTOMY ON HEMATOLOGIC AND NON-HEMATOLOGIC SPLENIC CONDITIONS
Derek Tessman, DO; Gordon Liu, BA; John Dewey, BS; Saad Shebrain, MD; Robert Sawyer, MD iPoster 132
MIXED METHODS ANALYSIS OF OPEN ENDED RESPONSES ON A PEDIATRIC BEHAVIORAL RATING SCALE Christine Schmitt; Megan Burke, MD; Neelkamal Soares, MD iPoster 133

A RARE CASE OF BILATERAL SPONTANEOUS ADRENAL HEMORRHAGE Dilpat Kumar, MD; FNU Warsha, MD; Faizan Shaikh, MD iPoster 135

STREPTOCOCCUS PNEUMONIAE INFECTION PRESENTING AS CAUDA EQUINA SYNDROME DUE TO EPIDURAL ABSCESS - A CASE REPORT Mariana Camelo Pereira, MD; Thales Nogueira Gomes, MD; Benjamin Avner, MD PhD iPoster 137

INFLUENCE OF ALCOHOL ON HOSPITAL ADMISSIONS, IN-HOSPITAL DEATH, AND LIVER TRANSPLANT FOR PATIENTS WITH WILSON DISEASE: NIS ESTIMATES FROM 2002-2014 Eric Martin Sieloff, MD; Christine Maisano, BA; Ashina Singh, MD; Cuyler Huffman, MS; Ross Driscoll, MD; Thomas Melgar, MD iPoster 139

30-DAY ED VISITS AND READMISSIONS PRE AND POST ERAS IMPLEMENTATION IN HYSTERECTOMY PATIENTS IN A COMMUNITY HOSPITAL Kathryn Dominick, DO; Kelsy Schultz, BA; Jessica Sassic, ; Rebekah Sharp, MD; Silvia Linares, MD iPoster 141

IS IT REALLY SCIATICA?: WHAT PRIMARY CARE PROVIDERS NEED TO KNOW ABOUT SI JOINT PAIN Max Shakourian, MD; Peter Lapen, DO; Zackary Cowan; Shaan Manawar; Ramona Wallace, DO; Mahsa Hassanzadeh Langroo, MD iPoster 142

EXPECT THE UNEXPECTED? AN UNUSUAL CASE OF SPONTANEOUS DISTAL ESOPHAGEAL PERFORATION Jasmine Saeedian, BA; Prashant Patel, DO iPoster 143

SELECTIVE THORACIC FUSION IN ADOLESCENT IDIOPATHIC SCOLIOSIS LENKE 1 AND 2 CURVE PATTERNS Harrison Seltzer, BS; Natalie Finazzo, BS; Aditya Mehta, BS; Raymond Bayer, BS; Joseph Weistroffer, MD; Dale Rowe, MD; Karen Bovid, MD iPoster 144

A CASE OF SMALL VESSEL VASCULITIS DUE TO STAPHYLOCOCCUS AUREUS. Dilpat Kumar, MD; Akshaya Gadre, MD; FNU Warsha, MD; Susan Bannon, MD iPoster 148

THE PROXIMAL HUMERUS PLATE: USEFULNESS IN POSTERIOR MALLEOLAR AND POSTERIOR PILON FRACTURE VARIANTS George Borrelli, MD; Jason Roberts, MD; Robert Gorman III, MD; Tyler Snoap, MD iPoster 149

RADIOGRAPHIC OUTCOMES OF SPINAL FUSION FOR ADOLESCENT IDIOPATHIC SCOLIOSIS WITH LOWEST INSTRUMENTED VERTEBRA AT THE THORACOLUMBAR JUNCTION. Raymond Bayer, BS; Harrison Seltzer, BS; Aditya Mehta, BS; Natalie Finazzo, BS; Joseph Weistroffer, MD; Dale Rowe, MD; Karen Bovid, MD iPoster 152

T-CELL LARGE GRANULAR LYMPHOCYTE LEUKEMIA DURING TREATMENT WITH METHOTREXATE FOR RHEUMATOID ARTHRITIS - A CASE STUDY Thales Nogueira Gomes, MD; Mariana Camelo Pereira, MD; Satish Solanki, MD iPoster 153
OCCULT CERVICAL LEIOMYOSARCOMA FOUND ON HYSTERECTOMY FOR VAGINAL PROLAPSE Annika Nuler, BA; Melinda Abernethy, MD; Laura Bauler, PhD iPoster 154

LIBMAN-SACKS ENDOCARDITIS AS THE INITIAL PRESENTATION OF METASTATIC ADENOCARCINOMA Michelle Helbig, DO; Prashant Patel, DO iPoster 157

THYROID STORM IN PREGNANCY IN A NONCOMPLIANT PATIENT Katherine Holden, DO; Melanie Schwier, DO; Silvia Linares, MD; James Goodspeed, MD iPoster 158

DELAYED ANCA POSITIVITY: A CHALLENGING CASE OF MULTISYSTEM EGPA Blair Graham, DO; Adam Ladzinski, DO; Natasha Haris, BS; Gabe Kousourou, DO; Nicholas Helmstetter, MD iPoster 159

CASE REPORT: HYPERTROPHIC NONUNION FOLLOWING POSTERIOR SPINAL FUSION RESULTING IN COMPLETE AND RAPID PARALYSIS, A CALL FOR INCREASED AWARENESS Guston Zervoudakis, MD; Adam Misseldine, MS; Michael Kasten, MD iPoster 160

TRANSDERMAL 4% LIDOCAINE PATCHES FOR POST-OPERATIVE PAIN MANAGEMENT FOLLOWING ARTHROSCOPIC ROTATOR CUFF REPAIR: A PROSPECTIVE, RANDOMIZED TRIAL Donghoon Lee, BS; Morgan Leider, MD; Richard Campbell, MD; Bradford Tucker, MD; Matthew Pepe, MD; Fotios Tjoumakaris, MD iPoster 161

RACE AND ETHNICITY IN ORTHOPAEDIC RANDOMIZED CONTROLLED TRIALS: ARE THEY FREQUENTLY REPORTED? - A SYSTEMATIC REVIEW Donghoon Lee, BS; Ryan Paul, BS; Joseph Brutico, BS; Fotios Tjoumakaris, MD; Michael Ciccati, MD; Kevin Freedman, MD iPoster 162

GENETIC CAUSES OF CHRONIC LIVER DISEASE IN PEDIATRICS Casey Fealko, BS; Mahmoud Abdeljaber; Eric Martin Sieloff, MD; James Dalton Boyer, DO; Dana Maajali, MD; Cuyler Huffman, MS; Shibani Kanunog, MD, MPH; Thomas Melgar, MD iPoster 98

THE IMPORTANCE OF TARGETED INTERVENTIONS DURING THE DEPLOYMENT OF THE SPANISH MYCHART Sorabh Singhal, BS; Andrew Lynch, BS; Cheryl Dickson, MD iPoster 118

RACE IN HEALTHCARE: STORIES OF GRACE IN THE FACE OF SYSTEMIC DISCRIMINATION Joi Presberry, MPH; Elissa Allen, PhD; Yvonne Jackson, EdD; Evelyn Ainsley McWilliams, BA; Anmol Hans, BS; Terra Bautista, BA; Elishae Johnson, PhD; Fernando Ospina, MA; Lynette Gumbleton, BA; Catherine Kothari, PhD iPoster 122

EMPOWERING WOMEN'S SELF-AGENCY IN PRENATAL CARE WITH A TRUSTING PATIENT-PROVIDER RELATIONSHIP Claudia Waters, BS; Silvia Linares, MD; Lynette Gumbleton, BA; Joi Presberry, MPH; Megan Sandberg, BS; Drew Moss, BS; Catherine Kothari, PhD iPoster 124

IMPACT OF COVID-19 ON PSYCHOTROPIC USE IN THE ELDERLY Andy Jan, BA; James Le, BS; David Huan, BA; Daniel Brauner, MD iPoster 138
OUTCOMES FROM OUTPATIENT TREATMENT OF COVID-19 WITH MONOCLONAL ANTIBODY THERAPY: A STATEWIDE SURVEY Benjamin Root, BS; Rachel Foshee, BS; William Fales, MD; Shanna Cole, PharmD; Michael Klepser, PharmD; Victoria Addis, (None); Andrew Alfred, (None); Lindsay Christensen, (None); Bretton Dempsey, (None); Tam Doan, (None); Jessica Gierka, Matthew Gray; Endira Hebovija, Christine Schmitt, Gina Shoemaker, Jessica Ziccarello iPoster 145

DIFFERENTIAL IMPACT OF SARS-COV-2 (COVID-19) WITHIN THE KALAMAZOO COMMUNITY Brittany N. Sullivan, BS; Amy J. Lin, MS; Justin R. Mak, BS; Catherine Y. Lee, BS; Jacob Baxter, BS; Joi Presberry, MPH; Katie Corbit, MPH; Terra Bautista, BA; Shanika Lucas, (None); Komal Razvi, MPH; Catherine Kothari PhD iPoster 150

STATEWIDE OUT-OF-HOSPITAL CARDIAC ARREST DURING THE BEGINNING OF THE COVID-19 PANDEMIC Lindsey Rauch, MD; William Fales, MD iPoster 156

A PROPOSED SURGICAL DECISION-MAKING MODEL FOR ELECTIVE SURGERY CANCELLATION DURING THE COVID-19 PANDEMIC IN THE CONTEXT OF THE FOUR PILLARS OF ETHICS Nolan Brown, BS; Bayard Wilson, MD; Stephen Szabadi, BM; Cameron Quon, BA; Vera Ong, BS; Alexander Himstead, BS; Nathan Shlobin, BA; Chen Yi Yang, BS; Brian Lien, MS; Shane Shahrestani, MS, Katelynn Tran, BS; Ali R Tafreshi MS, MD; Jack Birkenbeuel, BS; Seth C. Ransome, BS; Elliot Choi, MS; Ronald Sahyouni, MS, MD, PHD; Aaron Kheriaty, MD; Alvin Chan, MD; Isaac Yang, MD iPoster 163

LESSONS LEARNED THROUGH THE IMPLEMENTATION OF AN EVIDENCE-BASED ALERT WITHIN THE ELECTRONIC HEALTH RECORD. Sorabh Singhal, BS; Neelkamal Soares, MD iPoster 88

NAVIGATING DIFFICULT CONVERSATIONS OF CANCER SUSPICION IN THE EMERGENCY DEPARTMENT Mfoniso Ekpo, MS; Laura Bauler, PhD; Kathryn Redinger, MD iPoster 91

SUCCESSFUL DESENSITIZATION IN A PATIENT WITH ADALIMUMAB HYPERSENSITIVITY Samantha Woolery, MS; Laura Bauler, PhD; Roua Azmeh, MD; Patrick Jones, MD iPoster 107

A RARE COMPLICATION OF HERPES ZOSTER: SEGMENTAL ZOSTER PARESIS Keshav Patel, MS; Sarah Darweesh, MD; Darrin Lund, DO iPoster 126

WHAT GOES IN, MUST COME OUT: SUPERIOR VENA CAVA SYNDROME IN PATIENTS WITH RETAINED LONG-TERM IMPLANTED PORTS Dilpat Kumar, MD; Muhammad Ebad Rehman, MD; Prashant Patel, DO iPoster 134

VIRTUAL RESIDENCY INTERVIEWS: THE PERSPECTIVE OF 2020-2021 OBGYN APPLICANTS Kelsy Schultz, BA; Emma Swayze, MS; Duncan Vos, MS; Debra Taubel, MD; Rebekah Sharp, MD iPoster 146

EVIDENCE OF CONCEPT: AN EFFICIENT MODEL FOR ANATOMY LABORATORY COLLABORATION WITH CLINICIANS TO ADVANCE SURGICAL CARE George Borrelli, MD; James Jastifer, MD; Erica Christensen, MS; Laura Scheid, MS; Joseph Weistroffer, MD iPoster 151
SYSTEMIC REVIEWS IN ORTHOPEDIC SPORTS MEDICINE: AN UPDATE
Donghoon Lee iPoster 171

v-PREDICTORS OF PATIENT EXPECTATIONS FOR FUNCTIONAL OUTCOMES FOLLOWING HYALURONIC ACID Donghoon Lee iPoster 169

THE EFFECT OF PRESCRIBING PATTERNS ON UTILIZATION OF OPIOID MEDICATION IN ACLE RECONSTRUCTION Donghoon Lee iPoster 170
POSTER ABSTRACTS
Autosomal Dominant Polycystic Kidney Disease (ADPKD) is one of the most common genetic disorders affecting the kidney, occurring in 1 in every 200 individuals. Renal cyst development in ADPKD results from mutations in the PKD1 or PKD2 genes, which encode the proteins polycystin1 (PC1) and polycystin2 (PC2). PC1 and PC2 proteins are localized to primary cilia, hair-like organelles found on most eukaryotic cells, that function as sensors of stimuli from outside the cell and mediate the transmission of extracellular signals to the nucleus. Cilia in polycystic kidneys are abnormally long and are thought to increase signaling into the cell resulting in increased cell proliferation in the diseased kidneys. Cux1 is a transcription factor that is highly expressed in kidney development and in polycystic kidney disease. Cux1 is an inhibitor of the cyclin kinase inhibitor p27 promoting cell proliferation. Transgenic mice overexpressing Cux1 show increased cell proliferation and renal hyperplasia, but do not develop polycystic kidney disease. To begin to determine whether Cux1 plays a role in regulating ciliogenesis we evaluated cilia morphology and the expression of ciliary proteins in the kidneys of Cux1 transgenic mice and wild type controls. Cilia in Cux1 transgenic mouse kidneys were significantly longer than in control kidneys. Moreover, expression of OFD1, an inhibitor of cilia formation, was significantly decreased in the Cux1 transgenic mice. Taken together, these results suggest that, in addition to regulating the cell cycle, Cux1 regulates cilia formation in the kidney, a novel new role for this protein in the kidney.
Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine

Phosphorylcholine (PC) is an immunodominant determinant of Streptococcus pneumoniae (also referred as pneumococcus). PC is also a component of some other bacteria, apoptotic cells, and oxidized low-density lipoproteins (OxLDL). S. pneumoniae is the most common pathogen responsible for causing bacterial pneumonia. Infants, the elderly and immunocompromised individuals are at high risk of acquiring pneumococcal infections. Moreover, individuals over age 65 are 7-fold more susceptible to pneumonia than younger (ages 5-49) individuals. B1 cells constitute a unique subpopulation of normal B lymphocytes. B1 cells have been most extensively studied in the mouse system, however, the human B1-like cells have been recently identified although their origin and functions are still elusive. Antibodies present in normal serum produced by B1 cells without exogenous antigenic stimulation are termed natural antibodies. These constitutively produced natural antibodies provide the first line of defense against invading pathogens including S. pneumoniae. In the present work we studied the activity of anti-PC antibodies produced by human B1-like cells. We developed 21 PC specific antibodies by sorting PC-binding B cells (both B1-like and B2 cells) from healthy volunteers, and rescuing antibody from individual B cells by single cell PCR, cloning and expression. The molecular characterization of these antibodies revealed the diverse usage of V(Heavy) and V(kappa) genes. We evaluated antibody binding to pneumococcal PC by whole cell ELISA. We identified 4 broadly cross-reactive antibodies (2 from B1 like and 2 from B2 cells) that bind multiple pneumococcal serotypes. These antibodies were further examined for their ability to enhance
ANOTHER PIECE TO THE PUZZLE OF SAMPLE HANDLING: EVALUATION OF PREANALYTICAL HOMOGENIZATION ON POSTMORTEM BLOOD SPECIMENS

Deon Turner, BS; Julie Ianni, BS; James Ciaramitaro, BS; Paul Moorman, BS; Prentiss Jones, PhD

Biology, Western Michigan University; Biomedical Sciences, Western Michigan University
Homer Stryker M.D. School of Medicine

The quality of the sample plays a key role in the reliability of results especially involving autopsy specimens from deceased individuals. In postmortem autopsy cases blood is considered the gold standard sample for analysis in determining the cause of death. Although blood is considered the gold standard it still faces many challenges for securing an adequate sample quality for analysis. More often than not postmortem specimens are not particularly ideal due to gross hemolysis, coagulation, putrefaction, and other compromising biological processes. General techniques like phlebotomy for collecting blood have been used to improve the quality of samples, unfortunately, these techniques have only minimally improved sample quality and they still carry non-ideal conditions for postmortem analysis. Acknowledging this, this study evaluates the use of homogenization as a preanalytical step prior to analysis to determine whether there is a fundamental improvement in the quality of postmortem blood specimens. For the study postmortem blood samples were homogenized prior to sample extraction then processed using a solid-phase extraction technique and subsequently analyzed via a liquid chromatograph tandem mass spectrometer. The generated results were then compared with unhomogenized samples to evaluate differences these samples carried amongst one another. Overall, homogenization appeared to preserve the drugs found in unhomogenized samples, suggesting homogenization does not negatively impact drug analysis. Additionally, drugs not detected in unhomogenized samples were detected, suggesting a possible advantage to homogenization. Sample homogenization may improve specimen quality and advance knowledge regarding sample handling for postmortem studies.
A STUDY OF NEURONAL DIFFERENTIATION OF HYPOXIA-INDUCED REPROGRAMMING MUSCLE CELLS IN VITRO

Rachael Tolsma, BS;  Haiying Pan, MS;  Nariaki Nakamura, BS;  Yong Li, MD PhD

MD Class of 2023, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine

Our previous research suggests that muscle cells are reprogrammed into progenitors after injury. These cells are similar to multipotent stem cells and can differentiate into multiple lineages such as muscle, fat and neuronal-like cells. However, the mechanism behind this reprogramming and their involvement in muscle healing are largely unknown. Recent studies in our lab suggest that hypoxia induced by injury plays an essential role in the reprogramming of muscle cells. Therefore, we hypothesize that hypoxia promotes the reprogramming of muscle cells into multipotent cells. This study will focus on the neuronal differentiation potential of reprogrammed myocytes by studying whether hypoxia can stimulate muscle cells to form neuromuscular junctions (NMJs). The proposals in this experiment are: 1. To test if hypoxia exposed cells can be induced to undergo neuronal differentiation in vitro and 2. To test if the neuronal differentiation extends into the formation of NMJs in vitro. We cultured primary myoblasts under hypoxia for 48 hours and put the cells into neural differentiation media. Stem cell and neuronal markers were identified via qPCR and immunocytochemical staining. Our preliminary results suggest that hypoxia can prime muscle cells into differentiating in neural media and form NMJs. The results of this study suggest that hypoxia is involved in the formation of NMJs and that cellular reprogramming plays a role in muscle regeneration. We will continue to study this topic to provide more evidence that reprogrammed muscle cells can enhance muscle healing and assist in functional recovery.
EPIGENETIC REGULATIONS IMPLICATE MUSCLE HEALING PROCESSES AFTER INJURIES

Haiying Pan, BS; Nariaki Nakamura, MS; Keith Kenter, MD; Yong Li, MD PhD

Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine;

Injuries result in micro-environmental changes and influences the release of niche factors that govern resident stem cell behavior during muscle healing. Our previous study suggests that cellular reprogramming can be initiated by the strong stimuli in the injured skeletal muscles. We successfully identified the injured muscle-derived stem cells (iMuSCs) and discovered their multipotent behaviors. However, the mechanism behinds the reprogramming is largely unknown, which has prevented the understanding of basic biology and pathogenesis as well as limiting the better therapeutic potential to repair the injured tissues. Epigenetic modifications can control the fate and behaviors of stem cells during development, in which histone methylations provided epigenetic regulation in stem cell-mediated regeneration of adult tissues. Epigenetics can regulate tissue homeostasis and stabilize stem cells function as well. We hypothesize that the injured milieu can influence the cellular reprogramming through epigenetic pathways that implicate muscle healing. We discovered the timeframe of histone methylation activations after muscle injury. Moreover, we detected the epigenetics synchronize the induction and behavior of iMuSCs, and Msh homeobox 1 (Msx1) is promoted and contributed as an epigenetic mediator in regulating cellular reprogramming. Our results suggest muscle injury mediates and influences the release of niche factors on transcriptional regulation through epigenetic modification, vs. histone methylation. Those intracellular processes associated with cellular reprogramming and determined the tissue healing. Thus, the strategy of targeting epigenetic pathways may impact the reprogramming stem cells, homeostasis, and functions in the injury site that significantly implicate the muscle healing processes.
Intercellular communication mediated through secreted bioactive molecules is essential for the maintenance of homeostasis and in turn becomes dysregulated under pathologic conditions. A fundamental cell biological process shared by all forms of life, from bacteria, to plants, to higher order mammals, is the release of bioactive microscopic vesicles. Eukaryotic extracellular vesicles (EV) are comprised of a phospholipid bilayer membrane, similar to the plasma membrane, and are characterized by two notable qualities: regulated concentration and topographic distribution of membrane-associated factors, and accumulation of a distinct repertoire of luminal components, including proteins and nucleic acids, that exist in isolation from the extracellular milieu. Although B cells maintain the unique ability to express antibody, or immunoglobulin (Ig), on both the cell surface and in a secreted, soluble form, and produce comparatively significant quantities of EV, previous studies have largely neglected Ig function in B cell-derived EV. We examined the composition of EV produced by human B lymphoma cell lines and primary B cells from wild type and mus knockout mice, which fail to make the secreted form of immunoglobulin M (IgM). Using a combination of sucrose gradient fractionation, fluorescence activated cell sorting, and biochemical analysis, we found that B cell EV lumens contain IgM and can function as a depot thereof. Further, IgM encapsulation is regulated across B cell subsets and by cytokine stimulation. Our data suggest that, although previously unrecognized, the sequestration of IgM in EV may impact how IgM is released and the effect IgM has under normal and disease states.
EVALUATION OF THE ANTI-INFLAMMATORY EFFECTS OF LOW-DOSE NALTREXONE (LDN) IN MICROGLIAL CELLS

Hannah Millard; Jenny Lamberts, PhD
Pharmaceutical Sciences, Ferris State University

Chronic neuroinflammation is a factor that contributes to the development of Parkinson's Disease (PD), a neurodegenerative condition. Activated microglial cells play a role in neuroinflammation by releasing pro-inflammatory markers like nitric oxide (NO) and cytotoxic cytokines. Microglia can be activated in a number of different ways, one of which is TLR4 receptor stimulation in response to lipopolysaccharide (LPS) and other infectious proteins. Naltrexone, an opioid antagonist, has been shown to inhibit the TLR4 receptor at low doses. Consequently, low-dose naltrexone (LDN) exhibits anti-inflammatory properties in Crohn's disease and multiple sclerosis, among other disease states. However, there is a lack of in-vitro studies that examine the relationship between LDN and microglial activation. The goal of this study was to determine the molecular mechanism of LDN's anti-inflammatory effects. SIM-A9 microglial cells were activated with LPS and treated with increasing concentrations of LDN. A Griess assay was performed to measure NO production. Then, data were analyzed using GraphPad Prism software. The results of this study demonstrated no significant reduction in NO production from LPS-stimulated SIM-A9 cells following LDN treatment. Future experiments will address some of this study's limitations, including: testing longer incubation periods, including pre-treatment experiments, using different cell types, measuring other pro-inflammatory markers, or measuring NO using a different assay. There continues to be a need to determine the molecular mechanisms of LDN in reducing inflammation. The long-term goal of this research is to reduce the severity of PD by inhibiting neuroinflammation caused by activated microglia.
SYNTHESIS OF A GO/PEDOT-DMSO ELECTROACTIVE NANOCOMPOSITE FOR TISSUE ENGINEERING APPLICATION

Mitchell Kenter, BA; Adil Akkouch, PhD

Medical Engineering, Western Michigan University Homer Stryker M.D. School of Medicine

Electrical stimulation is being evaluated in regenerative medicine for its potential to promote stem cells adhesion, migration, and proliferation. Poly(3,4-ethylenedioxythiophene) (PEDOT) is a conductive polymer with excellent stability and biocompatibility. To enhance its conductivity, dopants such as dimethyl sulfoxide (DMSO) can be added. Engineered graphene oxide (GO) can also be introduced as an oxidant to enhance conductivity and mechanical properties. We hypothesize that GO/PEDOT-DMSO will exhibit superior conductivity and electrical stability compared to undoped PEDOT. The goal of this study is to synthesize a GO/PEDOT-DMSO composite and to assess its chemical, morphological and electrical properties. GO/PEDOT-DMSO nanocomposites were synthesized by oxidative polymerization of 3, 4- Etylenedioxythiophene monomer (EDOT) in the presence of GO at different EDOT:DMSO ratios. Briefly, in a 100 mL three-necked flask ferric chloride in H2O was added to DMSO (0, 1, 5 and 10% wt) under stirring (1200 rpm, 20 min). Afterward, a mixture of EDOT (0.02 M) and 5 mg/mL of GO in methanol was added dropwise while stirring for 6-hours. GO/PEDOT-DMSO particles were collected by filtration, washed with methanol:H2O and dried at 60 °C in a vacuum oven. The resulting nanocomposite GO/PEDOT-DMSO was characterized by XRF, FT-IR, EDS and its morphological and electrical properties were investigated. The GO/PEDOT-DMSO_5% resulted in the higher doping, which was confirmed by the elemental composition studies. Furthermore, the GO/PEDOT-DMSO_5% exhibited significantly higher electrical conductivity and stability as compared to pure PEDOT. Overall, the results suggested that the GO/PEDOT-DMSO could potentially be used as an electroconductive substrate for electrical stimulation therapy.
Organs-on-a-chip is a class of device that integrates and mimics diverse biological functions by culturing cells from different organs into a system of few cm² in size. These devices are attractive to study disease progression, drug screening and physiological processes. The field of organs-on-a-chip is based on advances in stem cells, tissue engineering and microfluidics. Microfluidics fabrication consists of the creation of a master mold and replication into a polymeric microfluidic prototype. Master molds are created using photolithography, a complex, time consuming and expensive procedure. To date, R&D in microfluidics is limited to centers equipped with specialized equipment and facilities. Recently, 3D printing has attracted great interest because of its high speed, accuracy and repeatability to build complex structures. The goal of this study is to design an organ-in-a-chip using 3D printing to study the interactions between different tissues in the knee joint. The overall printing process is divided into 6-steps: 1-Produce 3D model using FreeCAD, by translating our "user requirements" to engineering specifications (microchannels size and shape; inlet and outlet size and valves location). 2-Convert the CAD drawing to STL format (standard tessellation language), the 3D printers' language. 3-Transfer the STL-file to the printer software to designate the size, orientation and printing parameters. 4-Print the device using high-resolution UV-LCS printer. 5-Remove, clean and cure the device under UV-light. 6-Test printing fidelity by comparing the measured and designed dimensions using stereo-microscopy. This multi-tissue-in-a-chip device is expected to be a useful tool for the study of osteoarthritis development and potential treatment.
iPoster 51

WISCHNEWSKY SPOTS AND BLACK ESOPHAGUS IN DEATHS INVOLVING DIABETIC KETOACIDOSIS: A CASE SERIES

Ricardo Kaempfen, MS; Joseph Prahlow, MD; Amanda Fisher-Hubbard, MD

MD Class of 2022, Pathology
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction  Mucosal lesions within the upper gastrointestinal tract at autopsy are relatively rare but can be important in determining a cause of death. Two such lesions are acute esophageal necrosis (AEN, or "black esophagus") and Wischnewsky spots of the gastric mucosa. This report details 3 cases where diabetic ketoacidosis (DKA) was a primary or contributing cause of death. Black esophagus and Wischnewsky spots present concurrently in all 3 cases. Case Reports: The first two cases presented were determined to have primary causes of death of acute pyelonephritis and toxic effects of methamphetamine respectively. Both cases were complicated by hypertensive and atherosclerotic cardiovascular disease, which could contribute to the pathological findings of AEN and Wischnewsky spots. No hypothermia was reported in either case. In the third case, the decedent died of DKA. Uncontrolled diabetes mellitus had led to recent amputation of a great toe. The pathological findings were complicated by possible hypothermia. Discussion  AEN has been reported in few case studies that have mainly centered around alcohol abuse and diabetes mellitus but have been as far reaching as hypothermia and Steven's Johnson syndrome. Wischnewsky spots are lesions of the gastric mucosa that are classically thought to be associated with fatal hypothermia but have been seen in conjunction with DKA. In this series, AEN and Wischnewsky spots presented concurrently in all cases, suggesting a possible common or connected etiology, especially when considering previously reported simultaneous presentation in hypothermia. Thermogenic dysregulation and ischemia in diabetic ketoacidosis are explored as possible pathologic mechanisms.
ACCURACY OF TORQUE LIMITERS IN ORTHOPAEDIC SURGERY

Jeffrey Gilbertson, MD; James Jastifer, MD

Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine; Orthopaedics, Ascension Borgess Hospital

Background: Torque limiters (TLs) are designed for locking screw insertion to ensure adequate insertional torque for reliable fixation, but also to prevent overtightening. Manufacturers recommend periodic calibration of TLs. Methods: We used a calibrated Mark-10 Series TT02 digital torque tool tester to test TLs in various orthopaedic sets in clinical use at two teaching hospitals. A T-handle was attached to the TL and continuous, hand-driven clockwise force was applied until the limit was reached. The result was recorded in Newton metres (Nm). This process was repeated for a total of 4 measurements per TL. The mean measurement for each TL was then standardized and expressed as a percentage of the intended limit set by the manufacturer. A mean, standard deviation, and range was then calculated for all TLs tested, and the distribution of data was graphed via a histogram in increments of 5% of the intended limit. Results Thirty-two TLs were tested. The average recorded limit for all 32 TLs was 93.6% of the intended limit (SD 10.2%, range 71.9% - 110.0%). A histogram was created with the dataset and demonstrated a bimodal distribution with peaks at intervals of 85-90% and 100-105% of the intended limit. Conclusions The average recorded limit for TLs in this study was less than intended by the manufacturer. The range in values may be a result of the time since calibration, the amount of clinical use, manner of use, or the sterilization process.
Micro-computed tomography (microCT) is a high-resolution 3D imaging, similar to tomography and x-ray computed tomography. X-rays are used to create cross-sections of a physical object that can be used to recreate a virtual model without destroying the original specimen, but on a small scale. The aim of this study is to use microCT technology to evaluate bone formation in rat calvarial defect treated with 3D printed composite scaffolds. nHA/PLGA-PCL and PCL (control) scaffolds were manufactured using a Regemat v1 bioprinter equipped with a fused-deposition modeling system. Male Sprague Dawley rats aged 12-weeks were used and all protocols for animal procedures were approved by the Office of Animal Resources at the University of Iowa. Under general anesthesia, full-thickness defects measuring 11x11-mm were created in the parietal bones then scaffolds were inserted (n=6). After 12 weeks, skulls were harvested, formalin fixed and scanned using a SkyScan-1272 at 70-kV, 142-µA, and pixel size of 10-µm. Reconstruction of skulls was performed with NRecon software. Bone mineral density and bone volume fraction were used to evaluate new bone formation within a region of interest of 10-mm from the center of the defects, using CTAn software. 3D volume rendering and 3D imaging of the defect area were done using CTvox software. The x-ray threshold was first calibrated and then applied to all samples. Quantitatively, defects treated with nHA/PLGA-PCL had significant increase in bone formation and BMD compared to PCL group. We were able to generate a workflow for bone scanning, reconstruction and data analysis using microCT.
Autosomal Dominant Polycystic Kidney Disease (ADPKD) is common (1/500) and leads to end-stage renal disease. Most cases are caused by mutations in the PKD1 gene, with one mutant allele being inherited and the second allele becoming inactivated somatically. Current evidence indicates that the PKD1 gene is unusually prone to inactivating mutagenesis, with an affected kidney holding diverse PKD1 mutations across thousands of cysts. Unfortunately, the mechanisms of gene inactivation are unknown. Our previous studies identified DNA structural motifs within PKD1 that may explain its inherent instability: PKD1 is highly repetitive, with tandem intronic repeats that are known to be associated with mutagenesis. This is because some repetitive DNAs can support non-duplex DNA conformations that interfere with DNA metabolism. In order to better understand mechanisms of mutagenesis, our objective was to characterize the repeat sequences within PKD1 and determine their likelihood to form structures in vivo. Therefore, we applied three different structure-determination algorithms to PKD1 and compared the outputs. We also mapped PKD1 pseudogenes onto PKD1 with respect to these sequence repeats. We found that all three structure-prediction programs identified similar canonical motifs, supporting a model whereby PKD1 encodes widespread structural elements that promote locus-specific rearrangements and mutation. In addition to these canonical motifs, PKD1 encodes unique non-canonical structural motifs. Since PKD1 inactivation leads to cystogenesis, the identification of structures promoting these mutagenic events is important for understanding the etiology of ADPKD and may identify unique gene-specific structures to target for treatment.
iPoster 1

**AWARENESS AND ACCESSIBILITY OF CONTRACEPTION**

David Lee, MD; Abigail Cheng, BS; Alexis Jones, BA; Emma Swayne, MS; Kathryn Jones, MS; Monica Ellis, BS; Gisella Newbery, BA; Arushi Tripathy, BS; Erica Myrick, MS; Debra Taubel, MD; Kelsy Schultz, BA; Alyssa Woodwyk, MS, CAPM

MD Class of 2020, MD Class of 2021, MD Class of 2022, Medicine Obstetrics and Gynecology, Western Michigan University Homer Stryker M.D. School of Medicine; Beaumonth Health

Introduction: Our study sought to assess community member attitudes toward newly-acquired immediate postpartum long-acting reversible contraception (IPLARC) benefits and determine whether a lack of knowledge about contraception may be impacting their attitudes. Prior literature has extensively detailed contraceptive methods, impacts contraception has on at-risk populations, and inquiries regarding implementation of IPLARCs prior to inclusion.
VIRTUAL REALITY USE FOR SYMPTOM MANAGEMENT IN PALLIATIVE CARE:
A PILOT STUDY TO ASSESS USER PERCEPTIONS

Tracy Johnson, BA; Laura Bauler, PhD; Duncan Vos, MS; Alan Hifko, MD; Mohammad Ahmed, BS; Paras Garg, MS; Michael Raphelson, MD

MD Class of 2020, Other, Family and Community Medicine, Western Michigan University Homer Stryker M.D. School of Medicine;

In the past two decades, virtual reality (VR) technology has found use in a variety of clinical settings including pain management, physical medicine and rehabilitation, psychiatry, and neurology. However, little is known about the utility of VR in the palliative care setting. Moreover, previous investigations have not explored user perceptions of the VR experience in this population. Understanding user perceptions of the VR intervention will be critical for the development and delivery of effective VR therapies. To examine the utility of VR for palliative care patients, a pilot study of VR use was conducted with 12 adult patients diagnosed with life-limiting illness who were residents at a free-standing hospice facility. The intervention consisted of a one-time 30-minute VR experience. User perceptions were assessed through both quantitative and qualitative means, including participant responses to open-ended questions after the VR intervention. Acute changes in symptom burden were assessed using the revised Edmonton Symptom Assessment Scale (ESAS-r). Participants found the VR experience to be both enjoyable and useful, and the intervention was well-tolerated overall. This study provides support for VR as a promising new therapeutic modality for patients undergoing palliative care.
CASE SERIES OF EASTERN EQUINE ENCEPHALITIS VIRUS IN WESTERN MICHIGAN

Adam Ladzinski, DO; Matthew Rumschlag, MS; Aditya Mehta, MD;
Eric Edewaard, MD; Larry Morgan, DO; Brett Jagger, MD PhD

Internal Medicine, MD Class of 2020, Internal Medicine, Other, Western Michigan University
Homer Stryker M.D. School of Medicine; Neurology, Ascension Borgess Hospital

Eastern Equine Encephalitis Virus (EEEV) is a mosquito-borne alphavirus responsible for unpredictable outbreaks of severe neurologic disease in humans. While the vast majority of human EEEV infections are either asymptomatic or clinically indistinct, a minority of patients develop neuroinvasive disease, which is a devastating illness with a mortality of approximately 30%; no treatments are known to be effective. Neuroinvasive EEEV infection is relatively rare in the United States, with an annual average nationwide case incidence of 9 between 2003 and 2016. However, 2019 was an exceptionally active year for human EEEV disease, with 38 nationwide confirmed cases, including 10 in Michigan. Here, we report the clinical characteristics of a series of 7 cases of confirmed neuroinvasive human EEEV disease who presented to Southwest Michigan hospitals. Patients presented with one or more symptoms suggestive of encephalitis, usually confusion and/or seizure, and the diagnosis of neuroinvasive EEEV was confirmed by cerebrospinal fluid testing for EEEV antibodies or genomic material. The demographic profile of EEEV patients was notable for a strong male predominance, with nearly all patients being men over 60 years of age. Neuroimaging findings were remarkable for brainstem MRI abnormalities in a subset of cases, a pattern that has not previously been reported. Mortality in this case series was >50%, higher than previously reported series, and most survivors experienced significant, persistent sequelae. These data highlight the need for further research into EEEV diagnostics and treatments as well as public health interventions to reduce the impact of EEEV disease.
iPoster 11

GENERAL VS LOCAL AND REGIONAL ANESTHESIA FOR RECURRENT GROIN HERNIAS: AN OUTCOME STUDY FROM AMERICAN COLLEGE OF SURGEON-NSQIP DATABASE

Kendall Smith, BA; Kent Grosh, MD; Vinayak Dewoolkar, MD; John Collins, MD; Saad Shebrain, MBBCh, MMM

MD Class of 2022, Surgery, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: There is little data about the benefits of local/regional anesthesia (LRA) compared to general anesthesia (GA) in patients with recurrent groin (inguinal-Femoral) hernias. We hypothesize that patients with recurrent hernias who undergo repair under LRA will have better outcome.

Methods and Procedures: Using 2017-ACS-NSQIP database, patients who underwent open repair of recurrent groin hernias were identified and divided into 2 groups. Outcomes (30-day mortality, complications, readmission rates, operative time, ORT (minutes) and total hospital length of stay (LOS, days) were compared.

Results: A total of 2169 patients were identified. Group A 1847 patients (85.2%) under GA, and group B 322 patients (14.8%) under LRA. Overall, no difference in demographic and comorbidities between the two groups. However, group B has higher COPD (6.8% vs. 3.2%, p=0.002), and were older (68 ± 15.2 vs. 62 ± 15.3, p <0.001). Complications, and readmission rates were similar in both groups. Operative time (min), LOS (days), were higher in Group A (74 ± 43 vs 60 ± 30.5, p<0.001, 0.65 ± 2.5 vs. 0.27 ± 1.13, p<0.001). Emergency surgery was higher in group A (6.9% vs 2.2, p=0.001). Group A were healthier, with ASA (I,II) score (60.9% vs. 54.8%, p=0.04). No differences in 30-day mortality between the two groups.

Conclusion: although, patients undergoing repair of recurrent groin hernia under LRA are older, and have higher ASA class, they experienced shorter operative time, and LOS compared to GA group. No difference in complication & readmission rates and 30-day mortality between the two groups was noted.
iPoster 13

BRAT 1 MUTATION: RAPID WHOLE GENOME SEQUENCING AS AN EARLY DIAGNOSTIC TOOL IN A NEWBORN WITH ANTIEPILEPTIC RESISTANT SEIZURES

Estefani Hee Chung, MD; Julia Frueh, MD; Angela Lai, MD; Andrea Scheurer, MD

Pediatric and Adolescent Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Neonatology, Bronson Methodist Hospital

Pathogenic alteration in BRCA1[breast cancer 1]-associated ataxia-telangiectasia mutated activator 1 (BRAT1) is associated with Rigidity and Multifocal Seizure Syndrome - Lethal Neonatal (RMFLS). We conducted a literature review using PubMed as a search engine using the terms BRAT1 mutation and found that since 2012, twenty-six patients with BRAT1 mutations have been reported, all with a spectrum of neurodevelopmental and phenotypic anomalies. The most common variable amongst these patients is anti-epileptic resistant seizures. Over the years, the prognosis of this condition has been variable; seventeen patients including ours, presented on the first day of life with intractable seizures and early death before the age of one while others had delayed presentation with a longer life span. We describe a firstborn Caucasian male born to non-consanguineous parents that presented with intractable seizures and multiple phenotypic anomalies at birth with death in the second month of life due to cardiorespiratory failure. Rapid whole genome sequencing (rWGS) collected in the second week of life identified compound heterozygous variants in the BRAT1 gene. Early diagnosis allowed for informed decision-making and avoidance of prolonged hospital admission to allow for palliative care at home. rWGS has become more cost effective with improved time-to-result making genetic testing a more feasible diagnostic tool. In previous studies, it is unclear when genetic testing was completed, however, many of these patients underwent multiple invasive procedures. We suggest that pediatric providers consider RMFLS on their list of differentials for a neonate with multi-drug resistant seizures and that rWGS be done more readily.
Introduction: Bilateral facial nerve palsy (BFNP) is a rare disorder that is responsible for 0.3 - 2.0% of facial nerve palsies. In a ten-year study, numerous causes of BFNP were reported including Lyme disease, Guillain-Barre syndrome, sarcoidosis, and AIDS. The risk of facial nerve palsy for pregnant women is 3.3 times that for nonpregnant women. We present a case of BFNP in pregnancy with acute HIV infection.

Case: A 42-year old G7P5015 female at 37 weeks gestation presented with BFNP. Three months earlier, she had negative HIV screen. She also had a diffuse rash 1 month prior to presentation that resolved with diphenhydramine treatment. Five days prior to admission, she noticed numbness and weakness extending from her forehead to upper lip bilaterally. Examination on presentation was consistent with term pregnancy and bilateral CN VII deficits. Workup including MRI of the brain, lumbar puncture, myasthenia gravis panel, Lyme antibodies, syphilis screen, serum ACE levels, routine hematology and chemistry labs were all normal. HIV screening returned positive with a confirmatory 129,455 copies/ml. One week after discharge, labor was induced resulting in the birth of a healthy newborn. Patient was started on emtricitabine, tenofovir and raltegravir, resulting in complete recovery of BFNP in 1 month.

Discussion: BFNP is a rare disorder but it should be considered in pregnant women with facial weakness. Acute HIV infection in pregnancy can also increase the risk of it. Delivery of the fetus and timely antiretroviral therapy can lead to complete neurological recovery.
iPoster 17

RETINAL HEMORRHAGES IN A 6-MONTH-OLD CHILD RELATED TO DISSEMINATED INTRAVASCULAR COAGULATION

Maria Magidenko, BA; Amanda Fisher-Hubbard, MD; Joseph Prahlow, MD; Theodore Brown, MD

MD Class of 2022, Pathology, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Retinal hemorrhages (RH) are seen in 50-100% of fatal cases of abusive head trauma (AHT) in young children. However, other causes of RH must be excluded. We present the case of an unresponsive infant who was resuscitated and was noted, on clinical exam, to have RH, raising the concern of AHT. A subsequent death investigation confirmed that the hemorrhages were due to disseminated intravascular coagulation (DIC).

Case Report: A 6-month-old child was found unresponsive in an adult bed, where he had been sleeping next to his father. Following prolonged (> 2 hours) cardiopulmonary resuscitation, he was eventually resuscitated. Ophthalmologic examination revealed retinal hemorrhages, raising the concern of possible AHT. The child died 8.5 hours after hospital admission. Except for focal subscalpular hemorrhage, there was no trauma noted at medicolegal autopsy. The brain had early hypoxic-ischemic changes, and the eyes had RH, but no grossly-evident peri optic nerve hemorrhage. The cause of death was certified as sudden unexplained infant death with a contributing factor of an unsafe sleep environment. A review of hospital clinical laboratory values indicated that the infant had DIC, which likely contributed to the RH.

Discussion: Children with AHT often have a triad of extensive RH with subdural hemorrhage and encephalopathy. In our case, extensive medical intervention and clinical laboratory findings consistent with DIC likely explain the child’s RH. This case serves to inform physicians about the importance of considering DIC as a potential cause of RH, and to remember that RH is not always indicative of AHT.
TENSION HEMOPNEUMOTHORAX IN THE SETTING OF MECHANICAL CPR DURING PREHOSPITAL CARDIAC ARREST: A CASE REPORT

Dustin Rowland, MS; Nicholas Vryhof, MD; David Overton, MD; Joshua Mastenbrook, MD
MD Class of 2023, Emergency Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: There are reported complications associated with automated mechanical CPR (AM-CPR); their incidence remains poorly characterized. We present a case of a previously unreported complication, tension hemopneumothorax.

Case Description: A 67-year-old woman with a history of COPD and CABG was observed to be slumped behind the wheel of an ice cream truck that drifted off the road at low speed and was stopped by a wooden fence, resulting in only minor paint scratches. Patient was found to be in cardiac arrest. Manual CPR was initiated. No signs of trauma were noted. Bilateral breath sounds were present. After 13 minutes of manual CPR, firefighters applied their Defibtech Lifeline ARM AM-CPR device to patient. During resuscitation, the device had to be readjusted twice due to rightward piston migration off the sternum. Five minutes later, patient had absent right-sided breath sounds and ventilations were more difficult. Needle decompression was performed with audible release of air. A chest tube was then placed and roughly 400 mL of blood were immediately returned. Within 2 minutes, ROSC was achieved and patient was transported. Chest CT showed emphysematous lungs, bilateral rib fractures, and a small right-sided pneumothorax. Patient’s condition worsened and she died 48 hours later.

Conclusion: Migration of AM-CPR device pistons may contribute to the development of iatrogenic injuries such as hemopneumothoraces. We recommend application of inked stickers to the piston head of AM-CPR devices in order to provide an objective visual marker for tracking, correcting, and reporting piston migration.
A QUALITY IMPROVEMENT PROJECT: UTILITY AND USABILITY OF A
DIABETES MEDICATION POSTER IN AN INTERNAL MEDICINE/MEDICINE-
PEDIATRIC CLINIC

Wasif Shamsi, MD; Nirmal Muthukumarasamy, MD; Loren Weber, DO; Russell Van Maele, DO;
Emilee SurVance, DO; Kevin Kavanaugh, MD; Tracey Mersfelder, PharmD

Internal Medicine, Medicine Pediatrics, Western Michigan University Homer Stryker M.D.
School of Medicine; Pharmacy Practice, Ferris State University

Introduction: Type-2 diabetes and related complications are a common disease state seen in primary care. The available therapies have increased exponentially. This can be difficult for a busy primary clinician to know and utilize available options efficiently.

Objective: The objective was to determine whether creating a quick reference diabetes medication poster based on costs, classification, and clinical outcomes/contraindications/cautions for use in an internal medicine/medicine-pediatric clinic improves resident and faculty knowledge, comfort, and awareness of those medications.

Methods: This quality improvement prospective study was designed to evaluate the utility of a diabetes medication poster in the clinic over a two-month period. A pre- and post-survey was electronically sent to 65 residents and faculty to assess their level of confidence and knowledge of diabetes medication treatment before and after the poster was distributed. This project was classified as non-research by the Intuitional Review Board.

Results: There were 40 physicians that responded to the pre-survey. The survey revealed >90% agreed or strongly agreed that the poster would decrease risk of adverse reactions, help control cost, and give confidence to providers while discussing and prescribing diabetic medications.

Conclusion: There are a myriad of tools that can be utilized to help navigate complex diseases, such as diabetes. Posters, such as the one utilized in this project, have rarely been evaluated. Based on initial results, physicians viewed the diabetes medication poster as favorable. The poster was placed in the clinic for a period of two months and a post-survey will be conducted.
iPoster 21

HYPERGLYCEMIA DURING REFEEDING SYNDROME IN SEVERE ANOREXIA NERVOSA: A CASE REPORT

Maria Demma Cabral, MD; Ethel Clemente, MD; Corey Lager, MD; Nital Murthi, MD; Cheryl Roberts, RD

Pediatric and Adolescent Medicine, Other, Western Michigan University Homer Stryker M.D. School of Medicine; Bronson Diabetes and Endocrinology Center, Bronson Methodist Hospital

Hypoglycemia, or low blood glucose (BG), is a known complication of anorexia nervosa (AN) due to caloric deprivation. Less commonly, hyperglycemia in AN may occur in the setting of refeeding syndrome (RFS), a life-threatening event due to metabolic derangements particularly from low phosphorus. We describe a case of a 21-year-old female struggling with severe AN, purging type, whose body mass index was < 15.5 kg/m2. Close outpatient monitoring for complications of malnutrition was warranted with weekly weight checks and blood and urine tests. After a month of intermittent, asymptomatic hyperglycemia (BG range: 100-182 mg/dL) with normal hemoglobin A1c (HbA1c 5.3%), new-onset glucosuria occurred with maximum BG of 249 mg/dL. Coincidently, she had gained four pounds in one week from increased nutritional intake. Phosphorus (1.6 mg/dL) and potassium (2.4 mmol/L) levels were low. She was hospitalized overnight for medical stabilization and monitoring of RFS. She received intravenous fluids with electrolyte corrections. Intermittent, asymptomatic hyperglycemia without glucosuria persisted after hospitalization with eventual spontaneous resolution. Subsequent oral glucose tolerance test revealed impaired glucose tolerance. Hyperglycemia in RFS is postulated to occur from rapid conversion of a catabolic to an anabolic state leading to impaired glucose metabolism despite insulin release. Likewise, the increased glucose load from refeeding can also induce a stress response, leading to increased cortisol levels, further contributing to hyperglycemia. Our case provides important learning points in recognizing hyperglycemia as a manifestation of RFS. Understanding the pathophysiology of RFS helps dictate safe refeeding management in malnourished patients, particularly in severe AN.
PROPHYLACTIC ENOXAPARIN ADJUSTED BY ANTI-FACTOR XA PEAK LEVELS IN SURGICAL ONCOLOGY PATIENTS.

Katherine Kramme, MD; Paya Sarraf, MS; Gitonga Munene, MD

Surgery, MD Class of 2021
Western Michigan University Homer Stryker M.D. School of Medicine

Background: Studies among populations at high risk of venous thromboembolism (VTE) have demonstrated that recommended doses for enoxaparin thromboprophylaxis are associated with high incidence of subprophylactic anti-factor Xa levels. This study examines the efficacy and safety of dose-adjusted enoxaparin guided by anti-Xa levels.

Study Design: Patients undergoing abdominal cancer operations had dose adjustments based on peak anti-Xa levels to attain a target of >0.20 IU/mL were compared with a historic cohort of patients receiving recommended thromboprophylaxis. Incidence of in-hospital VTE and bleeding after changes in enoxaparin dosing were monitored.

Results: The study population comprised 197 patients-64 patients in the prospective group and 133 patients in the control group. Baseline characteristics were similar between the intervention and control groups, with the exception of the Caprini score (8.09 vs 7.26; p = 0.013). In the intervention group, 50 of 64 patients (78.1%) had subprophylactic peak anti-Xa levels. The VTE rates were lower in the intervention than the control group (0% vs 8.27%; p = 0.018). There were no differences in bleeding events (3.12% vs 1.50%; p = 0.597), postoperative RBC transfusions (17.2% vs 23.3%; p = 0.426), or mean Hgb on discharge (9.58 vs 9.37g/dL; p = 0.414). Anti-Xa levels correlated positively with age (65.7 vs 58.2 years; p = 0.022) and negatively with operating room time (203 vs 281 minutes; p = 0.032) and BMI (25.3 vs 29.2 kg/m2; p = 0.037).

Conclusions Thromboprophylactic enoxaparin 40 mg daily is often associated with subprophylactic peak anti-Xa levels. Dose adjustment based on anti-Xa levels increased the daily enoxaparin dose, resulting in a lower rate of in-hospital bleeding.
PULMONARY EMBOLISM: A RARE COMPLICATION OF MYCOPLASMA PNEUMONIAE

Khadijah Hussain, BS; Prasanth Pillai, DO; Mariam Ischander, MD

MD Class of 2022, Pediatric and Adolescent Medicine
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Mycoplasma pneumoniae is a common cause of community-acquired pneumonia in children. Pulmonary embolism is a rare complication of Mycoplasma pneumoniae and has been cited in the literature in very few cases.

Case Description: A 16-year-old female with developmental delay and morbid obesity presented to our hospital with dyspnea, hypoxia, fevers, and malaise. She had congestion and a non-productive cough with pleuritic chest pain the week prior. Her medications included oral contraceptive pills. Diminished lung sounds were noted on examination and she was admitted to the hospital for acute hypoxic respiratory failure (SpO2 <88%). Chest x-ray showed left lower lobe pneumonia so she was treated with amoxicillin-clavulanic acid and ceftriaxone. Ultrasound was obtained due to calf pain and showed DVT of the right peroneal veins. CT angiography of the chest demonstrated bilateral segmental pulmonary embolism and bilateral lower lobe pneumonia. The patient was discharged on enoxaparin four days later on room air but dry cough persisted and she was readmitted two days later with hypoxia (SpO2 <88%). Nasopharyngeal swab was positive for Mycoplasma pneumoniae on admission and azithromycin was started. The following day, anti-cardiolipin and anti-ß2 glycoprotein antibodies were negative. The patient was discharged home on room air two days later.

Discussion: The mechanism by which mycoplasma infections cause thrombosis likely involves hypercoagulability resulting from cold agglutinin-induced hemolysis and formation of autoantibodies. Pulmonary embolism should be considered in cases of unexplained respiratory symptoms following mycoplasma infection in pediatric populations. Failure to recognize the diagnosis risks poor outcomes and high mortality.
ACUTE EXPOSURE AND SUBSEQUENT DEATH VIA INTRACORPOREAL CONCEALMENT OF METHAMPHETAMINE IN TWO UNRELATED CASES

Ernest Morton, MS; Elizabeth Douglas, MD; Prentiss Jones Jr., PhD

MD Class of 2022, Pathology, Biomedical Sciences
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: We present two unique and unrelated cases in which the subjects attempted to conceal methamphetamine from law enforcement by swallowing plastic baggies containing the illicit substance. Unlike many cases of drug overdose, each subject received medical care prior to death. The antemortem care and documentation of events allowed for the construction of a timeline that demonstrated the signs and symptoms of a methamphetamine overdose and allowed for a direct comparison of the two cases. Well-described timelines of drug exposures resulting in death are rare in the literature.

Case: In the first case, drug ingestion was suspected but not verified until postmortem toxicology results were obtained. A blood sample taken 15 hours after the patient was pronounced dead, demonstrated the presence of amphetamine and methamphetamine with concentrations of .48 mg/L and 62 mg/L, respectively. These concentrations are some of the highest ever recorded in the literature. In the second case, a man reported to the hospital shortly after swallowing a bag containing drugs. While the patient received care, he ultimately perished. Upon his arrival to the hospital a blood sample was taken and demonstrated amphetamine levels of 0.24 mg/L and methamphetamine levels of 8.3 mg/L. Twenty-three hours after he was pronounced dead, a peripheral blood sample demonstrated amphetamine levels of 0.25 mg/L and methamphetamine levels of 9.6 mg/L.

Discussion: Despite the similarities of the drug, method of delivery, physical decline, and time between death in these 2 cases, the difference in postmortem concentrations is markedly apparent. This report explores the plausible
TUMEFACTIVE DEMYELINATION: MULTIPLE SCLEROSIS PRESENTING AS A SINGLE RING-ENHANCING LESION

Eric Edewaard, MD; Vishal Deepak, MD; Prashant Patel, DO

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Tumefactive demyelination refers to demyelinating central nervous system (CNS) lesions greater than 2 cm, often with ring enhancement and surrounding edema. They can mimic solid malignancy of the brain, presenting a diagnostic challenge for clinicians.

Case: A 57-year-old woman with history of tobacco use, migraine, and a transient ischemic attack presented with 1 week of focal neurologic symptoms. She began to notice paresthesia of her left foot which progressed up her leg and involved her left arm. She also had waxing-and-waning weakness in her left upper and lower extremities which worsened over several days. Vital signs were stable. Physical exam demonstrated diffuse hyperreflexia, 1/5 left leg weakness and 4/5 left arm weakness with globally decreased sensation to light touch on the left. Magnetic resonance imaging of the brain showed a 2.5 cm right parietal white matter lesion with partial ring enhancement, without mass effect. Cerebrospinal fluid contained oligoclonal bands and elevated myelin basic protein. As imaging was nondiagnostic and the patient had no history of demyelinating disease, brain biopsy was performed and histopathology confirmed tumefactive demyelination. The patient began high dose systemic steroids, with significant improvement in her strength.

Discussion: Tumefactive demyelinating lesions must be considered in the evaluation of CNS lesions. They share characteristics with abscesses and malignancies including primary CNS lymphoma and high-grade glioma. When past medical history and lumbar puncture are nondiagnostic, brain biopsy is important in providing histo-pathologic diagnosis prior to initiating appropriate treatment.
Introduction: Delay in diagnosis of a functional adrenal mass is associated with significant morbidity and potential mortality. With nonspecific nature of clinical symptoms, a high index of suspicion and biochemical confirmation are critical for an accurate diagnosis.

Case Description: A 37-year-old male presented with severe chronic lower back pain. Over the previous two years he had undergone sporadic and incomplete workup. Twenty-four months previous, a CT abdomen and pelvis showed right renal stones and a 3.5 cm left adrenal incidentaloma. Dexamethasone suppression test at that time revealed elevated morning serum cortisol (18.4 mcg/dL) and undetectable ACTH levels. Over the last 18 months, before presentation, he developed hypertension, diabetes and marked abdominal striae. Twelve months previous, he suffered a cervical spine fracture that required decompression and fusion. Follow-up MRI demonstrated multiple thoracic spine fractures in various stages of healing and re-demonstrated the left adrenal mass. Bone DEXA scan Z-score was -2.3. Biochemical testing showed markedly elevated 24-hour urine cortisol (257mcg), with normal metanephrines and VMA. Plasma levels of aldosterone, renin, catecholamines, metanephrines, and normetanephrines were within normal limits. Findings were consistent with primary hypercortisolism. The patient underwent an uneventful laparoscopic adrenalectomy. Pathology confirmed a functional adrenocortical adenoma. Postoperatively, he completed a 10-day hydrocortisone taper. Three months postoperatively, the patient continued to do well and was able to return to work.

Conclusion: Delay in diagnosis of a functional adrenal mass is associated with significant comorbid conditions. Adrenal incidentalomas should undergo appropriate, prompt and complete biochemical testing to evaluate for functionality or malignancy.
LAPAROSCOPIC RESECTION OF A PHEOCHROMOCYTOMA (PARAGANGLIOMA) OF THE ORGAN OF ZUCKERKANDL IN A PEDIATRIC PATIENT

Katherine Kramme, DO; Robin Fountain, MD; Michael Leinwand, MD

Surgery, Western Michigan University Homer Stryker M.D. School of Medicine; Pediatric Cardiology, Bronson Methodist Hospital; Pediatric Surgery, Bronson Methodist Hospital

Introduction  Pheochromocytoma is a rare neuroendocrine tumor that secretes catecholamines. While classically located in the adrenal gland, a small percentage of these tumors arise along the parasympathetic change. The majority of cases are seen among adults age 20-50 years old. Surgical resection, most often via an open approach, is standard of care.

Case Discussion  We present an interesting case of a 12-year-old female diagnosed with a functional pheochromocytoma of the Organ of Zuckerkandl. Presenting symptoms included headaches, tachycardia, and hypertension. Following preoperative optimization of blood pressure, she underwent successful tumor resection via a minimally invasive laparoscopic approach. She was discharged home the following day off blood pressure medications with normal vital signs and resolution of symptoms. She has done well through follow up.

Conclusion  This case demonstrates the successful laparoscopic resection of a pheochromocytoma localized to the Organ of Zuckerkandl in a pediatric patient.
iPoster 35

GROWING TERATOMA SYNDROME: AN EXTREMELY RARE FINDING IN TESTICULAR CANCER

Jack Stover, BA; Kevin Herzog, MD; Kirk Payne, MD

MD Class of 2022, Western Michigan University Homer Stryker M.D. School of Medicine; Pathology, Bronson Methodist Hospital; Hematology and Oncology, Ascension Borgess Hospital

Introduction: Growing teratoma syndrome is a rare syndrome that affects patients with non-seminomatous germ-cell tumors (NSGCTs). It is characterized by recurrent growing masses that appear during or after chemotherapy in the presence of normal levels of tumor markers.

Case History: 23-year-old male presents with nausea, vomiting, and abdominal distention. Patient reports onset of abdominal pain and enlarging left testicular mass 5 months prior to presentation. Physical examination on admission reveals a protuberant abdomen tender to palpation and a 19 cm left testicular mass. Laboratory testing showed an elevated BHCG of <1 IU/mL, elevated LDH of 339 mg/L, and an alpha feto-protein of 3232 ng/mL. CT scan of the abdomen shows massive iliac and retroperitoneal adenopathy. Left orchiectomy shows non-seminomatous germ cell tumor with 70% teratoma and 30% embryonal cell features. Two weeks following hospital discharge, patient begins the first of three cycles of BEP chemotherapy. All tumor markers normalize after cycle 2. Follow-up CT scan post-chemotherapy shows a marked increase in the size of previously visualized abdominal masses in the setting of normal tumor markers worrisome for growing teratoma. Patient is referred to Indiana University where he undergoes surgical resection of all masses in a 12-hour operation.

Discussion: Detection of increased tumor growth on CT scan following chemotherapy for non-seminomatus germ cell tumor in the setting of normal tumor markers suggests the diagnosis of growing teratoma syndrome which may be cured with an extensive and highly specialized surgical procedure.
Background: Post-operative inguinodynia is a common complication of inguinal hernia repair. Few patients may experience severe disabling inguinodynia that impacts their quality of life, and invasive intervention to relieve the pain becomes necessary.

Method/Case: A 44-year-old healthy male developed symptomatic bilateral inguinal hernias. He underwent a laparoscopic bilateral totally extraperitoneal (TEP) inguinal hernia repair with mesh. Titanium helicoidal tacks were used for mesh fixation. Postoperatively, the patient experienced progressive severe (scored as 10/10) bilateral lower abdominal pain, for at least 5 months, described as worse than the hernia pain. Pain medications were unsuccessful. CT abdomen & pelvis demonstrates no evidence of hernia recurrence. Iliohypogastric/ilioinguinal nerve block was effective in reducing pain. However, the pain recurred within a few days. The locations of titanium tacks were identified on CT scan. Exam findings matched the distribution of tacks in lower abdomen. The patient underwent Robotic-assisted diagnostic laparoscopy to evaluate hernia repair and identify culprit tacks. Six titanium tacks along the lower posterior aspect of transversus and rectus abdominis muscles and Cooper's ligament were unscrewed and removed uneventfully using a robotic system. The patient experienced immediate and significant post-operative pain relief and returned to work with light-duty, within 1 week. In a two-month follow-up, the patient is pain-free and has returned to full capacity at work.

Conclusion: Severe inguinodynia can be debilitating after inguinal hernia repair. Meticulous surgical technique with appropriate use of tacks could significantly decrease the risk of inguinodynia. Robotic surgery provides a safe and effective approach to removing non-absorbable tacks.
Anorexia nervosa (AN) is an eating disorder (ED) commonly diagnosed in adolescence with health consequences such as malnutrition, bradycardia, refeeding syndrome, and death. Published clinical practice guidelines (CPG) are available to determine need for medical inpatient stabilization. We describe our experience with 3 adult patients admitted to the adult academic service using the modified CPG adapted from pediatrics as there is no such existing protocol for adults in our institution. All 3 patients were women with median age of 20 years and BMI < 18.5. All met at least one criterion for hospital admission: all had unstable vital signs, electrolyte imbalances, and failed outpatient management. Physicians, nurses, dietitians, and social workers were educated and involved as part of the multidisciplinary team, which is standard of care. No inpatient psychology was involved. The starting caloric intake was 1200-1500 calories, adjusted accordingly to a discharge caloric goal of 2100-2400 calories. None required enteral feeding with a nasogastric tube. Average % increase of ideal body weight was 2.4% (1.6 kg). The average length of stay was 7.3 days. The most decompensated patient stayed the longest and was transferred to a residential treatment facility for higher level of care after medical stabilization. The other two patients were discharged home. Effective and safe hospitalization of patients with ED requires close interdisciplinary collaboration given the stigma surrounding this diagnosis and the knowledge gap in most adult physicians. Our experience can help create the first CPG for the institution in providing care for adults with ED.
We present a case presentation of a robotic choledochal cyst excision with choledochoduodenostomy reconstruction. Choledochal cysts are due to congenital malformation of bile ducts and require resection due to their risk of malignant transformation. Historically these resections were done open due to the difficulty in creating the hepaticojejunostomy without tension on the anastomosis. Our supporting video highlights the benefits of robotic surgery with its superior visualization and articulating instruments facilitating a complex dissection and anastomosis. The patient is an 8 year-old girl who presented with right upper quadrant pain and weight loss and was found on ultrasound and MRCP to have a type IV choledochal cyst. She did well postoperatively without any complications. A brief review of the relevant literature is included. As compared to hepaticojejunostomy, hepaticoduodenostomy for reconstruction after excision of type IV choledochal cyst is well supported in the literature. It has been shown to have shorter operative times, a lower risk of postoperative bile leak, and decreased fat malabsorption, without an increased risk of cholangitis.
NON-ISCHEMIC CARDIOMYOPATHY AS A RARE ADVERSE EFFECT OF CLOZAPINE

Abhinav Garg, MD; Anandbir Bath, MD; Jagadeesh Kalavakunta, MD

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Interventional Cardiology, Ascension Borgess Hospital

A 50-year-old female with a past medical history of hypertension, hyperlipidemia, tobacco abuse and multiple psychiatric issues presented to the emergency department with complaints of gradually worsening shortness of breath, productive cough and left anterior chest pain that was worse with coughing and certain positions. The patient also complained of orthopnea and the inability to lay flat. The patient has a significant past medical history of resistant schizophrenia being treated with clozapine. The patient was tachypneic and hypoxic on presentation. Physical examination revealed normal heart sounds with no murmurs or gallops. Lab workup showed BNP 3200, hyponatremia and negative troponins. EKG showed sinus bradycardia with first degree AV block. Transthoracic echo showed severe global hypokinesis of the left ventricle with EF 20 to 25% and moderately dilated left ventricle. The patient underwent cardiac catheterization which revealed non-obstructive coronary arteries with severe non-ischemic cardiomyopathy. No other causative factor could be identified causing this cardiomyopathy. Her medications were reviewed and Psychiatry was consulted to evaluate for clozapine as a cause of non-ischemic cardiomyopathy. Clozapine was gradually tapered and then discontinued after discussion with psychiatry. The patient reported improvement in her shortness of breath, chest pain and orthopnea at a 3-month cardiology follow-up. Repeat echocardiogram revealed EF of 45 to 50% with borderline normal LV function. This case is unique as it outlines clozapine as a rare cause of non-ischemic cardiomyopathy, as discontinuation of the drug showed improvement in symptoms and heart function.
CASE STUDY: INCIDENTAL FINDING OF MULTIPLE MYELOMA IN PATIENT WITH BACK PAIN

Rubina Baig, MD; Mahmoud Kassir, MD; Wesley Eichorn, DO

Family and Community Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Multiple Myeloma is characterized by the abnormal proliferation of plasma cells in the bone marrow. This often results in skeletal destruction due to osteolytic lesions, leading to osteopenia and/or pathologic fractures. Multiple Myeloma may present in many different ways, including renal failure, anemia, hypercalcemia or just bone pain. We present the case of a 59 year-old woman who presented to the Emergency Department for back pain after a non-traumatic ground-level fall, and was found to have Multiple Myeloma.

Case History: Upon arrival to the Emergency Department, the patient was found to be hypertensive. She was also found to have an age-indeterminate vertebral compression fracture as well as new onset renal failure. Initially, renal failure was attributed to progressive hypertensive disease. However, considering the simultaneous bone fracture and anemia - workup was continued. Peripheral blood smear showed Rouleaux formation. Protein Electrophoresis confirmed IgA lambda monoclonal gammopathy. Skeletal survey discovered multiple skull lytic lesions. Diagnosis of Multiple Myeloma was confirmed, and the patient was promptly started on hemodialysis and chemotherapy.

Discussion: Multiple Myeloma accounts for about 10 percent of all hematologic malignancies. This case illustrates the importance of keeping high suspicion for Multiple Myeloma, even when the clinical picture is easily explained by other chronic and common disease processes. A clinical picture involving acute onset renal failure, anemia and back pain should warrant immediate workup for Multiple Myeloma.
Objective: The objective of this study is to determine the effect of pharmacist intervention on patient-centered outcomes in diabetes management.

Research Design: This study will be a single-centered retrospective chart review of diabetic patients seen by a physician at least twice between 1/1/2018 - 8/1/2018 and also seen by an ambulatory care pharmacist at least twice between 1/1/2019 - 8/1/2019. This study will encompass 15 different Bronson practice sites across three counties in the state of Michigan.

Outcomes: The primary outcome for this study will be change in HbA1c during 1/1/2019 - 8/1/2019 when compared with baseline lowering between 1/1/2018 - 8/1/2018. Secondary outcomes include blood pressure lowering, number and type of pharmacist interventions, medication changes (increased/decrease dose, medication added/deleted), whether the pharmacist was the only member of the care management team involved, and whether the patient was put on a statin, aspirin, or ACE/ARB therapy.

Preliminary Data: Data review is currently taking place, but preliminary results in the primary outcome are as follows:

- Of the 250 patients pulled, 47 met inclusion criteria.
  - During the physician baseline period (1/1/2018 – 8/1/2018)
    - Initial A1c: 9.56
    - Final A1c: 9.64
    - 18 patient’s A1c decreased
    - 26 patient’s A1c increased
    - 4 patients had no change
  - During the pharmacist intervention period (1/1/2019 – 8/1/2019)
    - Initial A1c: 9.85
    - Final A1c: 8.85
    - 32 patient’s A1c decreased
    - 15 patient’s A1c increased
    - 1 patient had no change

Further data review regarding analysis of primary outcome data and secondary outcomes is pending.
iPoster 43

DETERMINING DRUG-SEEKING BEHAVIOR IN THE EMERGENCY
DEPARTMENT:
PROVIDER PERSPECTIVES

Joshua White, BS; Natasha Trainer, BS; Parker Crutchfield, PhD; Duncan Vos, MS

MD Class of 2021, Medical Ethics, Humanities, and Law, Biomedical Sciences
Western Michigan University Homer Stryker M.D. School of Medicine

Background: With the growing opioid epidemic, Emergency Department (ED) providers are faced with the challenge of treating their patients' pain while also preventing abuse from "drug-seeking patients." Prior research has attempted to characterize these patients, who may demonstrate certain "drug-seeking behaviors." However, less is known about the thought process that goes into decision making on the part of the ED provider. This project aims to identify and quantify the criteria that ED providers use to determine which patients are likely to be drug-seeking.

Methods: This was an electronic survey administered to ED providers working in Southwest Michigan. Respondents were asked to complete a free-response section in which they wrote their top "drug-seeking criteria," and a section with unique patient scenarios/characteristics that they had to rank in accordance to its significance.

Results: Approximately 33 surveys were completed. The most common free-text criteria were behavioral, including Exaggerated or inconsistent, requests narcotic pain medications by name, and reports allergies to non-narcotic pain meds. For the section of ranking scenarios, the most significant criteria were similar behaviors, including Patient has a known history of prescription drug abuse, Patient requests pain medication by IV, and Patient reports and unusually large number of medication allergies. Patient demographics, such as age or race, were not seen as important.

Conclusion: This study identified the criteria that ED providers use to determine which patients are drug-seeking. Many of these criteria related to certain behaviors demonstrated by the patient and were consistent with established literature on drug-seeking.
UNINTENTIONAL DROWNING WITH THE CONTRIBUTING FACTOR OF CARBON MONOXIDE INTOXICATION

Raymond Bayer, BS; Joseph Prahlow, MD

MD Class of 2022, Pathology; Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: There are approximately 4,200 cases of drowning in the United States every year. Commonly identified risk factors for drowning include male sex, alcohol use, and lack of lifejacket. In this case report we will examine a less commonly identified risk factor: carbon monoxide exposure.

Case Report: A 19-year-old female drowned after entering a lake from a boat on which she had been riding. Prior to entering the water, she had reported a cramp and had been riding on the boat at low speed for two hours. Autopsy revealed muddy water in the mouth, nose, and upper airways, muddy fluid in the trachea and bronchi, and focal hemorrhages in the lungs bilaterally. In addition, bright red lividity and musculature were noted. Toxicology testing revealed an alcohol level of 71 mg/dl and carboxyhemoglobin level of 46.2%. The cause of death was drowning with a contributory factor of carbon monoxide intoxication.

Discussion: Carbon monoxide levels on idling and stationary boats frequently exceed 1,000 ppm in the rear deck area, enough to cause loss of consciousness within 2 hours of exposure. The ability of carbon monoxide intoxication to produce loss of consciousness makes it especially dangerous to persons on or near recreational boats. This case serves as a public health warning on the dangers of carbon monoxide emission from boats, and its potential role in contributing to drowning deaths.
5-FLUORACIL CAUSING ACUTE CORONARY THROMBOSIS

Ricardo de Castro, MD; Michelle Helbig, MD; Mike Francisco, PA; Mridul Parmar, MD; Mohammad Omaira, MD; William Nichols, DO

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Hematology/Oncology, Bronson Methodist Hospital; Critical care, Bronson Methodist Hospital

Introduction: 5-Fluorouracil (5-FU) is considered to be the backbone of colorectal cancer (CRC) systemic therapy since the great majority of recommended regimens include its administration. However, there are a few reports showing direct cardiac toxicity of the drug due to direct heart injury or less common coronary thrombosis. We report a patient with known stable CAD and new episode of chest pain after 5-FU injection for CRC treatment.

Case description: This is a 51-year-old man with a past medical history significant for CAD with previous coronary bypass surgery and CRC in chemotherapy with 5-FU who presented at emergency department with chest discomfort. He had his outpatient chemotherapy and minutes after the infusion of the drug patient developed anterior chest pain, sharp, associated with nausea and vomiting. Initial troponins were positive, but ECG did not show any signs of acute ischemia. Because of hypoxia and low blood pressure, patient was intubated and sent to intensive care unit. Echocardiogram showed reduced ejection fraction with wall motion abnormalities. Patient performed a left heart catheterization which showed an acute occluded saphenous graft to marginal branch of circumflex artery. A drug-eluting stent was placed and after 7 days of recovery patient was discharged home.

Conclusion: Chemotherapy toxicity with 5-FU is a rare phenomenon with sparse cases described in the literature. It is more common in patients with previous coronary artery disease and it seems to be more dangerous when the medication is given in a bolus regimen instead of continuous infusion.
THE PHANTOM OF LACTIC ACIDOSIS DUE TO METFORMIN IN A PATIENT WITH HEART FAILURE.

Ricardo De Castro, MD; Neiberg Lima, MD; Mridul Parmar, MD; Vishal Deepak, MD; William Nichols, DO; Susan Bannon, MD

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Metformin has long been the cornerstone of therapy for glycemic control in patients with type 2 diabetes worldwide. Historically, Metformin use has been contraindicated in patients with heart failure (HF) owing to concerns of lactic acidosis, even though recent data suggest a benefit of its use in this subset of patients.

Case presentation: Patient is a 64-year-old man with diabetes, non-ischemic heart failure, and hypertension who presented to the emergency department with progressive shortness of breath. On the morning of his admission, he developed mild difficulty breathing which was worse over the course of the day. Denied chest pain, nausea, vomiting. At ED he was normotensive with normal vital signs. Initial laboratory exams showed creatinine 2.75 mg/dl (from previous 0.96 mg/dl), arterial blood gas with pH 7.15, bicarbonate 15 mmol/L and lactic acid 14.5 mmol/L. He was admitted to the ICU, intubated and started on norepinephrine and continuous renal replacement therapy (CRRT). Lactic acid cleared slowly, and patient was extubated in his 3rd admission day. CRRT was discontinued and patient was discharged home in his 7th hospital day asymptomatic.

Discussion: Metformin is currently recommended as the preferred initial pharmacotherapy in patients with type 2 DM in the absence of contraindications. Even though there is an FDA warning about Metformin and heart failure, recent publications showed that Metformin is effective, safe, and generally well-tolerated in patients with heart failure. Nevertheless, lactic acidosis is a possible complication of this drug especially in patients with kidney dysfunction.
IMPROVING DOCUMENTATION OF LONG-ACTING, REVERSIBLE CONTRACEPTIVE MEDICATION AND PROCEDURE COUNSELING

Andrew Luciano, MD; Alison Radigan, MD; Rebecca Kaminski, DO; William Scott Humphrey, MD

Family and Community Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Long-acting reversible contraceptives (LARCs) provide benefits to the individual and society. Almost half of pregnancies in the United States are unintended. LARCs allow women to prevent unintended pregnancy with relatively little risk, while often having desirable side effects. Evidence suggests that patients desire more information regarding LARCs. LARCs are unique among contraceptives in that they have both medication and procedural risks and benefits. These must be presented to the patient and documented prior to insertion in order to facilitate informed consent. Currently, at the WMEd Family Medicine Residency Clinic, there is no standardized process for LARC counseling, and the procedure consent form used is nonspecific. Therefore, any details regarding risks, benefits, and alternatives discussed with the patient must be documented within the provider's note. We believe that our clinic could improve documentation and systemize the process of LARC counseling. An internal chart audit revealed that 50% of charts reviewed did not include documentation of discussion regarding LARC risks and benefits. This is important both for patient autonomy as well as a medicolegal standpoint. We created a LARC specific medication and procedure consent form detailing risks and benefits of each type of LARC, and a dedicated smart phrase to be used in the chart. Clinic providers were given an electronic presentation on these new tools. Following a three-month period of use, we will compare the presence and adequacy of documentation for LARC insertions prior to and following the intervention. We expect to see a significant increase in documentation of patient counseling.
NOVEL MIDDLE EAR MALFORMATION CAUSING CONGENITAL HEARING LOSS:
A CASE REPORT AND LITERATURE REVIEW

Aaron Zebolsky, MS; Corbin Sullivan, MD

MD Class of 2021, Western Michigan University Homer Stryker M.D. School of Medicine; ENT, Head & Neck Specialists, Bronson Methodist Hospital

Introduction: Congenital malformations of the middle ear are rare causes of conductive hearing loss. The ossicular chain comprised of the malleus, incus, and stapes is formed from the first and second pharyngeal arches early in development. Most malformations involve fixation of two or more ossicles, preventing adequate sound transmission. Functional ossiculoplasty has been well-described for common deformities, but there is a paucity of literature describing surgical techniques for other rare malformations.

Presentation case: We describe the case of an 8-year-old boy presenting with a lifelong history of unilateral hearing loss. On surgical exploration, the neck, crura, and base of the stapes bone were molded into a concentric ring with no footplate and only a loose fibrous connection to the cochlea. Furthermore, the region of the oval window was thick and immobile. A stapedectomy was performed as well as laser debridement of the oval window niche and placement of a bucket-handle prosthetic.

Discussion: Recent literature reviews propose distinct classes of congenital middle ear malformations in attempt to guide surgical management. These classes are based largely on incudostapedial joint fixation and stapes suprastructure. However, not every patient fits clearly into these classes. Concomitant involvement of the cochlear oval window has not been reported as in our patient here.

Conclusion: Rare middle ear malformations may be difficult to classify. An example is described here, with a mobile ring-shaped stapes and concomitant involvement of the oval window. Further research is needed to classify and guide management in these unique situations.
UNUSUAL CASE OF SPLENIC RUPTURE FROM UNDIAGNOSED HYPERCOAGULABILITY DISORDER

Allison Zheng, BS; Elizabeth Douglas, MD

MD Class of 2022, Pathology; Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Hypercoagulability is the predisposition of the body to create clots, or the inability of the body to remove normal clots. Hypercoagulability disorders often have multifactorial origins, requiring a genetic component with an environmental risk factor such as oral contraceptives or surgery for the disease to become symptomatic. Clinically, hypercoagulability diseases may present with pulmonary emboli or deep vein thrombosis and can sometimes be fatal. The aim of this report is to illustrate an acute, fatal outcome of hypercoagulability disorders.

Case Description: A 25-year-old Caucasian male collapses and becomes unresponsive after complaining of back and left arm pain. He had previously complained of shortness of breath, fatigue, nosebleeds, hemoptysis, hematemesis and unintended weight loss. Lifesaving measures were taken by paramedics and at the ER until a cardiac ultrasound showed no cardiac activity, and he was pronounced dead. At autopsy, 1200 mL free blood and 500 cc clotted blood was found in the abdomen. Cause of death was ruled as hemoperitoneum due to splenic rupture from splenic vein thrombosis. Postmortem genetic testing found homozygous mutations in factor XIII and plasminogen activator inhibitor-1.

Conclusions: Hypercoagulability disorders rarely lead to catastrophic hemoperitoneum. However, because of the possibility of asymptomatic, systemic effects, they can go undiagnosed until they present acutely, with potentially fatal results. As genetic testing is increasingly used to determine underlying risk factors, it is necessary to consider situations where living relatives provide consent an adult decedent.
A LITERATURE REVIEW ON THE ASSOCIATION BETWEEN VITAMIN D DEFICIENCY AND MULTIPLE SCLEROSIS

Mariyam Sheidu, BS; Maria Cabral, MD

MD Class of 2020, Pediatric and Adolescent Medicine
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Multiple sclerosis or MS is an autoimmune disease defined by axonal demyelination of nerves in the brain and spinal cord. While the etiology of multiple sclerosis (MS) is still largely unknown, it is known that a risk factor for multiple sclerosis is decreased sun exposure [1-3]. Since decreased sun exposure is a risk factor for vitamin D deficiency, we would like to explore if vitamin D deficiency could be a potential mechanism for MS pathogenesis, because vitamin D has a vast array of biochemical effects on the body beyond calcium and phosphate homeostasis.

Objective: The goal of this literature review is to examine whether an association exists between vitamin D deficiency and MS in the current literature.

Materials and Methods: Observational studies and randomized control trials in PubMed from the years 2011 to 2019. We used MESH terms "vitamin D deficiency" and "multiple sclerosis."

Results: Studies reveal that vitamin D deficiency is associated with increased disability in MS, but not necessarily an increase in oxidative products [15,16]. Results from randomized control trials suggest that high dose vitamin D3 supplementation does not stop disease progress, but does reduce the number of T2 lesions on MRI [18].

Conclusion: Vitamin D deficiency plays a role in multiple sclerosis development, but there is still some controversy regarding its use as a treatment option to prevent MS onset or halt MS progression. Nevertheless, there was an overwhelming majority of literature that supported that vitamin D is an important factor in MS pathogenesis.
INDUCED METHEMOGLOBINEMIA CAUSED BY BENZOCAINE SPRAY.

Ricardo De Castro, MD; Neiberg Lima, MD; Mridul Parmar, MD; Vishal Deepak, MD; William Nichols, DO; Susan Bannon, MD

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Sudden onset of hypoxia and dyspnea in a hospital setting requires prompt evaluation and treatment. When these symptoms are followed by cyanosis, methemoglobinemia should be on the differential as it requires special management. The prompt suspicion and treatment of this condition is crucial for patient recovery.

Case presentation: Patient is a 68-year-old man with COPD, OSA, and CAD who was admitted to the hospital for an episode of dyspnea after an elective septoplasty cauterization with inferior turbinate tonsillectomy and uvulopalatopharyngoplasty to treat OSA. He presented with new-onset dyspnea, followed by cyanosis, and severe hypoxia not resolved after 100% oxygen administration. Troponin and ECG were normal. A methemoglobin level was obtained and was 24.8%. He was given methylene blue and his symptoms, including his cyanosis, subsided less than 10 minutes after the initial dose. Talking with the patient after the event, he revealed to us that he was using the 20% benzocaine spray (Hurricane) for throat pain at least 20 times a day in the hospital even though it was prescribed to be used only three times daily as needed. Patient was discharged home the next day with no sequelae, asymptomatic.

Discussion: Methemoglobinemia can be either inherited or acquired. Inherited methemoglobinemia is a rare disorder. A wide variety of agents are known to induce methemoglobinemia, including benzocaine. In patients with multiple comorbidities, especially lung and heart disorders, the diagnosis is a challenge. Cyanosis not reverted after 100% oxygen is an important clue to define the disease.
STATIN-ASSOCIATED NECROTIZING AUTOIMMUNE MYOPATHY

Ricardo De Castro, MD; Abbas Jowkar, MD

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Neurology, Bronson Methodist Hospital

Introduction: Cardiovascular disease causes significant mortality in the United States and statins are important drugs in its prevention. They are generally safe and tolerated but may rarely cause toxic myopathy which improves on discontinuation of the drug. In very rare cases, 2-3 per 100,000 people, develop an autoimmune necrotizing myopathy.

Case description: A 67-year-old woman with diabetes, hyperlipidemia, hypertension developed proximal upper and lower muscle weakness and was found to have an elevated CPK in the rhabdomyolysis range. As she was on atorvastatin it was felt she may have developed statin-induced toxic myopathy and the drug was discontinued. Her weakness continued to worsen resulting in her falls and difficulties to walk. Her CPK levels, 5 months later, were still elevated in 4000s. EMG of her proximal muscles demonstrated amyopathic process with marked membrane instability characteristic of inflammatory myopathy. She tested positive for autoantibodies against 3-hydroxy-3-methylglutaryl coenzyme A reductase. Subsequent muscle biopsy showed evidence of scattered muscle necrosis with sparse inflammatory response. She was treated with intravenous immunoglobulin (IVIG) and prednisone with taper and addition of a second-line immunosuppressive agent. Her symptoms improved markedly and her CPK levels declined in the lower 1000s.

Discussion: Autoimmune HMGCR myopathy caused by statins is very rare and challenging to treat. Early diagnosis is important because delays in treatment can cause irreversible muscle damage with function loss.
SECONDARY ORGANIZING PNEUMONIA IN A 5-YEAR-OLD PATIENT WITH DOWN SYNDROME AND T CELL DEFICIENCY

Minh Nguyen, DO; Roua Azmeh, MD; Mariam Ischander, MD

Internal Medicine, Pediatric and Adolescent Medicine, Pediatric and Adolescent Medicine; Western Michigan University Homer Stryker M.D. School of Medicine

Post-infectious (secondary) organizing pneumonia (OP) is a rare phenomenon with nonspecific clinical findings, and variable radiographic patterns. In this abstract, we describe a case of post-infectious organizing pneumonia secondary to rhino/enterovirus infection in a 5-year-old Down syndrome (DS) female patient with T cell Immune deficiency and chronic pulmonary aspiration. Our patient is a 5-year-old female with DS and chronic pulmonary aspiration. She presented with shortness of breath and was found to have Rhino/enterovirus. A chest X-Ray (CXR) discovered bibasilar pulmonary opacities, suspicious for a community acquired pneumonia. She was started on amoxicillin and discharged in a stable condition. Three days later, patient was readmitted due to hypoxia in the clinic. A repeat CXR showed a secondary organizing pneumonia. A computed tomography of the chest found bilateral patchy ground-glass opacification lesions. Patient improved with an oral steroid. The classic radiologic features of OP are focal consolidation and ground glass opacities. The histologic pattern is defined by the presence of buds of granulation tissue. Biopsy is the gold standard for confirmation, but not required. Our patient's radiographic findings were consistent with post-infectious OP and her improvement with corticosteroid persuaded against a biopsy. In addition, DS patients have high rates of infections in the respiratory tract, attributed to their defective immune systems. In our patient, immunologic workup revealed low total lymphocyte count (CD45+) and T lymphocytes (CD3 and CD4). In this report, we highlight a rare pediatric case of post-infectious OP and a possible contributory role of immune dysregulation and chronic pulmonary aspiration.
AROUND THE WORLD: A SHORT CASE SERIES OF ATYPICAL INTRACRANIAL BULLET TRACKS

Keenan Boullemour, BS; Joseph Prahlow, MD

MD Class of 2022, Pathology; Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Perforating gunshot wounds (GSWs) of the head occur when a bullet travels all the way through the head, whereas penetrating GSWs occur when a bullet does not exit. In such scenarios, the bullet pathway is typically linear, in a straight line. We present two cases where, upon perforating the cranium, projectiles traveled along the inside curvature of the cranial vault, coming to rest on the inner opposite side of the vault, without having traversed the brain.

Case Descriptions: Case 1: A 19-year-old sustained multiple lethal GSWs. Imaging revealed a bullet within the right cranium. At autopsy, the GSW entered the left temporal region and traveled around the anterior inner table of the skull, stopping within the superficial right occipital lobe. Case 2: A 42-year-old was found dead from a suicidal gunshot wound of his submental chin. Imaging revealed a bullet within the right cranium. Autopsy revealed the bullet entered the cranial vault via the left anterior cranial fossa, and then traveled along the inner contour of the skull before stopping within the right superficial parietal lobe.

Discussion: Although most GSW projectiles travel along a relatively straight pathway within the body, including the brain, the presented cases demonstrate that bullets may travel in an arc-like trajectory along the inner contour of the skull and be recovered on the opposite side of the brain. Such a trajectory might help to explain a clinical scenario where neurologic deficits are not as pronounced as one might expect.
BRUGADA SYNDROME MIMICKING ACUTE CORONARY INFARCT

Ricardo De Castro, MD; Neiberg Lima, MD; Stela Sampaio, MD; Susan Bannon, MD

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Hospital de Messejana Brazil

Introduction: ST changes and chest pain are a scary and deadly combination. Most of the time they require urgent heart catheterization. However, Brugada syndrome can present with similar features and involves a different approach. We present a patient with typical chest pain and ECG showing possible STEMI who was diagnosed with Brugada syndrome.

Case description: Patient is a 46-year-old man with hypertension and smoking, who presented at emergency department complaining of anterior chest pain, sharp, radiating to left arm associated with dizziness and palpitations. His wife told that two weeks prior, she found him lying on the floor drooling, confused and with noisy breathing. At emergency department his blood pressure was 154 over 94 mmHg, oxygen saturation 98%. Troponin was negative. Initial ECG showed ST elevation in leads V1 to V3. Echocardiogram did not show wall motion abnormalities or decreased ejection fraction. Exercise stress test negative for ischemia and coronary tomography was normal. Electrophysiology exam negative for ventricular tachycardia or ventricular fibrillation. A final diagnosis of Brugada syndrome was made and patient had an implanted defibrillator placed.

Conclusion: Brugada syndrome is an autosomal dominant channelopathy responsible for 4-12% of all sudden cardiac deaths in the world. The most common mutation occurs in the gene SCN5A and family members screening is mandatory. There are three types of Brugada ECG, but only type I is considered diagnostic. Treatment consists in the implant of a cardiac defibrillator, even though novel therapies involving ablation are emerging.
METHEMOGLOBINEMIA AND VAGINAL BENZOCAINE.

Ricardo De Castro, MD; Neiberg Lima, MD; Marcos Madeiro, MD; Susan Bannon, MD

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Hospitalist Service, Bronson Methodist Hospital

Introduction: Methemoglobinemia can be either acquired or inherited. Most of the cases in the literature are acquired and associated with drugs especially dapsone and benzocaine. The prompt recognition of this condition is imperative in patient treatment and recovery. Symptoms can be indolent or develop within hours and treatment consist of methylene blue intravenous.

Case presentation: Patient is a 59-year-old woman with hypertension and recent shoulder surgery was found down at home. According to her husband, she was feeling lightheadedness and diaphoresis for the past 3 days before her admission with a dry cough but no fevers or chills. At her presentation, patient cyanotic and oxygen saturation at 75% not increased with 100% oxygen. The husband referred that patient uses vaginal benzocaine for itching. At the emergency department, her initial labs did not show abnormalities, chest x-ray was normal. Arterial blood gas was performed showing 35% of methemoglobin. Prompt treatment with methylene blue was initiated and patient did recover within hours. She was discharged home asymptomatic.

Discussion: Acquired methemoglobinemia is a rare condition but commonly associated with topic anesthetics like benzocaine. This medication is an over the counter formulation and can be easily found in groceries. The differential diagnosis is broad and clinicians should be suspicious of this condition whenever they find a combination of cyanosis not reverted with 100% oxygen and exposure to drugs such as dapsone or benzocaine. Treatment with methylene blue is the first choice and should be initiated as soon as possible.
Background: Atrial fibrillation is a common arrhythmia experienced after coronary artery bypass grafting (CABG) and has been associated with longer hospital stays and complications. Amiodarone is considered to be a drug of choice for atrial fibrillation prophylaxis. This study aims to assess the difference in outcomes when CABG patients are given prophylactic amiodarone as recommended on Bronson Methodist Hospital’s order set(s) as opposed to when patients are given an amiodarone regimen that differs from the order set(s) in place.

Methods: This study is an IRB approved, single-center, retrospective chart review including adult patients who received amiodarone for prophylaxis of atrial fibrillation and were admitted to Bronson Methodist Hospital in Kalamazoo, MI for CABG between January 2013 and June 30, 2019. The primary outcome is determining a difference in atrial fibrillation occurrence.

Results: A total of 100 patients were included in the final analysis with 50% having amiodarone regimens in concordance with the order set(s). The average length of stay was 8.6 days, and 68% of the patients included had a history of taking a beta-adrenergic blocking or calcium-channel blocking agent. 24% of these patients experienced perioperative atrial fibrillation, 83% of patients in this group were not given the recommended amiodarone regimen.

Conclusions: Results of this study allow Bronson Methodist Hospital to assess how well their CABG patients are being managed for the prevention of atrial fibrillation and guide future decisions regarding the CABG order set(s). We found that often adverse event endpoints were associated with non-conformity to the order set(s).
LANGERHANS CELL HISTIOCYTOSIS (LCH) OF GI TRACT IN A 6-MONTH-OLD FEMALE

Megan Potilechio, DO; Anya Ring, DO

Family and Community Medicine, Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Langerhans cell histiocytosis (LCH) is a rare hematologic disorder involving a proliferation of myeloid progenitor cells resembling dendritic immune Langerhans cells. The disease has a wide variety of clinical presentations with various local and systemic involvements. We present a case of a 6-month-old diagnosed with LCH presenting with GI tract involvement.

Case History: The patient is a 6-month-old female with severe malnutrition, lifelong feeding intolerance and recurrent bloody stools who presented with two days of bilious emesis and increasing feeding intolerance. Laboratory workup notable for hyponatremia, elevated LFTs, severe hypoalbuminemia, normocytic anemia, and leukocytosis with elevated inflammatory markers. Imaging demonstrated hepatomegaly with parenchymal edema and steatosis. A narrow proximal small bowel was seen on small bowel follow-through. EGD was significant for diffuse ulceration of the duodenum and congested mucosa in the stomach and rectum. Biopsy confirmed LCH in the stomach and recto-sigmoid colon. Bone marrow biopsy was positive for BRAF by PCR. After diagnosis, patient was started on monotherapy with cytarabine for treatment of systemic LCH.

Conclusions: LCH is a rare condition, and clinical presentation is highly variable. Involvement of GI tract is uncommon and is often indicative of systemic disease, which requires more aggressive treatment. As in this patient, LCH can mimic milk protein allergy, but it does not improve with dietary modifications or age. Although rare, LCH should be considered in infants with hematochezia and failure to thrive in the presence of feeding intolerance.
**iPoster 161**

**TRANSDERMAL 4% LIDOCAINE PATCHES FOR POST-OPERATIVE PAIN MANAGEMENT FOLLOWING ARTHROSCOPIC ROTATOR CUFF REPAIR: A PROSPECTIVE, RANDOMIZED TRIAL**

Donghoon Lee, BS; Morgan Leider, MD; Richard Campbell, MD; Bradford Tucker, MD; Matthew Pepe, MD; Fotios Tjoumakaris, MD

MD Class of 2022, Western Michigan University Homer Stryker M.D. School of Medicine; Rothman Orthopaedic Institute

Introduction: Multiple strategies have been investigated to decrease narcotic use following arthroscopic rotator cuff repair (RCR); post-operative lidocaine patch usage is one potential strategy. This study sought to determine the effectiveness of lidocaine patches in reducing post-operative pain following RCR.

Materials and Methods: This was a prospective, clinical trial evaluating the use of 4% transdermal lidocaine patches following RCR. Prospective recruitment occurred from the practice of three board certified, fellowship trained shoulder surgeons. Patients received interscalene nerve block and were prescribed 30 oxycodone (10mg). ASES (American and Shoulder Elbow Surgery) survey was completed pre-operatively and up to 6-months post-operatively. 14-day VAS (Visual Analog Scale) pain and medication log was completed three times daily.

Results: 80 (40 control, 40 lidocaine) patients were enrolled. There was no difference in ASES scores pre-operatively (P=0.69; Lidocaine 50.68 (+/- 26.14), Control 43.22 (+/- 13.75)) or 6 months (P=0.68; Lidocaine 88.12 (+/- 11.71), Control 89.55 (+/- 8.87)). Mean consumption of opioids in MME (morphine milligram equivalents) did not differ between groups during the first 14 post-operative days (P=0.379; Lidocaine 81.03mg (+/- 95.11), Control 58.65mg (+/- 87.50)). Daily pain logs did not differ at any time point in regard to pain (P=0.16 to P=0.99). The lidocaine group reported significantly less satisfaction with their pain management from evening of post-operative day 2 (P=0.048) through afternoon of POD8 (P=0.029).

Conclusion: Transdermal 4% lidocaine patches are not effective in reducing pain or opioid consumption following arthroscopic rotator cuff repair. Additionally, patients utilizing this modality were more dissatisfied with their pain management for much of their initial post-operative course.
EMOTIONAL LABILITY IN AN ATYPICAL ACUTE LYMPHOBLASTIC LEUKEMIA PATIENT WITH METHOTREXATE-INDUCED LEUKOENCEPHALOPATHY

Keenan Boul nemour, BS; Laura Bauler, PhD; Alyssa Erskine, DO; Mark Schauer, MD

MD Class of 2022, Biomedical Sciences, Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: The manifestation of intrathecal (IT) methotrexate toxicity in patients with acute lymphoblastic leukemia (ALL) has been well documented in young patients. Adults with B-cell ALL is uncommon but there are recorded cases. Managing adverse effects is therefore an underrepresented part of the present literature.

Case Description: We present a case with a triad of unique events: A 26-year-old patient with B-cell predominant ALL, the unique symptom of emotional lability in addition to common symptoms of methotrexate-induced encephalopathy, and a unique oral treatment for leucovorin-refractive neurotoxicity. Upon hospital admission for slurred speech and emotional outbursts followed by stroke-like symptoms, a full workup revealed central nervous system (CNS) toxicity following the patient's tenth cycle of chemotherapy. An initial leucovorin rescue did not resolve the patient's neurological symptoms within 24 hours, necessitating dextromethorphan-guaifenesin administration to limit the methotrexate toxicity. The patient displayed steady improvement over the following 4 days. The slurred speech, stroke like symptoms and imaging findings enabled prompt identification of methotrexate-induced leukoencephalopathy.

Conclusions: Emotional lability is symptom of methotrexate-induced CNS toxicity that is rarely documented by published cases. However, display of extreme emotional outbursts may provide an early indication of methotrexate induced encephalopathy. The triad of unique events in this case suggests that patients with atypical demographics for a disease may present with unique symptoms that do not respond to standard treatment measures.
OPIOID SYSTEM IMPLICATED IN TREATMENT OF DEPRESSION

Jay Patel, MD; Bruce Ruekberg, MD; Kathleen Gross, MD

Psychiatry; Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Many substances with antidepressant effects exist worldwide. Since introduction of prescription antidepressants in the 1950s, research has focused on the monoamine and glutamate neurotransmitter systems. Recent developments suggest that the opioid system may play a role in the pathogenesis and treatment of depression. This case highlights a substance that activates both the opioid and monoamine systems to treat depression.

Case Presentation: A 33 year-old-male with history of depression presented to an outpatient psychiatric clinic for re-evaluation of his depression. He reported multiple ineffective antidepressant trials. He had learned of a medication, tianeptine, marketed to treat depression in Europe. Although not FDA approved in the USA, he was able to obtain the medicine through unregulated channels as a supplement/research chemical. In taking this substance, he found improvement in his symptoms, but as time progressed, he found himself developing a tolerance to tianeptine, needing higher and higher dose to maintain euthymia. After his initial depression resolved, his attempts to discontinue tianeptine resulted in withdrawal symptoms similar to opioid withdrawal. Consequently, he presented to us in search of alternative treatment for his depression.

Discussion: Abuse potential and other risks exist in using agents such as tianeptine long term for depression, however this raises the question of the role of the opioid system in treating depression. Similarly, ketamine trials have shown reduced effectiveness with naltrexone blockade of opioid receptors versus no blockade. Antidepressants acting on the opioid system, without producing tolerance and dependence, represent a novel target for future research efforts.
EAR SWELLING AND AN UNUSUAL DIAGNOSIS OF CUTANEOUS LEISHMANIASIS

Ricardo De Castro, MD; Neiberg Lima, MD; Adam Ladzinski, DO; Davi Leitao, MD; Benjamin Avner, MD

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Rheumatology, Ascension Borgess Hospital

Introduction: Leishmaniasis is recognized as an endemic human disease in tropical countries but is uncommon in the United States. Its manifestations are broad and mimic inflammatory processes and neoplastic diseases. Whereas in endemic areas the diagnosis may be simple, it could be a real challenge in places with a low incidence of this disease.

Case presentation: Patient is a 51-year-old woman with diabetes complaining of ear pain and redness. Her symptoms started one month after a trip to Mexico. She noticed a small nodule in her ear which became swollen and red within weeks. An initial diagnosis of cellulitis was given, and she started on antibiotics. As the lesion was progressing, her antibiotics were switched, and drainage was attempted. However, no significant improvement was seen, and prednisone was added for possible polychondritis. A biopsy was performed with suspicion of possible skin cancer. Pathology reported a granulomatous inflammation process with parasitized histiocytes. Further investigation showed the presence of Leishmaniasis. Patient started on appropriate treatment with good recovery.

Discussion: Infection with protozoan parasites of the genus Leishmania leads to a wide variety of clinical disease syndromes. Cutaneous leishmaniasis (CL) includes different presentations with the most common being typical chronic, ulcerative lesion. Usually, it starts with a slowly progressing, nonhealing skin ulcer. The differential is broad including inflammatory and neoplastic diseases. Most CL resolves over time without specific treatment, but often patients seek medical care because of the location of disease, cosmetic concerns or secondary bacterial infection.
SPONTANEOUS SPLENIC RUPTURE DUE TO INFECTIOUS MONONUCLEOSIS

Megan Burke, MD; Mekala Neelakantan, BS; Karan Pandher, BS; Dilip Patel, MD

Pediatric and Adolescent Medicine, MD Class of 2021, Western Michigan University Homer Stryker M.D. School of Medicine; Chicago Medical School at Rosalind Franklin University

Introduction: Infectious mononucleosis, often caused by the Epstein Barr Virus, is a diagnosis that frequently occurs in the adolescent population. Following is a case description of an adolescent who presented with a non-traumatic splenic rupture after being diagnosed with infectious mononucleosis. The patient was ultimately treated with a splenic artery coil embolization.

Case Presentation: An adolescent female with flu-like symptoms and recently diagnosed EBV mononucleosis, presented with syncope, hypotension, tachycardia and acute abdominal pain. Physical examination revealed tachycardia, tachypnea, and significant abdominal guarding and tenderness. Ultrasound imaging showed free fluid in the abdomen, with CT demonstrating a splenic rupture and associated subcapsular hematoma. Subsequently, CT angiography was utilized to identify and embolize the splenic artery in a non-operative fashion, as well as identify collateral splenic arterial circulation. The patient remained hemodynamically stable during this time and tolerated the procedure well, with no other complications during the rest of the hospital course.

Discussion: Splenic rupture is a significant and dangerous complication of infectious mononucleosis. While the mechanism remains elusive, it is important for clinicians to be aware of this possible sequela and take necessary precautions for avoidance. The rupture is often caused by trauma, but can also be prompted in cases of increased intra-abdominal pressure or continued expansions of a subcapsular hematoma. As such, at-risk patients should avoid significant physical activity with close imaging follow-up. Hemodynamic stability is an important factor in determining the treatment for a splenic rupture, with possibilities including endovascular techniques versus splenectomy.
FACTORS ASSOCIATED WITH READMISSION FOLLOWING SHOULDER ARTHROPLASTY

Emma Swayze, MS; Christine Bowman, MD; Mark Sytsma, MD

MD Class of 2021, Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine; Orthopaedic Surgery, Bronson Methodist Hospital

Background: Shoulder arthroplasty is a common, reliable treatment for multiple shoulder pathologies, including osteoarthritis, rotator cuff arthropathy, and proximal humerus fractures. There has been growing interest in identifying and mitigating risk factors associated with readmission following arthroplasty procedures. Currently, there is a paucity of data regarding readmissions after shoulder arthroplasties.

Purpose: To identify factors associated with 30- and 90-day readmission rates following shoulder arthroplasty procedures. Methods: A retrospective review was conducted querying the electronic medical record at a single institution for shoulder arthroplasty procedures performed from July 2012 - June 2017. Patients 18 years and older with at least 90 days of follow-up were included in the study. Factors related to patient demographics, the surgical encounter, and post-operative readmissions were recorded. Logistic regression analysis was used to identify whether each factor was associated with 30-day and 90-day readmission.

Results: A total of 505 patients were included in the study. There was a 4.17% and 3.56% readmission rate within 30 and between 30-90 days, respectively. Patient age, length of stay, presence of congestive heart failure, and lack of peripheral nerve block were significant predictors of 30-day readmission. Length of stay, presence of coronary artery disease, diagnosis of proximal humerus fracture, and discharge to a skilled nursing facility were significant predictors of 90-day readmission.

Conclusions: Age, length of stay, cardiac co-morbidities, lack of peripheral nerve block, and discharge to a skilled nursing facility are significant predictors of readmission following shoulder arthroplasty procedures. Level of Evidence: Level III retrospective study.
DOES A COLONOSCOPY NEED TO BE DONE NOW?: QUANTITATING THE VALUE OF CLINICAL HISTORY IN DIAGNOSING DIVERTICULAR HEMORRHAGE

Farah Ahmad, MD; Iftiker Ahmad, MD; Barbara Pawlaczyk, MD

Ascension Genesys Regional Medical Center, Michigan State University; Internal Medicine, Michigan State University

Background: Diverticulosis is one of the most common conditions worldwide. Absent in the literature is work evaluating the contribution of clinical history in diagnosing diverticular hemorrhage.

Study Aim: To evaluate the diagnostic value of a characteristic diverticular bleed history (painless bright red blood per rectum with a past medical history of diverticular disease) in diagnosing diverticular hemorrhage among patients presenting with acute lower gastrointestinal bleed (LGB) without high-risk features.

Methods: This pilot retrospective cohort study was conducted at a Midwest community teaching hospital. Data collected from the electronic medical record involved adult patients presenting with acute LGB between 2003 and 2019. Inclusion criteria included vital stability and the absence of high-risk features. Patients were evaluated for the presence of a positive diverticular bleed history. Statistical analysis included a chi-squared analysis, sensitivity/specificity, positive predictive value (ppv), and negative predictive value (npv).

Results: 116 consecutive cases with a mean age of 67.7 were included with a diverticular hemorrhage prevalence of 24.2% (28/116 cases) by endoscopy. A positive history was significantly associated with an endoscopic diagnosis of diverticular hemorrhage with an effect size of 0.528.
Introduction: Annually, more than 350,000 out-of-hospital cardiac arrests (OHCAs) occur in the US. CPR has been shown to improve survival. Mechanical CPR (mxCPR) devices have been introduced to improve CPR quality. The American Heart Association states mxCPR can be considered in specific settings. Existing studies involve multi-jurisdictional populations and have yielded mixed results. We focused our study on a single fire department jurisdiction encompassing a large midwestern city served by a single ambulance provider and hypothesized that within this setting, the implementation of a LUCAS-2 mxCPR device would increase the pre-hospital ROSC rate as compared with manual CPR (mCPR).

Methods: Retrospectively, nine years of adult non-traumatic OHCA data were extracted from the ambulance provider ePCR. Chi-square analysis compared ROSC rates before and after LUCAS-2 implementation. Logistic regression assessed the impact of Utstein variables on ROSC. Results: From initially 857 OHCAs, 264 (74 pre-LUCAS) met inclusion criteria. ROSC rates were 29.7% (22/74) and 29.5% (56/190), respectively, for mCPR and mxCPR (p=0.9673). Logistic regression revealed ROSC was significantly associated with a witnessed arrest (OR 3.1; 95% CI 1.9-5.1; p<0.0001), and an initially shockable rhythm (OR 2.8; 95% CI 1.5-5.2; p<0.0013).

Conclusions: There is no significant difference in non-traumatic adult OHCA ROSC rates among patients receiving mxCPR vs mCPR. Systems with limited personnel might consider augmenting their resuscitations with a mxCPR device, although cost and system design factors should be considered. Secondary analyses suggest that OHCA patients with a witnessed arrest or an initially shockable rhythm, have a higher likelihood of attaining ROSC.
A 34-YEAR-OLD RECOVERING ALCOHOLIC WITH ACUTE LIVER FAILURE

Sravani Alluri, MD; William Humphrey, MD; Dalal Kassir, MD; Megan Potilechio, DO; Laura Marsh, DO; Susan Jevent-Eichorn, DO; Kristi Vanderkolk, MD

Family and Community Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Acute liver failure is a rare condition characterized by rapidly deteriorating liver function, altered mentation, and coagulopathy in individuals without pre-existing liver disease. The most common causes include drug-induced liver injury, viral hepatitis, autoimmune liver disease and shock. We present a case of a 34-year-old woman who developed acute liver failure during treatment for alcohol addiction with disulfiram.

Case History: The patient presented to the emergency department with four days of fatigue, nausea, vomiting, and upper abdominal pain. She had recently undergone inpatient treatment for alcohol withdrawal and was started on disulfiram at discharge. Two weeks into sobriety, she presented with the above symptoms and appeared mildly icteric. She was found to have AST 11,806, ALT 6,625, as well as, hyperbilirubinemia, and elevated INR. Abdominal ultrasound with doppler demonstrated normal hepatobiliary architecture with patent hepatic vasculature. Disulfiram was held and patient was started on supportive treatment. Workup for autoimmune, acute viral illness, Wilsons disease, and hemochromatosis was negative. The patient had steady decrease in transaminases and improvement in coagulopathy. Disulfiram was discontinued. The patient's liver function gradually improved, returning to normal within six weeks.

Discussion: Few etiologies can raise liver enzymes into 10,000s. This pattern of liver injury and rapid improvement with discontinuation of disulfiram and supportive care suggests drug induced liver injury. Only a handful of cases of disulfiram toxicity have been reported and we suggest this as the likely culprit in this case.

Kendall Smith, BA; Brandy Shattuck, MD; James Elliott

MD Class of 2022, Pathology, Western Michigan University Homer Stryker M.D. School of Medicine; Elkhart County Coroner

Introduction: Congenital diaphragmatic hernia (CDH) is a condition characterized by incomplete formation of the diaphragm, most commonly presenting prenatally or at birth.

Case History: We are presenting a case of a 3-year-old female who died of cardiac arrest hours after jumping in a bounce house at a festival. On autopsy, the patient was found to have a previously undiagnosed CDH, which likely herniated in response to pressure changes associated with jumping. The patient experienced several hours of vomiting prior to her death due to incarceration of the abdominal organs that had traversed the opening. Respiratory compromise and cardiac arrest ultimately ensued due to compression of the heart and lungs to the right side of the chest cavity.

Conclusion: Late onset CDH can be difficult to diagnose but should be considered for patients presenting with acute gastrointestinal or respiratory symptoms.
iPoster 84

PROPHYLAXIS THERAPY USING ADJUNCTIVE AZITHROMYCIN WITH STANDARD CEPHALOSPORIN VS. CEPHALOSPORIN ALONE FOR CESAREAN DELIVERY AT BRONSON HOSPITAL

Dean Van Loo, PharmD; Sylvia Wasson
Pharmacy, Ferris State University

Background: As a result of an increase in surgical procedures, there is also a rise in complications leading to morbidity and mortality. One of the leading indications for surgery is cesarean delivery. Cesarean delivery often leads to post-delivery infections. It is common practice to use a cephalosporin as prophylaxis treatment to reduce the rate of infections. Azithromycin as adjunct therapy to cephalosporin is showing promise in the reduction of post-cesarean infections. This study examines the further reduction impact of infection within a 6-week post-cesarean period.

Methods: This is an on-going retrospective, cohort study being conducted at Bronson Methodist Hospital including 100 patients with > 24 weeks gestation, aged 21 years or older, who have undergone urgent or emergent cesarean delivery for a singleton pregnancy receiving adjunctive azithromycin 500 mg IV and a standard cephalosporin vs. a standard cephalosporin alone between March 1, 2017 and May 1, 2019.

Preliminary Results: For this study, 60 patient charts were reviewed of which 29 were eliminated. The primary outcome occurred in 3 of 16 (18.8%) patients who received adjunctive azithromycin and 1 of 15 (6.7%) patients who received cephalosporin alone. These results equate to a confidence interval of -0.1 - 0.39 for the azithromycin + cephalosporin group and 0.07 - 0.21 in the cephalosporin alone group.

Conclusion: Currently, the prophylaxis adjunctive use of azithromycin + cephalosporin shows no significant difference from cephalosporin alone for urgent or emergent cesarean delivery at Bronson Methodist. However, with additional data collection, there may be a more convincing yield.
iPoster 2

HOSPITAL ADMISSIONS FOR MITRAL STENOSIS IN PREGNANCY IN THE UNITED STATES. A TWELVE-YEAR ANALYSIS.

Neiberg Lima, MD; Carol Lima, MD; Ricardo de Casto Jr, MD; Cuyler Huffman, MS; Mireya Diaz, PhD; Silvia Linares, MD; Mark Schauer, MD; Thomas A Melgar, MD

Internal Medicine, Obstetrics and Gynecology, Medicine Pediatrics, Other
Western Michigan University Homer Stryker M.D. School of Medicine; Hospital Geral de Fortaleza

Background: Maternal cardiac disease is the major cause of maternal morbidity and mortality. Even though mitral stenosis (MS) is rare in the US, it is a high-risk condition during pregnancy.

Methods: This study is a retrospective review of the HCUP-NIS Database from 2002-2014. Inclusion criteria consisted of the presence of at least one billing code for pregnancy and at least one billing code for mitral stenosis (MS). The comparison group consists of the presence of at least one billing code for pregnancy and no billing code for MS. We compiled lists of codes for known co-occurrences and performed procedures.

Results: There were 2014 weighted discharges for both pregnancy and MS. The data contained 104 weighted discharges with MS in Pregnancy that underwent one cardiac intervention. Patients who had at least one diagnosis for MS had a larger mean cost per discharge. Pulmonary Hypertension (PH), Atrial Arrythmias (AA), Stroke and Heart Failure (HF) were respectively reported in 25.71%, 7.14%, 0.95% and 19.28% of the discharges with billing code for MS and pregnancy whereas in patients without billing codes for MS only 0.04%, 0.07%, 0.05%, 0.22% had those conditions. No deaths were identified in this group.

Conclusion: Our study identified a low incidence of MS in the USA over our 12-year study period. Our results substantiate MS as a risk factors for PH, AA, HF and stroke in pregnant patients. Even though, the mortality is low, it is important that clinicians be aware of this diagnosis due higher costs and morbidity.
AN INTERVENTION DESIGNED TO INCREASE POST-PARTUM VISIT ATTENDANCE RATES AT A FEDERALLY QUALIFIED HEALTH CENTER

Megan Potilechio, DO; Dalal Kassir, MD; Angela Barreto, MD; Mahmoud Kassir, MD; Michael Mattia, MD; Tabish Naz, MD; Lauren Piper, DO; Joseph Billian, MS; Jennifer Moubray, BS

Family and Community Medicine, Other
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Kalamazoo County has a high infant mortality rate, 6.7 per 1000 live births from 2013-2017. Mothers and infants are at highest risk of complications within the first few days following a delivery. The initial 6 weeks post-delivery can be crucial to evaluate medical complications, provide contraceptive counseling, screen for postpartum depression and evaluate other social concerns. This project was designed to improve post-partum visit attendance and neonatal mortality at a federally qualified health center in Kalamazoo County.

Methods: All patients that were seen for prenatal care by the WMED Family Medicine Residents were enrolled into this study. Scheduling templates were developed in which newborn and maternal post-partum visits were scheduled together. We compared post-partum attendance rates from 01/01/2017-12/31/2017 to postpartum visit attendance rates from 08/07/2018 (Implementation of couplet scheduling) to current. Data was collected at three-month intervals. Improvements in post partum visit attendance rates were analyzed using the Chi-square test of independence. We also examined which factors are significantly related to post-partum visit attendance including whether this was a woman’s first pregnancy, age at delivery, race, ethnicity, primary language, gestational age at first prenatal care visit, number of prenatal care visits, gestational age at delivery and infant gender. To quantify the effect of each factor on attendance we used odds ratios and Bonferroni adjusted confidence intervals. There is a significant increase of post-partum visit attendance rates from 49% to 72% following implementation of couplet scheduling.
iPoster 9

CHAGAS HEART DISEASE IN THE UNITED STATES - A THIRTEEN YEAR ANALYSIS.

Neiberg Lima, MD; Duncan Vos, BS; Ricardo De Castro, MD; Adam Ladzinski, DO;
Carol Lima, MD; Thomas Melgar, MD

Internal Medicine, Other, Western Michigan University Homer Stryker M.D. School of Medicine;
Hospital Geral de Fortaleza

Abstract: Introduction: Chagas Heart Disease (CHD) is endemic in Latin America, causes tachyarrhythmias, bradyarrhythmias and heart failure. It is under-recognized in the US. The real epidemiology of CHD is not well known in the USA.

Methods: This study is a retrospective review from the NIS-HCUP Database from 2002-2014. Inclusion criteria consisted of the presence of a billing code for CHD. Two control groups were created; discharged patients with ischemic heart disease (IHD) and with non-ischemic heart disease (NIHD). We compiled lists of codes for known complications of cardiomyopathies, performed procedures and compared in these groups.

Results: There were 1383 weighted discharges with a billing code for CHD. Length of stay and hospitalization cost medians were higher in CHD group. The majority of the patients with CHD were Hispanic. Patients with CHD, IHD and NIHD were reported with Pulmonary Hypertension in 11.3% 3.09% and 12.46%; with sinoatrial node dysfunction in 4.5%,1.52% and 2.11%; with atrial tachyarrhythmias in 32.06%, 21.39% and 35.07%; with heart failure in 65.6%, 28.16% and 53.69%; with severe AV node block in 5.57%, 0.9% and 1.36%; with stroke in 6.85%, 0.9% and 1.36%; with ventricular arrhythmias in 23.88%, 7.22% and 6.57%. The proportion of CHD, IHD and NIHD that resulted in death during hospitalization was 3.21%, 3.40% and 4.29%.

Conclusions: Our study identified a low occurrence of CHD in the USA over 13-year study period. While the prevalence for CHD is low, it is important that clinicians be aware of this diagnosis due the mortality and morbidity associated.
Military veterans face unique challenges, placing them at a higher risk for opioid prescription, opioid use disorder, and fatal overdose. Veterans are at higher risk than non-veterans for chronic pain, PTSD, TBI, and fatal opioid overdose. Considering the current opioid epidemic, this study examines the rates of medicolegally-investigated opioid-related deaths among veterans in 12 counties in Michigan since 2008. Our analysis revealed that opioids were present in postmortem toxicology in 8.9% of investigated deaths. Additionally, we found an increase in opioid-related deaths among veterans beginning in 2015 and peaking in 2018. There were a total of 15 opioid-related deaths between 2008-2014, and 264 deaths between 2015 and 2019, outlining the rapid escalation to "crisis" levels. The number of deaths decreased in 2019, perhaps suggesting that preventive efforts are proving effective, and a "peak" of the opioid epidemic among veterans. Our study provides novel data, identifying fentanyl, methadone and oxycodone as the most commonly found opioids in veteran opioid-related deaths, differing from previous studies identifying hydrocodone, morphine, and fentanyl as the most common opioids in veteran overdoses. The presence of methadone in postmortem toxicology suggests a wider availability of methadone to veterans compared to previous studies. Given the novel findings of both the recent decline in opioid-related deaths and the prevalence of methadone among opioid-related veteran deaths, we believe this study offers compelling new directions for investigation in the midst of the highly-relevant opioid epidemic, especially among the high-risk population of our military veterans.
IMPACT OF PATIENT PROVIDER RELATIONSHIP ON POST-PARTUM CONTRACEPTION CHOICE

Lydia Hillier, BSN; Serena Smith, BS; Laura Bauler, PhD; Catherine Kothari, PhD

MD Class of 2020, Biomedical Sciences
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Post-partum contraception choice is an important predictor of effective family planning. Individuals utilizing the least effective forms of contraception have the highest rates of unplanned pregnancies and short interpregnancy intervals which contribute to poor birth outcomes. Patients with quality patient:provider relationships are more likely to use and be comfortable talking about contraception.

Objective: To determine if patient:provider relationship quality impacts post-partum contraception choice, we examined survey data from 244 women 8-weeks post-partum to assess the quality of the relationship as measured by effective communication and patient empowerment, post-partum contraception choice, and patient demographics.

Results: Of women surveyed 46% used medical contraception (sterility, intrauterine device, or hormonal methods), 21% used condoms, and 33% used natural family planning, abstinence, withdrawal or no birth control. Of those not currently using contraception, 25% were open to becoming pregnant, while 35% lacked an 8-week post-partum visit. The quality of the patient:provider relationship did not correlate with a patients choice of more medically involved contraception (p = 0.972). However, patients with weaker patient:provider relationships more often lacked a primary care provider, were poorer, and utilize Medicaid.

Conclusion: In contrast to the general population, post-partum women have increased healthcare system contact throughout pregnancy, which may improve patient comfort and self-advocacy within the healthcare system. For these women, it is possible that their life circumstances, comfort with the healthcare system, and future family plans play a much larger role in contraception choice than patient:provider relationship.
RACE AND INTERSECTIONALITY: WOMEN'S STORIES OF POWERLESSNESS AND INVISIBILITY IN HEALTHCARE

Elissa Allen, PhD; Yvonne Jackson, EdD; Evelyn Ainsley McWilliams, BA; Anmol Hans, BS; Terra Bautista, BA; Elishae Johnson, PhD; Fernando Ospina, MA; Joi Presberry, MPH; Lynette Gumbleton, BA; Catherine Kothari, PhD

Bronson School of Nursing, Western Michigan University, Department of Physical Therapy, Western Michigan University; MD Class of 2021, MD Class of 2023, Psychiatry, Other, Western Michigan University Homer Stryker M.D. School of Medicine; Kalamazoo County Health and Human Services; HelpNet Bronson Battle Creek, Bronson Methodist Hospital

Background: Black women experience higher rates of infant mortality and adverse birth outcomes compared to white women. Structured inequity, along with interpersonal discrimination, are primary contributors. Within Kalamazoo County, black mothers are twice as likely to live in poverty, report experiencing discrimination on a regular basis and are significantly more likely to have inadequate prenatal care.

Research aims: To understand women's personal experiences with medical providers, explore their expectations of medical providers and practices, and examine variations by race/ethnicity and socioeconomic status.

Methods: One-hundred-and-seventy-eight women were pre-recruited from the Mom's Health Experience Survey. Fifty-seven of them participated in Community Voice Panel (CVP) focus groups. Twelve focus groups were conducted by two female facilitators and discussed women's experiences spanning from home life to medical office experiences and back. All focus groups were recorded, transcribed, and consensus-coded for themes.

Results: Thematic analysis revealed differences in treatment of women of color (WOC) in the health care system. Powerlessness and invisibility were pervasive feelings in WOC, described as feeling "like a mouse in a corner." The intersection of class, age, and gender with race exacerbates the power differential women experience. Women also described positive provider experiences and strategies to improve the provider-WOC patient relationship.

Conclusion: WOC described systematic discrimination within the healthcare system and gave suggestions for improving the quality of care. Their suggestions serve as a call to providers to challenge their methods of delivering healthcare to WOC to improve health outcomes and overall experiences.
TEN CASES OF VALERYL FENTANYL IN SOUTHWEST MICHIGAN

Christine Stevens, BS; Erinn Ton, BS; Michael Markey, MD; Prentiss Jones, PhD

MD Class of 2021, Biomedical Sciences
Western Michigan University Homer Stryker M.D. School of Medicine; Sparrow Forensic Pathology

Introduction: Valeryl fentanyl, a synthetic opioid, is rarely found in drug overdoses in the United States. Since it was put on temporarily Schedule I status in 2017, valeryl fentanyl cases in the USA have drastically decreased. Its recent reappearance in SouthWest Michigan indicates that valeryl fentanyl may be on the rise as an intended component of illicitly-made opioids and should be tested for, as little literature exists describing valeryl fentanyl abuse trends, etiology, and mortality rates.

Case Description: Ten cases of drug overdose involving valeryl fentanyl are described. Cases were deemed positive when valeryl fentanyl was detected in postmortem blood. These cases occurred between July 2018 and November 2019 in Kalamazoo, Muskegon, Calhoun, Ionia, and Ingham county. The cause of death in all but one case was toxic effect of drug(s). The ages of the deceased ranged from 18-55 years old. Valeryl fentanyl was often found along with 4ANPP, norfentanyl, fentanyl, and morphine.

Conclusion: While fentanyl and heroin are commonly found together, fentanyl is often misleadingly sold as, or mixed with, heroin, valeryl fentanyl is an uncommon compound in drug overdoses. The fact that almost all of the cases described here were also positive for norfentanyl, fentanyl, 4-ANPP, and morphine, may suggest that the valeryl fentanyl is coming from the same source and is likely being mixed with heroin. Laboratories need to test for valeryl fentanyl given the dearth of clinical information and because detection can help law enforcement monitor drug trafficking trends and determine if regulations are working.
"THE QUICKER THEY COULD BE DONE WITH ME, THE BETTER": WOMEN'S PERSPECTIVES ON TIME, EQUITY, AND QUALITY PERINATAL HEALTHCARE

Pamela Wadsworth, PhD; Abigail Duerst, BS; Catherine Kothari, PhD

Bronson School of Nursing, Western Michigan University
MD Class of 2023, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine

Background: Provider-patient mis-communication is identified by infant mortality (IM) review teams across the nation. Two-thirds of IM-reviews in Kalamazoo issued recommendations to strengthen communication. Women's perinatal care feedback is critical to create equitable, quality, patient-centered care and improve health outcomes.

Objective: The goal was to elicit perspectives from a diverse set of women regarding communication barriers they faced and advice for improving perinatal care.

Materials and Methods: Women were pre-recruited from the Mom's Health Experience Survey into the Community Voice (n=57). Topics explored were perinatal healthcare experiences. Focus group discussions were led using semi-structured interviews. Conversations were transcribed, reviewed, and consensus-coded for themes.

Results and Discussion: Dominant themes related to how care delivery systems structure provider-patient communication. Three structural elements emerged from focus group data: continuity of care, adequate information exchange, and visit time. Barriers included: mandated provider changes, rotating providers, lack of communication between providers, lack of time for relationship formation and exchange information with healthcare providers. Facilitators to high-quality patient communication and care included continuity of care from pre-conception throughout the postpartum period, communication between the healthcare team, online portals, and relationships with healthcare providers.

Conclusion: Continuity of care, adequate information exchange, and sufficient time were three critical elements to patient-centered communication. Healthcare organizations should consider allocating more time for perinatal office visits and strategies for making the most of the visit time available, prioritizing continuity within and across encounters, and streamlining information exchange.
INTRODUCING MINDFULNESS INTO THE UME CURRICULUM: ASSESSING THE UTILITY OF A STUDENT-FACILITATED EXPERIENTIAL APPROACH.

Maria Magidenko, BA; Allison Zheng, BS; Adrienne Aardema, BS; Melissa Pellman, MS; Megan Sandberg, BS; Daniel Micheli, BS; Karen Horneffer-Ginter, PhD
MD Class of 2022, Medical Ethics, Humanities, and Law
Western Michigan University Homer Stryker M.D. School of Medicine

Background: Given its physical and emotional benefits, mindfulness has received increased attention in the medical field. However, it is not clear if mandatory mindfulness events promote adoption of mindful practices.

Objective: This study evaluated the effectiveness of a student-led experiential teaching approach in encouraging medical students to adopt a mindfulness practice.

Methods: A mindfulness event was hosted, including an overview of mindfulness research, examples of zero-second practices, a sitting meditation, and a choice of 3 breakout sessions (e.g. walking, yoga). Students were invited to participate in anonymous pre- and post-surveys, including current mindfulness interests and experiences as well as the Applied Mindfulness Process Scale (AMPS) and Perceived Stress Scale (PSS). Of the class of 84 students, 38 completed both surveys. Quantitative statistical analysis was performed in SPSS and qualitative responses were analyzed.

Results: Pre- and post-AMPS and PSS scores showed no statistically significant difference. Students felt less judged practicing mindfulness after the mindfulness event (p=0.026). Being able to choose breakout sessions was rated most effective (50% indicating "very much"). Lack of time appeared to be the biggest obstacle in practicing mindfulness (62% of students who elected to comment). 68% of students were somewhat or more motivated to practice mindfulness after the event.

Discussion: These results indicate that incorporating mindfulness into the medical school curriculum may be useful in decreasing stigma and increasing mindful practices. Recognizing multiple forms of mindfulness and providing options may help establish a mindfulness practice amongst medical students.
IDENTIFYING THE PRESENCE OF SECONDARY TRAUMATIC STRESS SYMPTOMS AMONG EMERGENCY MEDICINE RESIDENTS AT WMU HOMER STRYKER MD SCHOOL OF MEDICINE

Elise Klesick, DO; Paige Neaterour, MD; Clay Mishler, MD; Brenton Kinker, MD; Jon Parker, DO; Wesley Turner, DO; Alexander Brech, MD; Raxit Parikh, DO; Richard Lammers, MD; Tendeukai Warren, MD

Emergency Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Emergency physicians and residents face primary trauma daily while caring for patients at work and are at risk for secondary traumatic stress (STS). Prior research has shown that STS has a prevalence of 16-17% among health care workers in the acute care or trauma setting. Dr. Charles Figley defined STS as "the natural, consequent behaviors and emotions resulting from knowledge about a traumatizing event experienced by a significant other. It is the stress resulting from helping or wanting to help a traumatized or suffering person." This study examined the emergency medicine resident population at WMU Homer Stryker MD School of Medicine to identify the prevalence of these STS symptoms. The secondary traumatic stress survey by Bride et al. was sent out to PGY1-PGY3 Emergency medicine residents. Respondents were kept anonymous and data were collected for cross-sectional analysis through REDCap. A total of 28 residents responded to the survey. All respondents reported experiencing primary trauma since starting residency and all participants reported at least one symptom of STS. Residents averaged experiencing 11 symptoms. Twenty-five percent (7/28) had at least one daily symptom. The most frequent daily symptom was "Expecting bad things to happen", while "Feeling Jumpy" was reported by the fewest residents. "Intrusive Thoughts" were experienced at least once per week by the most residents (53.6%). Our study suggests that STS symptoms are experienced by a significant number of emergency medicine residents at WMU and that trauma is experienced by emergency medicine residents with regularity.
REDCAP AND RSHINY TOGETHER TO SURVEY AND DELIVER PERSONALIZED FEEDBACK OF A WELL-BEING ASSESSMENT

Duncan Vos, MS; Anita F. Bell, BS; Richard Brandt, BS; Karen Horneffer-Ginter, PhD

Biomedical Sciences, Medical Education, Other
Western Michigan University Homer Stryker M.D. School of Medicine

Background: Finding assessment tools that strengthen engagement and heighten perceptions of relevance are key to successfully delivering wellness initiatives. REDCap (Research Electronic Data Capture) and ShinyR are data tools commonly used independently. ShinyR applications can be written to query a REDCap database in real-time, typically to automate data-pulls. To the best of the authors’ knowledge, REDCap and ShinyR have not been used together to pull data in real-time in order to provide participants with an immediate personalized visual representation of their responses.

Objective: The goal of the current study is to examine the functionality of using REDCap and ShinyR to implement a well-being assessment immediately followed by a visual representation of the participant’s responses. Methods: A well-being assessment was developed in REDCap prompting participants to input their personal ratings of importance for each of six dimensions of well-being as well as time allocated to each dimension. Completion of the well-being assessment auto-directs the participant to the ShinyR application URL to view their personal results. Using an application programming interface (API), ShinyR programmatically pulls REDCap responses and performs transformations and computations to the data to provide participants with a visual representation of their personal assessment in real-time. Generated data demonstrate the utility of the well-being assessment and the personalized post-assessment well-being results.

Results: Generated data demonstrate successful functionality of a well-being assessment and post-assessment display of personalized results.

Conclusion: REDCap and ShinyR can be used together for a user-friendly real-time experience that strengthens engagement and heightens perceptions of a wellness initiative.
Implanted central venous port catheters (ports) are widely used for chemotherapy, total parenteral nutrition and blood monitoring. If placed in the subclavian vein, up to 15% of patients who receive implanted ports have immediate complications, including venous injury, pneumothorax and pneumomediastinum. Long-term ports are associated with delayed complications, including thrombosis, occurring in 1.9-21.5% of patients. Although rare, if thrombosis of the port’s catheter occurs, it can cause significant occlusion of the vein and result in superior vena cava (SVC) syndrome. We report this feared, potentially avoidable complication in two cases of SVC syndrome that developed in patients with previous diffuse large B cell lymphoma (DLBCL) in remission with retained long-term implanted ports.

Case Series: Case 1: A 93-year-old woman with a history of DLBCL status post port placement, treated with R-CHOP and R-CVP with adriamycin chemotherapy, now in remission for 3 years presented with a positional headache for 4 weeks. Associated symptoms included facial flushing, dizziness, dyspnea, chest tightness, and fluctuating left arm swelling over the same period of time. Her exam revealed normal vital signs, but distended neck vessels, facial plethora and a port in the right chest wall. Computed tomography (CT) of the chest with contrast revealed an acute-to-subacute occlusion of the SVC due to thrombosis of the distal tip of the port catheter.

Case 2: A 34-year-old man with a history of DLBCL status post port placement, treated with R-CHOP chemotherapy, now in remission for 2 years presented with facial swelling for 2 days. Associated symptoms included a positional headache, facial flushing and dizziness.

Our cases highlight the importance of removing the implanted port catheter soon after chemotherapy is completed, and remission is confirmed. This can prevent port catheter-related complications like thromboembolism and reduce the burden, risk and cost associated with systemic anticoagulation.
MAKING OUTBREAK INVESTIGATIONS REAL TO MEDICAL STUDENTS

Mireya Diaz, PhD

Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine

Objective: Rapid spread of outbreaks, like the current coronavirus, in a world with dimmed frontiers underscores the relevance of this topic in the medical curriculum. Limited literature on how to deliver this content in a format that combines experiential, competency, and team-based frameworks motivated to assess a learning activity developed under such foundations.

Methods: The effectiveness and students' perception of the activity were evaluated in a prospective cohort of 84 first-year medical students during Fall 2019. Competencies gained as shown in a team presentation, as well as students' perception of competencies gained and activity's utility were gathered. The learning activity was not graded. Estimates of students' perception account for correlated data within teams.

Results: Team presentations indicated that most competencies were acquired, with room for improvement in issues such as outbreak detection, epidemic curve type, generating informative hypotheses about most likely outbreak sources, and designing a study suitable for answering the hypothesis. Based on 56 responders representing all teams, most (82.6%) agreed or strongly agreed that the learning activity was useful in providing the necessary skills to conduct an outbreak investigation beyond what was learnt in class.

Conclusion: Providing students with experiential learning opportunities in which they can practice their recently acquired skills (i.e. recognize symptoms, elaborate a differential diagnosis) engaged them in the non-clinical components of the activity (i.e. epidemiology context). Such opportunities can also gauge outside a formal evaluation the level of mastery achieved and deficiencies not only in the specific but also in related competencies.
DEVELOPMENT OF SOFT TISSUE SIMULATORS FOR BIOPSY AND SUTURING TRAINING AMONG STUDENTS AND RESIDENTS

Aniruddha Paranjpe, MD; Thomas Melgar, MD; Carleigh Zahn, MD

Medicine Pediatrics, Western Michigan University Homer Stryker M.D. School of Medicine; Department of Internal Medicine, Division of Rheumatology, University of Iowa Healthcare

Background: Abscess drainage, cyst removal, shave biopsy, skin tag removal are commonly performed outpatient procedures for which medical students, medical residents need training. While multiple commercial training models exist to assist trainees in practicing various outpatient dermatological procedures, these do not provide skills of palpation since they often lack the 3 soft tissue layers found anatomically including dermis, subcutaneous tissue and muscle fibers.

Method: Silicon based casts were made in stages by adding dye and allowing the silicon to solidify creating multiple layers of soft tissue, with muscle fibers at the base, subcutaneous layer above the muscle layer and skin layer most superficially. A mesh was placed within the subcutaneous layer while hardening. This provided tensile strength for the simulators to allow trainees to approximate the skin layers during suturing. The skin layer was hardened within textured plaster molds to develop skin tags and warts with a skin like texture. Cysts were developed filling latex glove finger tips with non-scented moisturizer. These cysts were placed between the subcutaneous and skin layers of the model during the hardening process.

Results/Discussion: Medical student and Resident trainees used scalpel, forceps and sutures with hemostats to perform skin tag removal, perform shave biopsy and cysts removal. The mesh located between subcutaneous and skin layers allowed for the tensile strength needed to approximate the superficial skin layer together during suturing. Our model highlights how low-cost soft tissue simulators can be developed and used to train medical students and medical residents in performing common soft tissue outpatient procedures.
A SURVEY OF OPIOID PRESCRIPTION PRACTICES AND PAIN MANAGEMENT EDUCATION IN ORTHOPEDIC SURGEONS

Kelsey Suggs, MS; Keith Kenter, MD

MD Class of 2022, Orthopaedic Surgery
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Opioid overdoses are a leading cause of injury-related death in the U.S. with prescription opioids largely contributing to cases of abuse[1]. Orthopedic surgeons are among the highest prescribers of opioids with prescriptions often in excess of pills[1,2,3]. This may be a result of the lack of education regarding pain management[4,5]. We hypothesize that there is no standard pain management prescribing regimen after shoulder arthroscopy with U.S. surgeons and this will be similar to when compared to other countries. Furthermore, we believe that orthopedic surgeons, in general, do not receive adequate training or guidelines in postoperative pain management regimens.

Methods: We implemented a survey of Magellan Society for Orthopedic Surgeons members at a recent meeting. Questions regarding postoperative pain management regimens following shoulder arthroscopy were recorded. Also asked was their educational experience or where they learned this regimen. Results: 34 orthopedic surgeons from 15 countries responded. There was minimal to no formal education regarding post-operative pain management. Comments on their regimens ranged from "do not know reason", "trial and error" or 'gestalt". The survey also demonstrated great variability between pain control regimens for the same operation regardless of country.

Conclusions: Our study confirms the lack of training regarding postoperative pain management in orthopedic surgery in the U.S., but also illuminates that this is not uniquely a U.S. problem. Our pilot data underscores the need for further research to understand the relationship between pain management training and differences in opioid abuse in the U.S. compared to populations in other countries.
iPoster 82

A SACROILIAC JOINT SIMULATOR FOR ULTRASOUND GUIDED SI JOINT INJECTIONS TRAINING

Thomas Melgar, MD; Anirrudha Paranjpe, MD; Carleigh Zahn, DO

Medicine Pediatrics, Western Michigan University Homer Stryker M.D. School of Medicine; Department of Internal Medicine, Division of Rheumatology, University of Iowa Healthcare

Introduction: Injection of the sacroiliac (SI) joint is an important treatment modality for patients with low back pain with and without spondyloarthropathies of SI joint. Performing the procedure using landmarks fails to reach the sacroiliac joint space in most cases. Ultrasound guidance can improve the success rate. No ultrasound capable SI joint injection simulator is commercially available to train physicians. Similar simulators for other joints cost $1,500-$7,000. We set out to create a low-cost high-fidelity SI joint injection simulator.

Methods: A plaster cast was taken of the lumbosacral region of a volunteer and rendered waterproof using a latex sealant. Artificial foam bones of the sacrum and pelvis ($78) was obtained from Sawbones™ straight pins supported the bones in the cast. Six liters of ballistic gel was made using high concentrations of Knox® gelatin ($15). Gelatin was poured into the mold and refrigerated one liter at a time to avoid floating of the foam bones from the desired location.

Results: Three ultrasound capable SI joint simulator were created from the same mold and used to train an average of 45 internal medicine, med-peds and family medicine residents and third and fourth year medical students. Learners had the opportunity to visualize the needle insertion into the sacroiliac joint using dynamic ultrasound. Since the gel is transparent the learner can correlate the image on the ultrasound machine with direct visual inspection of the needle and pelvic anatomy.

Discussion: A low-cost, high-fidelity simulator can be created to train learners on SI joint injections.
EVALUATION OF MEDICAL STUDENT FACTORS THAT MAY INFLUENCE THE DECISION TO PURSUE A CAREER IN ORTHOPAEDIC SURGERY

Lucy Meyer, BA; Symone Brown, ; Kevin Black, MD; Ann Van Heest, MD; Lisa Cannada, MD; Keith Kenter, MD; Mary Mulcahey, MD

Tulane University School of Medicine; Tulane University Dept of Orthopaedic Surgery; Penn State University Dept of Orthopaedic Surgery; University of Minnesota Dept of Orthopaedic Surgery; Univ of Florida Jacksonville Dept of Orthopaedic Surgery; Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine

Background: As more women embark on medical careers an increasing number are pursuing careers in surgical subspecialties. Despite these improvements, orthopaedic surgery continues to have the lowest female representation amongst surgical subspecialties. The purpose of this project was to determine the motivating and deterring factors for medical students, particularly females, interested in a career in orthopaedics.

Methods: An anonymous electronic survey was sent to PGY-1 and PGY-2 orthopaedic residents at 5 ACGME-accredited institutions and to medical students at 3 LCME-accredited institutions. The survey consisted of questions regarding the participants' medical school demographics, motivations for pursuing careers in various fields and factors that may have deterred them from choosing a career in orthopaedic surgery.

Results: Overall response rate: medical students - 25% (455/1788); orthopaedic residents - 21% (167/780). 40% of students and 46% of residents indicated experiences before medical school most heavily influenced their decision for a specialty and most impact was from an individual. Patient care was the most important factor to pursue orthopaedic surgery (77% students, 73% residents). The competitive match process and a lack of work-life balance were the most deterring factors to pursue orthopaedic surgery. Both groups responded freely to verbal deterrents they received from faculty/friends for considering orthopaedic surgery which demonstrated a male gender bias.

Conclusion: This study highlights the need to mentor students regarding their career choice and providing positive role models. More importantly, minimizing negative comments may encourage more women to pursue a career in orthopaedic surgery.
IPoster 33

SENTIMENT ANALYSIS OF INITIATING MESSAGES POSTED AROUND A BRAIN CANCER DIAGNOSIS IN A MODERATED CANCER ONLINE COMMUNITY

Ka Sam, BS; Melissa Sherfield, BS; Mireya Diaz, PhD

MD Class of 2023, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine

Background: Social media has become a haven for patients and their loved ones where they can exchange information and find support. Analysis of posted messages can provide valuable knowledge about disease experiences.

Objective: To perform sentiment analysis of anonymous messages about individuals recently diagnosed with brain cancer.

Methods: Ninety-seven free-text messages posted in a moderated cancer forum were analyzed with text mining tools. Retrieval of messages' polarity and emotions (Plutchick's wheel) was conducted using Bing and NRC emotion lexicons. Overall estimates were meta-analyzed. Potential differences of items between patients' age group, sex, tumor severity, time since diagnosis, and messenger's relationship to patient were assessed. Principal component (PCA) and multiple correspondence (MCA) analyses on emotions were performed to assess their co-occurrence in messages and lexicon respectively. (IRB: WMed-2019-0487)

Results: Messages display on average 9.7% (95% CI 8.9, 10.6) positive, and 11.0% (95% CI 10.1, 12.0) negative affect. Polarity is lexicon-dependent. Fear was the most prevalent (10.7%, 95% CI 9.8, 11.7) emotion, present in all messages. The eight basic emotions loaded into three components (73% variance explained), corresponding to positive emotions, negative emotions, and their combination. Messages with higher or unspecified severity showed slightly increased negative affect (p-v=0.019).

Discussion: Initiating messages around a brain cancer diagnosis portray a neutral affect by far, and certain amount of fear. Affect differs by disease severity. Future endeavors include addition of the other thread's messages, their content analysis, assessment of threads from other cancer sites and care phases to characterize them and compare them.
Hospice is a venue organized to provide a "good death" for patients and family. Since many hospice patients are bedridden and often incoherent or unconscious, much of this venue's interactions take place between hospice professionals and patients' families. The families of patients desire definitive prognoses, as knowing what to expect can help them to act. In light of this need, how then do hospice professionals use language to achieve and maintain buy-in from patients' families? Drawing on eight months of observation in Hospice House Interdisciplinary Team (IDT) meetings, we analyze the verbal interactions between hospice professionals and families of patients, focusing in particular on registers of prognosis, to better understand how hospice professionals use language to manage family expectations. In order to accomplish these professional goals, hospice professionals use future grammars, primarily comprising predictive and subjunctive verbs. Imperative verbs are rarely used. Paying attention to the uses of these linguistic registers helps us further understand some key qualities of the good death, and in general, may offer a richer understanding of death itself.
Background: Women are traditionally underrepresented in medical studies, in particular, clinical research. Not only do women respond to specific treatments differently due to physiological differences, but they also have to deal with unique social stressors. Male patient narrative and men's response to medical care are often considered as the standard, even though these guidelines might not apply as well to women.

Objective: This project aims to explain how the disparity works in distinctive clinical scenarios, and how it influences the health outcomes of male versus female patients.

Methods: We examined a meta-analysis, several systemic reviews and expert pieces. We compared and contrasted symptoms and the success of the treatment in diseases including cardiovascular diseases, pain management, and mental illnesses. We looked at how female patients are treated in these scenarios compared to male patients.

Results: Women tend to receive less adequate care in most cases. They only represent 26.7% of clinical research subjects in cardiovascular diseases. Women tend to experience multiple pain simultaneously and have higher rates of musculoskeletal pain conditions. Data on substance use disorder is inconclusive. When it comes to mental health, women have higher prevalence of depression. Yet, women have lower rate of suicide completion of 21% versus 79%, most likely due to social factors.

Conclusion: There are still steps to be taken to improve female experiences when it comes to medical care. We should focus our efforts on changing medical research and education to increase discussion of female narratives.
EVALUATION OF A CONTINGENCY MANAGEMENT SMARTPHONE-SMARTCARD PLATFORM IN A COMMUNITY CLINIC

Mark Rzeszutek, MS; Anthony DeFulio, PhD
Psychology, Western Michigan University

Background: Contingency management (CM) is one of the most effective psychosocial interventions for increasing drug abstinence and attendance to recovery-related appointments, but it has not been broadly adopted within the treatment community. A smartphone-smartcard platform for implementing CM was developed to overcome barriers to CM adoption and increase its dissemination and use as an adjunct to treatment.

Purpose: The purpose of this retrospective study was to assess the effectiveness and acceptability of a smartphone CM service as an adjunct to traditional treatment provided in a Midwestern inner-city clinic.

Methods: A smartphone-smartcard platform allowing easy implementation of CM was offered to patients at a clinic in a large Midwestern city. Patients who used the platform (N = 108) could receive monetary incentives for attending scheduled therapy appointments and for urine samples that were consistent with illicit drug abstinence and medication adherence. These patients were later matched and compared to similar patients at another center located in the same city that was operated by the same provider.

Results: Patients who received the intervention were significantly more likely to attend appointments and produce urine samples consistent with treatment goals than their controls. Patients and therapists reported high satisfaction with the platform.

Conclusion: Acceptance of the service was high and clinical outcomes were improved for patients using the smartphone-smartcard CM platform. Given its efficacy, ease of implementation and the convenience of the use of the platform for all stakeholders, this appears to be a promising approach to increasing access to CM and improving clinical outcomes.
Sex dichotomies exist regarding both physiological immune responses and pathological autoimmune responses. However, very little information exists as to how sex patterns antibody-secreting plasmablasts (PBs) and plasma cells (PCs). Using the Prdm1-enhanced yellow fluorescent (eYFP) reporter mouse strain, we compared the prevalence of PBs and PCs in the bone marrow (BM), spleen (SPL) and thymus (THY) of young (3 months old) female and male mice. While PB/PC generation was equivalent in the BM and SPL of both sexes, the female THY had significantly increased percentages and numbers of both PBs and PCs when compared to males. This correlated with the overall increase in thymopoiesis present in females. Characterization of THY PBs/PCs demonstrated increased expression of canonical activation markers such as CD69 and MHC II when compared to their BM and SPL counterparts. In some aspects, these differences were sex-based in origin. Anti-CD45 intravenous antibody labeling suggested that THY PBs/PCs were locally generated and not THY immigrants. As such, female THY demonstrated increased numbers of a germinal center B (GCB) cell-like population expressing both GL7 and CD95(Fas). THY B cells have been previously shown to participate in the regulation of T cell selection and we hypothesized that THY PBs/PCs would be generated in a T cell dependent manner. Indeed, administration of anti-CD40L blocking antibodies ablated THY GCB, PB and to some extent PC production. In summary, female mice are skewed towards increased THY PB/PC generation. The production of these cells happens locally and is dependent on CD40L-based T cell interactions.
CONTROLLED-ASSEMBLY OF CHONDROCYTE SPHEROIDS USING 3D PRINTED MOLDS

Shelby Chaney, MS; Zeena Qiryaqoz, BS; Adil Akkouch, PhD

MD Class of 2023, MD Class of 2024, Medical Engineering, Western Michigan University
Homer Stryker M.D. School of Medicine

Spheroids are becoming popular in tissue engineering due to their ability to better mimic the 3D architecture of living tissues compared to 2D-cell cultures. Spheroids have granted new insights in personalized medicine, disease pathogenesis, drug discovery, and regenerative medicine as potential alternatives for cell and even whole-organ transplantation. However, the fabrication processes of spheroids have not been perfected and there are many procedural techniques that need to be optimized. The purpose of this study is to develop a procedure to consistently create chondrocyte spheroids of a desired size using agarose molds. The agarose is designed to contain 800–1000 µm diameter wells using 3D printed negative molds (NM). 3D models of NM were produced using FreeCAD software and printed using DLP 3D printer. Excess resin was cleaned and NM were cured under UV-light. Next, sterile agarose solution (2%) was prepared and pipetted into the NM. Hardened molds were removed and washed with culture medium. Different concentrations of human chondrocytes (up to 5×10^5 cell/well) were plated onto the agarose molds and incubated overnight to form spheroids. Finally, spheroids were transferred on non-adhering culture plates and cultured for up to 4-weeks. Spheroids were harvested, stained using DAPI and visualized under a fluorescence microscope. Spheroids shape (circularity) and size were determined by image analysis.
EBOLAVIRUS PATHOGENESIS: COULD PROTEASE-ACTIVATED RECEPTORS BE THE POTENTIAL LINK BETWEEN THE IMMUNE RESPONSE AND COAGULOPATHY?

Karley Lujan, MS; Laura Bauler, PhD
MD Class of 2024, Biomedical Sciences
Western Michigan University Homer Stryker M.D. School of Medicine

Background: Ebola is a devastating viral disease that has claimed lives and destroyed communities far past the well-publicized 2014 outbreak. Despite the continued prevalence of this virus and advances in vaccines, the pathogenesis of Ebola still isn't completely understood, in part due to limitations imposed by its biosafety-level 4 status. Currently it is unclear how coagulopathy and the inflammatory response correlate. Protease-activated receptors (PARs), while not directly immune receptors, potentially regulate the immune response through a shared signal transduction cascade. Ebola viral infection causes an increase in coagulation cascade proteases which are known activators of PARs. PARs are currently unexplored in the context of Ebola pathogenesis.

Methods: This study provides an untested theoretical model based on the literature for how PARs may connect the coagulopathy and inflammatory responses seen during Ebola infection.

Results: Activation of PAR2 leads to increased cytokine production, decreased anti-viral response, and altered vascular function; which mirrors the response seen during Ebola infection. The PAR2 mediated effects work in combination with Toll-like Receptor 4 (TLR-4) which is activated by Ebola viral glycoprotein. The presence of PAR2 and TLR-4 on macrophages could together explain a link between coagulation abnormalities and immune response during an Ebola infection.

Conclusion: The pathogenesis of Ebola is very complex and challenging to study, thus development of literature-based models can provide direction for future studies. Understanding the connection between coagulation and the immune response to infection with Ebola can help guide treatment and will lead to a better understanding of Ebola pathogenesis.
Diabetes, a chronic metabolic disease that affects nearly 10% of the world's population can lead to very serious complications such as renal failure, liver cirrhosis, and heart attacks. The most common type is Type 2 diabetes and is diagnosed when a person has elevated amounts of blood glucose due to insulin resistance. This resistance to insulin leads to problems with glucose transport into tissues for subsequent metabolism. Over the years it has been shown that insulin regulates the expression of several key enzymes in both carbohydrate and fatty acid metabolic pathways via the phosphatidylinositol 3-kinase (PI3K) pathway. Previously, using glucosamine, a precursor of the hexosamine biosynthetic pathway, we had established a model of insulin resistance in primary rat hepatocytes in culture. Using this primary cell culture model, we showed that under insulin resistant conditions, the expression of glucose 6 phosphate dehydrogenase (G6PDH), a key enzyme in carbohydrate metabolism and fatty acid synthase (FAS), a key enzyme in fat metabolism were differently regulated but the mechanism of this differentiation was unclear. Under this model of insulin resistance, we now show that this differential regulation is due to the liver X receptor (LXR) and insulin induced gene (INSIG).
Nearly two million bone-grafting surgeries are performed in the US per year. Current surgical procedures still facing significant challenges in treating large and nonunion bone defects. Tissue engineering has made great strides in developing artificial constructs for bone repair using biomaterials. However, there remain substantial challenges in creating bioactive scaffolds that mimic the piezoelectric properties of bone and the architecture of the ECM, so they can significantly modulate stem cell fate and performance. We hypothesize that 3D printed PLLA/PDS-[GO/DMSO-doped] PEDOT scaffolds will exhibit superior electrical conductivity compared to PCL/PDS-[undoped] PEDOT. The goal of this study is to use electrospinning in combination with micro-extrusion 3D printing to fabricate 3D scaffolds with nanofibrous structure-like native extracellular matrix. PLLA-PDS copolymer solution was prepared in 1, 4-dioxane and mixed overnight with GO/DMSO-doped PEDOT nanopowders at 5, 10, and 20% weight ratio. Copolymer solutions were loaded into the Axo-A3 3D bioprinter and printing was conducted at room temperature in an electrical field of 10 kV. Scaffolds were observed under SEM; pore size, filament size, and surface elemental composition will be recorded. The surface resistance was measured using four-point probe. Scaffolds were successfully printed using novel melt electrowriting technology. GO, DMSO and PEDOT were found present on the surface of GO/DMSO-doped PEDOT. PLLA/PDS-[GO/DMSO-doped] PEDOT scaffolds showed superior conductivity when compared to PCL/PDS-[undoped] PEDOT scaffolds. SEM analysis revealed the formation of nanofibrous network with desired pore size and well-oriented nanofibers. This nanoscaffold will be used for treating bone fracture nonunions by means of electrical stimulation.
EXERCISE TO THE RESCUE: EFFECTS OF AGING AND LONG-TERM EXERCISE ON STRUCTURAL PLASTICITY OF MOTOR NEURONS AND GDNF EXPRESSION IN SPINAL CORD

Alberto Cintron-Colon, MS; John Spitsbergen, PhD

Biological Sciences, Western Michigan University

As age progresses the neuromuscular system weakens. A possible reason for this weakening is the loss of connectivity between motor neuron and muscle. Physical exercise has been linked to neuroprotection by increasing neurotrophic factor (NF) expression. GDNF is a potent NF for somatic motor neurons (MNs) maintenance and survival. The goal of this study was to examine structural neuroplastic changes that occur with age and exercise by examining MN size in the lumbar spinal cord. Spinal tissues were taken from sedentary and exercised Sprague-Dawley rats between 4 weeks and 24 months of age. Exercise groups consisted of 14-week-old rats that had access to running wheels for 10 weeks; and 12-month-old, 18-month-old, and 24-month-old rats that had access to running wheels for 24 weeks. Antibody against choline acetyltransferase (ChAT) was used for detection of motor neurons, anti-GDNF was used for GDNF localization, and DAPI was used for nuclear staining. The results show that MN cell body size increased from 4 weeks of age to 6 months of age then decreased at older ages (12, 18, and 24 months of age) in sedentary, aging rats. Exercise in age-matched groups caused a significant increase in cell body size at 12 months of age and had a tendency to towards increase at 18 and 24 months of age. MNs had GDNF co-localized at the cell body at all ages. These findings suggest that exercise plays a role in the structural plasticity of ChAT-positive cells. Understanding the role that NFs play in regulating neural plasticity.
"COOL AIN'T COOL- INTRAVENOUS FLUIDS AND THEIR IMPACT ON BODY TEMPERATURE"

Abigail Harrelson, DO; Oreste Romeo, MD

Emergency Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Trauma Surgery, Bronson Methodist Hospital

Background: Hypothermia in trauma patients has been recognized as having a negative impact on morbidity and mortality, as it is part of the lethal triad of trauma. Prehospital interventions to help prevent hypothermia could therefore be beneficial in impacting patient's long-term outcome. Purpose: We aimed to determine whether or not prehospital intravenous fluid (IVF) temperatures in the trauma patient would have any clinically significant impact on patient's body temperature on arrival to the emergency department.

Methods: Any patient transported to our Level 1 Trauma Center via ground emergency medical services (EMS) with IVF running who was placed in one of our three resuscitation rooms was included in our study. Trained staff recorded the temperature of the patient and the IVF on arrival, as well as the volume infused. Data was collected from June 2019 through April 2020, having had to stop short of a full year's data collection due to the COVID-19 pandemic.

Results: In total, 130 data points were collected over a 10-month period, which did not give our study enough power to show any statistical significance. However, the data trends revealed that prehospital IVF temperature, as well as patient's body temperature, were lower in the colder months of the year.

Conclusions: Our study suggests that in regions with a significant portion of the year having cold ambient temperatures, EMS should consider protocols for prehospital IVF warming, to help mitigate the chance of hypothermia in the critical trauma patient.
FEMORAL HEAD OSTEONECROSIS 3 MONTHS AFTER INTRAARTICULAR STEROID INJECTION: A CASE REPORT

Brandon Manderle, MD; Hira Khan, MD; Wesley Eichorn, DO; Bernard Roehr, MD

Family and Community Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Orthopaedics, Bronson Methodist Hospital

Introduction: Intra-articular corticosteroid injection (IACI) is a common treatment amongst orthopaedic surgeons, sports medicine physicians and general practitioners. IACI represents a useful tool for short term pain relief and diagnosis. However, IACI is not without complications. Amongst the rare local effects of IACI, rapidly progressive osteonecrosis bears further discussion given its antithetical effects when used for treatment of osteoarthritis. Osteonecrosis has been reported in the literature only twice after single IACI. This case report provides further evidence for osteonecrosis as an acute complication after a single IACI.

Case Description: An 86-year-old female presented to the hospital for left hip pain and a mechanical fall. On x-ray she was found to have significant bone loss to her left femoral head. On history, she had had a single x-ray guided left hip IACI 3.5 months prior to presentation for left hip and knee pain as a diagnostic and therapeutic tool. She had no history of prior surgery, recent trauma (apart from the admitting fall), and no other recent steroid use or medication changes. Joint aspiration studies revealed a lack of evidence for infectious etiology. The patient was ultimately diagnosed with likely osteonecrosis due to intra-articular steroid use. Unfortunately, the patient died weeks later from a separate medical illness and never received planned hip biopsy with replacement.

Discussion: While IACI use is common practice, it is not without risks that warrant discussion with patients. This case provides further data regarding rapidity in onset as well as radiographic evidence of rapid onset osteonecrosis after IACI.
A 62 year old man on dialysis presented for evaluation of outpatient bradycardia and hypotension. In the ED, patient had wide-complex rhythm with heart rates ranging from 76-127. The previous day, Flecainide and Metoprolol were discontinued and patient was dialyzed and discharged. The patient was treated empirically for possible hyperkalemia. No significant change in ECG was noted with administration of calcium. Sodium bicarbonate produced questionable benefit. Potassium level was 4.6 mmol/L. Cardiac rhythm fluctuated between sinus rhythm and wide complex tachycardia in the ED & ICU. Flecainide level was 2.1 mcg/ml (normal <1 mcg/ml). Toxicity developed despite previous discontinuation and dialysis prior to presentation because of Flecainide's large volume of distribution and lipopholicity.
iPoster 89

PRISM CORRECTION OF HOMONYMOUS HEMIANOPSIA BY DISPLACEMENT FIELD TECHNOLOGY.

Sorabh Singhal, BS; Peter Colquhoun, MD

MD Class of 2022, Surgery, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Homonymous Hemianopia (HH) is characterized by loss of vision in half of the visual field. These visual field deficits adversely affect patients’ quality of life, especially due to its impact on driving. Patients utilize prism glasses to displace images from affected areas of their vision to "expand" their existing visual field. The efficacy of prisms in improving daily function in patients with HH remains an area of active research.

Case History: The patient is a 60-year-old man diagnosed with melanoma in 2011. Metastasis to the brain was treated with craniotomy and stereotactic radiation, leading to loss of vision in his right visual field. The patient had difficulty with reading, using a computer, playing tennis, biking, and he was forced to discontinue driving. After multiple interventions from low-vision specialists, the patient utilized an oblique Peli prism, which displaced the right field defect into the left superior field. Humphrey Visual Field (HVF) testing demonstrated that the right-side scotoma was displaced, allowing near full visual field. The patient passed a Michigan Secretary of State Driving Skills Test and has resumed tennis and reading.

Conclusions: This case describes success by returning to driving with the use of an oblique Peli prism. Consistent with past studies, prism use did not actually decrease the field defect over time. Rather, the prism may help in certain situations to increase awareness, such as aiding in accident avoidance and improving quality of life.
CLOSURE OF ATRIOVENTRICULAR CANAL PATCH DEFECT WITH AMPLATZER PFO OCCLUDER DEVICE

Lucas Rich, BS; Keshav Patel, MS; Joel Reinoehl, MD; Christopher Rogers, DO

MD Class of 2021, Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Bronson Advanced Cardiac Healthcare, Bronson Methodist Hospital

Introduction: A patent foramen ovale (PFO) is a common embryologic defect with a prevalence of 25% with potentially catastrophic consequences from paradoxical emboli. While traditional surgically closed, patient outcome and satisfaction trials incentivize the development of novel percutaneous interventions. We present such a case utilizing an Amplatzer PFO occluder device to close an atrioventricular (AV) canal patch defect.

Case: A 57-year-old female with a remote history of a congenital AV canal defect, repaired at age 5, presented to the ED with symptomatic tachy-brady syndrome requiring dual chamber pacemaker implantation. Her clinical course was complicated with inadvertent placement of the right ventricular pace lead through a defect in the AV canal patch into the left ventricle, which was discovered 2 months later when she presented with transient neurologic deficits. A brain MRI demonstrated multiple areas of subacute cerebral infarcts postulated as embolic phenomena from the inadvertent LV pacer lead. She underwent lead revision and subsequently percutaneous closure of the 8.4mm AV canal patch defect utilizing an 18mm Amplatzer PFO occluder device. Intracardiac echocardiography and fluoroscopy confirmed appropriate device positioning and on 2 year follow-up the patient remains asymptomatic.

Discussion: The location of the AV canal patch defect allowed deployment of the device without impairment of pulmonary venous return, stenosis of the superior vena cava, or entrapment of a pace lead. Further, percutaneous intervention facilitated patient discharge one day post-procedure with minimal lifestyle restriction. Our case highlights a unique percutaneous technique which may offer treatment options for similar cases in the future.
THE IMPORTANCE OF PATIENT ADVOCACY IN FOREIGN BODY IDENTIFICATION AND MANAGEMENT: A CASE SERIES

Jessica Ziccarello, BS; Laura Bauler, PhD; Joshua Mastenbrook, MD

MD Class of 2023, Medical Education, Emergency Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Foreign bodies can present dilemmas for Emergency Department (ED) physicians given the challenges of obtaining reliable histories, dependence on plain radiographs, and a need to balance recommendations from subspecialty consultants.

Case 1: A 42-year-old male presented to the ED after aspirating a plastic caulk cap. Lung sounds on the right were diminished and chest x-ray revealed hyperinflation of the right lung. Pulmonology opined that this was related to inflammation given the lack of a radiopaque object, but after the ED physician reiterated his concerns, the consultant agreed the findings could be secondary to foreign body obstruction. During bronchoscopy, the cap was discovered blocking the right mainstem bronchus.

Case 2: A 22-year-old female presented to the ED with left-sided pharyngeal pain after ingesting the stem of her eyeglasses. X-rays revealed an 8-9cm linear object in the proximal esophagus, but no foreign body was found on esophagastroduodenoscopy. Gastroenterology suggested the object had passed naturally; however, the patient was adamant it was still present. The ED physician reidentified the foreign object on bedside ultrasound, and computed tomography showed it had penetrated the esophagus and was resting anterior to the left carotid sheath.

Discussion: These cases demonstrate how advocacy for the patient, despite more conservative recommendations from consultants, is critical in ensuring appropriate final management. Placing more emphasis on the patient’s history and the corroborating physical exam findings can lead to better management and outcomes for the patient while building trust between patients and providers.
AN UNSUSPECTED CASE OF PEDIATRIC MYOCARDITIS

Aditya Mehta, BS; Joshua Mastenbrook, MD; Evan Pixley, DO; Laura Bauler, PhD

MD Class of 2022, Emergency Medicine, Medical Education, Western Michigan University
Homer Stryker M.D. School of Medicine

Background: Pediatric myocarditis has an annual incidence of 1 in 100,000 children and can present with a range of signs and symptoms varying from asymptomatic to fulminant disease. The rarity of the disease and lack of specific symptoms makes diagnosis challenging; consequently, myocarditis is often underdiagnosed and subsequently may be mismanaged.

Case Report: We present a case of myocarditis in a 12-year-old male initially evaluated at a small outlying Emergency Department for fever, gastrointestinal symptoms, and lower sternal chest pain. He was found to have a lactic acidosis (11.5 mmol/L) and an elevated AST, ALT, and CK, with unremarkable chest and abdominal x-rays and a negative hepatitis panel. Patient was treated for suspected viral gastroenteritis and dehydration with intravenous fluid and transferred to a pediatric hospital. Patient continued to decompensate and developed transient episodes of 3rd-degree heart block with non-diagnostic ST changes on his EKG. An echocardiogram showed an EF of 40%. Patient was diagnosed with viral myocarditis and transferred to a pediatric cardiac ICU. He was discharge home 7 days later with a normal ejection fraction.

Discussion: When a pediatric patient presents with vague viral symptoms and shock, myocarditis should remain on the differential until it can be appropriately ruled-out. Treatment includes fluid restriction, ace-inhibitor, beta-blocker, IVIG, and heparin. Careful evaluation of all clinical evidence may aid in preventing anchoring bias and ultimately lead to successful treatment.
Background: Stroke is one of the leading causes of morbidity and mortality in the United States. For patients presenting to the emergency department (ED) with stroke symptoms, physicians must rapidly evaluate for stroke in order to initiate appropriate treatment and avoid long term disability of patients. However 30% of cases presenting to the (ED) with acute onset of neurological deficits are due to stroke mimics.

Case History: An 87-year-old man with a sixty-year smoking history, chronic obstructive pulmonary disease, and extensive cardiovascular disease history presented to the ED with lower back pain, right rib pain, and new onset right arm weakness. Due to the classical stroke symptoms and risk factors, stroke was suspected. Computed tomography (CT) of the head excluded hemorrhage or mass lesion. A CT angiography of the head and neck revealed a large mass compressing the right subclavian artery and right brachial plexus. A subsequent CT scan of the chest, abdomen, and pelvis revealed masses on the pubic ramus, iliac bone and several vertebral bodies. Biopsy of the rib mass revealed squamous cell carcinoma.

Discussion: Even in high-paced settings, clinicians must maintain a high index of suspicion for stroke mimics. A thorough patient history and physical exam, differentiating between peripheral and central symptoms, can help to distinguish between stroke and stroke mimics. This case illustrates the vital importance of neuroimaging in the diagnosis of stroke and in the case of our patient, his stroke mimic.
Background: Childhood systemic lupus erythematosus (cSLE) is an autoimmune disorder characterized by the formation of autoantibodies that most often presents in children around the age of 12. Diagnosis is often challenging and lengthy due to the waxing and waning nature of the disease. SLE is found to be comorbid with antiphospholipid antibody syndrome (APS) in 30-40% of patients. APS can lead to the formation of thromboses although rare, occurring in only 4% of patients. Furthermore, development of thrombosis in the pediatric population is extremely rare occurring in 0.1/10,000 individuals.

Case History: Here we describe the case of a 6-year-old female who presented with abdominal pain, arthralgia, fever, right foot pain and numbness. She was diagnosed with a right popliteal artery thrombus. Further testing revealed an abundance of autoantibodies including antinuclear (ANA), lupus anticoagulant (LA), and anticardiolipin (aCL) which resulted in a diagnosis of cSLE with associated APS.

Discussion: This case describes a novel presentation of disease due to the young age of the patient at disease onset, the presence of concurrent cSLE and APS at initial diagnosis and the development of an arterial thrombosis in a child. While cSLE can be difficult to diagnose in the absence of characteristic symptoms, the unusual presentation of our patient further complicated diagnosis even when multiple symptoms aligned with a cSLE diagnosis. Awareness of the potential for onset of cSLE in children significantly younger than the average age can lead to more expeditious testing and diagnosis, resulting in better outcomes and patient care.
STATUS CATAPLECTICUS: A NIGHT AND DAY SHIFT DIAGNOSIS

Drew Moss, BS; Lucas Rich, BS; Nicholas Helmstetter, MD

MD Class of 2022, Medicine Pediatrics
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Narcolepsy is a rare hypothalamic disorder of orexin deficiency characterized by excessive daytime sleepiness, cataplexy, hallucinations, and sleep paralysis. Cataplexy, the only specific symptom of narcolepsy, is a sudden loss of muscle tone with retained consciousness often precipitated by strong emotion. Recurrent cataplexy--status cataplecticus--is described in case reports following withdrawal or interruption of antistatalptic medications. We present the case of a patient who developed status cataplecticus following brief interruption of sodium oxybate and venlafaxine.

Case: A 30-year-old woman with a past medical history of narcolepsy with cataplexy, migraine with brainstem aura, and generalized anxiety disorder presented to the emergency department with one week of recurrent episodes of transient weakness lasting several minutes. On presentation, vital signs were normal with neurologic examination, lab workup, and MRI all unremarkable. Continuous video electroencephalogram captured four back-to-back spells characterized by global loss of muscle tone with unresponsiveness to noxious stimuli and blink-to-threat challenge with intact consciousness. No interictal epileptiform discharges were recorded. Further history revealed brief interruption of sodium oxybate and venlafaxine dosing due to changes in shift work. After restarting the medications, and with diligent adherence, her symptoms resolved without recurrence at one-year follow-up.

Discussion: Sodium oxybate is the only approved medication for cataplexy, however antidepressants including selective serotonin-norepinephrine reuptake inhibitors are commonly prescribed off-label. Upon discontinuation, the decrease in serotonergic and noradrenergic tone is postulated to trigger rebound cataplexy, and rarely status cataplecticus, within one week. Our patient’s case highlights the importance of recognizing this rare but reversible complication.
A CURIOUS CASE OF GUTTATE PSORIASIS
Casey Fealko, BS; Mahesh Shrestha, MD; Natalie Behrle, MD
MD Class of 2022, Pediatric and Adolescent Medicine
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Although pediatric psoriasis is a common skin disorder, guttate psoriasis is a lesser common subtype. The subacute rash typically appears after an acute streptococcal or viral upper respiratory tract infection. As these are common acute illnesses in the pediatric population, the general pediatrician may not link such illness to the rash, leading to a delay in diagnosis and treatment. We present a case of guttate psoriasis secondary to streptococcal infection to bring awareness to this unique diagnosis.

Case Description: A 10-year-old vaccinated male presented to the outpatient clinic with concern for pruritic rash for 3 days. It was located over the chest and abdomen with a focal lesion over the umbilicus. Erythematous papules with excoriations and honey colored discharge were observed, consistent with impetigo. He was prescribed oral clindamycin and topical mupirocin for 7 days. Two months following resolution, the patient again presented with impetigo and dry, erythematous, pruritic plaques. He was treated with clindamycin and mupirocin and referred to dermatology where he was diagnosed with guttate psoriasis in addition to impetigo. Topical triamcinolone acetonide 0.1% was added to treat for guttate psoriasis. Within days, there was resolution of the rash. Intriguingly, he was previously treated for acute streptococcal pharyngitis weeks prior to onset of the initial rash.

Discussion: Our patient presented with classical history and physical exam for guttate psoriasis. Despite this, our diagnosis was delayed given the presence of a confounding impetigo rash and lack of reference back to his preceding acute streptococcal infection.
Background: Cholecystitis is the second most common non-obstetric surgical cause of acute abdomen during pregnancy. Laparoscopic cholecystectomy (LC) has become the treatment modality for cholecystitis during pregnancy. However, in high-risk patients, such as late, and twins pregnancy, laparoscopic or open cholecystectomy could be challenging. Utilizing percutaneous cholecystostomy tube (PCCT) offers a temporary management option in peripartum period until interval LC is performed.

Case Description: We present a high-risk pregnancy case of a 41-year-old woman at 34th week of gestation with a dichorionic-diamniotic-twin gestation, with a known history of choledocholithiasis. She presented with back pain and a positive sonographic Murphy sign, with ultrasound findings suggesting an early acute cholecystitis. Due to pregnancy status, and weighing risks/benefits of surgery, a PCCT for gallbladder decompression was chosen. An interval LC was performed, safely, 4 weeks later (i.e. postpartum day 4 after Caesarean Section).

Discussion: Laparoscopy has become the preferred treatment modality for many surgical diseases during pregnancy at all trimesters. LC has been shown to be a safe procedure. However, a recent study from a large national data base in the USA found that 3rd trimester cholecystectomies were associated with increased hospital stay, preterm delivery, and readmission. Although rarely used as a first-line intervention for gallbladder diseases, PCCT is an important minimally invasive procedure for treatment of cholecystitis in patients who are high-risk to undergo surgery due to concurrent comorbid condition. Our case is unique due to the twin gestation, advanced maternal age, and gestational age.
Background: Cystic Fibrosis (CF), a life-shortening, autosomal-recessive disease arises due to mutations in the CFTR gene, commonly leading to pulmonary and digestive symptoms. While numerous mutations have been proven to cause CF, there are an even larger number of CFTR mutations that have yet to be clinically described. Patients who are positive on newborn screening with elevated immunoreactive trypsinogen (IRT) and have a sweat chloride values <60 mmol/L or fewer than 2 disease-causing mutations in the CFTR gene, are given the designation of CFTR-related metabolic syndrome (CRMS). CRMS is a newer designation, to which the clinical implications have not yet been fully elucidated.

Case History: To our knowledge, the patients presented in this series represent the first documented case of CRMS siblings sharing the p.Ile1328Thr variant of CFTR. The sisters in this case were 24 months (Patient A) and 10 months (Patient B) of age, and had identical mutations in CFTR: the CF-causing p.Phe508del mutation, and the variant of uncertain significance p.I1328T. Patient A had an extensive medical and surgical history, due to her complicated renal pathology. Patient B suffered from stridor/laryngomalacia, adequately managed by medical intervention. Both sisters suffered from severe cases of gastroesophageal reflux disease (GERD).

Conclusions: This case series documents the symptoms observed in two individuals with the p.I1328T mutation, which has only been previously observed in 2 individuals, neither of whom developed CF. Due to the benefits of early intervention for CF patients, monitoring of CRMS patients is essential to ensuring optimal patient outcomes.
Introduction: Suicide is a leading cause of death in individuals between the ages of 10 and 54. Traditional firearms are the leading cause of suicide in men. An atypical firearm designed for direct contact firing in defense from sharks or hunting alligators called a "powerhead" or "bang stick" is rarely seen in suicidal cases. It features a short, non-rifled barrel only large enough to house the cartridge. The barrel is held away from the firing pin by a spring, which is depressed when the end of the barrel is jammed against the target.

Case Description: A 50-year-old man was found with powerhead type device, a projectile casing, and multiple departure notes. Upon autopsy, an anterior, midline entrance gunshot wound with appropriate internal beveling was observed on the frontal skull. Grey-black powdery discoloration was on the exterior bone surface, consistent with firearm discharge in direct contact with the barrel.

Conclusion: For suicidal individuals, safety planning provides sequential action steps designed to survive suicidal crises. In addition, the individual’s environment is made safer by removing likely means of suicide. Bang stick devices may not be considered in safety planning, especially in the Northern United States where they are rare. Bang sticks are readily available online, and are not subject to federal firearm laws if fixed to a long shaft by the manufacturer. This case serves to increase awareness of bang sticks as a deadly weapon and emphasizes the importance of their inclusion in safety planning interventions with at-risk individuals.
MY WATCH SAVED ME!" - SMARTWATCH DETECTION OF VENTRICULAR TACHYCARDIA

Ricardo De Castro, MD; Melissa Lessa, MD; Colleen Howing, MD; Kelsey Burson, DO; Aditya Mehta, MD; Matthew Rossing, MD

Internal Medicine, Emergency Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Universidade Federal do Ceara; Critical Care; Bronson Methodist Hospital

Introduction: Smartwatches have become commonplace, but their features are well evolved. New sensors have been developed, including those designed to detect heart rate and provide electrocardiogram (ECG) reads. Studies have demonstrated the watch’s ability to detect atrial arrhythmias such as atrial fibrillation. In this case, we describe a patient whose smartwatch detected an arrhythmia, subsequently leading to the diagnosis of ventricular tachycardia.

Case Presentation: A 49-year-old woman with a past medical history of Hypertrophic Obstructive Cardiomyopathy, Heart Failure with Reduced Ejection Fraction (HFrEF), and Chronic Kidney Disease Stage III presented to the hospital with chief complaint of palpitations. She was sitting at home and had acute onset of palpitations associated with lightheadedness and mild dizziness. She checked her Apple Watch and found her heart rate was 160 bpm. She did an ECG using her watch and sent it to her Cardiologist. She was advised to go to the emergency department (ED) immediately. Her blood pressure was found to be 70/40 mmHg. ECG showed ventricular tachycardia and urgent cardioversion was performed. Patient's rhythm returned to sinus afterwards.

Discussion: One of the main causes of death in patients with HFrEF is cardiac arrhythmias, including ventricular tachycardia and ventricular fibrillation. New smartwatches are being studied for monitoring of atrial arrhythmic events but not ventricular arrhythmias. There are some case reports of ventricular arrhythmic events recorded, although there is no definitive literature in this regard. The ease of use makes smartwatches a promising technology for detecting ventricular arrhythmias and likelihood of improving patient outcomes.
CARDIAC FIBROMA WITH CARDIAC ARREST: A RARE CLINICAL PRESENTATION OF GORLIN SYNDROME IN AN 8-MONTH-OLD INFANT.

Mohammad Baidoun, MD; Mohamed Elgendy, MD; James Loker, MD

Pediatric and Adolescent Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Pediatric Cardiology, Bronson Methodist Hospital

Introduction: Pediatric cardiac tumors are rare, often benign and carry associations with genetic conditions. They are primarily composed of connective tissue and fibroblast and can be symptomatic due to intracavitary obstruction, inflow and outflow tract obstruction, coronary artery compromise, thromboembolic events, conduction defects, and can also lead to sudden death.

Case History: In this case, we report an 8-month-old female presented to pediatric cardiology office for cardiac evaluation given family history of Gorlin syndrome, also known as Nevoid Basal Cell Carcinoma Syndrome, found to have a large 4 x 4 x 6 cm fibroma in the apical lateral free wall of the left ventricle and later presented to the ER with cardiac arrest.

Conclusion: NBCCS is inherited in an autosomal dominant manner. NBCCS is characterized by the development of multiple jaw keratocysts, frequently beginning in the second decade of life, multiple and/or early-onset basal cell carcinomas (BCCs) usually from the third decade onward. Cardiac fibromas, especially when identified in infancy, should raise clinical suspicion to evaluate for NBCCS. Early clinical recognition of NBCCS would facilitate the timely identification of basal cell carcinoma or medulloblastoma and implementation of surveillance guidelines. If cardiac fibromas are left untreated, there is an increase in the risk of fatality, particularly due to lethal ventricular arrhythmia. Early surgical intervention remains the cornerstone of fibroma management. Screening for cardiac fibromas is recommended in patients with family history of Gorlin syndrome and timely surgical intervention is crucial to prevent adverse events that can reach sudden cardiac death.
SARS-CoV-2 INFECTION ASSOCIATED SEVERE DILATED CARDIOMYOPATHY IN A 4 WEEK OLD INFANT

Mohammad Baidoun, MD; Mohamed Elgendy, MD; Robin Fountain, MD

Pediatric and Adolescent Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Pediatric Cardiology, Bronson Methodist Hospital

Introduction: COVID-19 infections tend to be less severe in children compared to adults. In general, children with COVID-19 have an excellent prognosis and typically recover within 1-2 weeks after disease onset. We report the case of a 4 week old infant with severe isolated systolic dysfunction who was found to be positive for COVID-19. He did not have the multi-system inflammatory syndrome in children (MIS-C) commonly associated with COVID-19 infection.

Case report: In this report, we describe the case of a 4 week old infant admitted for evaluation of increased work of breathing, occasional coughing, poor feeding and irritability. His workup was remarkable for positive nasopharyngeal swab specimen for SARS-CoV-2 RNA. His echocardiogram showed severely dilated Left Ventricle with severe dysfunction (Fractional Shortening of 11%). Patient has been followed by his Pediatric Cardiologist every 4-6 weeks since discharge with gradual improvement in his systolic function with his most recent echocardiogram (at 5 months of age) showing FS of 35%.

Discussion: COVID-19 infections tend to be less severe in children compared to adults. In general, pediatric patients with COVID-19 have an excellent prognosis. COVID-19 may result in cardiac injury through multiple potential mechanisms, including cardiomyocyte injury due to acute inflammatory response, viral invasion leading to cellular damage or Ischemic injury in the presence of severe hypoxia as a result of acute lung injury. To the best of our knowledge; this is the first case of an infant with SARS-CoV-2 associated severe dilated cardiomyopathy with complete recovery of heart function.
INCIDENTAL DIAGNOSIS OF AN ASYMPTOMATIC PAPILLARY RENAL CELL CARCINOMA

Steven Jones, BS; Laura Bauler, PhD; Michael Baumgartner, MD; Mark Schauer, MD

MD Class of 2022, Biomedical Sciences, Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Background: The United States Preventive Services Task Force has recommended lung cancer screening in high-risk adults with low-dose computed tomography (LDCT) since 2013. This screening protocol has reduced lung cancer mortality by 20%, but incidental findings are common, and the cost of investigating these findings, which are often benign, is significant. However, as many as 15% of patients undergoing LDCT screening have a clinically significant incidental finding, most commonly cardiovascular or pulmonary disease, or extrapulmonary neoplasm.

Case History: A 70-year-old man with a 45-pack-year smoking history underwent LDCT for lung cancer screening, during which an incidental indeterminate right renal mass was discovered. The patient had no complaints of hematuria or flank pain. He subsequently underwent renal ultrasound, which showed an exophytic, solid-appearing, anterior upper pole mass of the right kidney. Right partial nephrectomy was performed excising a 5.6cm mass. Pathology confirmed the diagnosis of papillary renal cell carcinoma, a cancer with a ten-year survival rate as low as 41% if discovered after invasion of the urinary collecting system. This patient's tumor was confined to the renal capsule without renal vein or collecting system invasion. Follow-up abdominal CT scans over the subsequent 5 years have shown no evidence of metastasis or recurrence.

Conclusion: Early detection of "incidentalomas" can enable detection and treatment of carcinoma before symptomatic presentation, improving outcomes for patients. However, not all incidental findings are worthy of follow-up. Physicians are advised to carefully consider screening procedures to ensure that the benefits outweigh the risks for their patient.
RA is a chronic inflammatory joint disease characterized by widespread joint destruction and instability leading to progressive loss of function. The wrist is particularly vulnerable and is commonly the first body part to exhibit symptoms. Chronic inflammation of the wrist results in the progressive degeneration of carpal ligaments and ultimately, disruption of load distribution and motion across the wrist joint. Individually, the pathologic manifestations of RA-associated carpal instability and lunate dislocations (generally a high-energy injury) have been well-described. However, literature discussing the sequelae of atraumatic lunate dislocation in the setting of RA remains limited to a small number of case reports making it a difficult entity to both recognize and treat. Here, we discuss the presentation and treatments of 3 rheumatoid arthritis patients with atraumatic lunate dislocation.

Case Descriptions:

80 yo female presents with chronic right wrist pain and swelling found to have chronic anterior lunate dislocation on imaging. Due to chronicity and adequately controlled symptoms with medical management, patient elected for non-operative treatment.

74 yo female presents with approximately 4 months of painful mass in volar right wrist. Volar dislocation with proximal migration of lunate seen on imaging and she was subsequently treated with lunate resection.

64 yo male with history of Parkinson's Disease and recurrent falls presents with chronic bilateral wrist pain and left wrist swelling of at least two weeks. Dorsal dislocation of left lunate demonstrated on imaging and he underwent left wrist proximal row carpectomy.
A CASE OF PENILE CARCINOMA PRESENTING AS SCROTAL PAIN AND SWELLING

Nga Nguyen, MD; Kristi VanDerKolk, MD
Family and Community Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Penile carcinoma is a rare malignancy in the United States. It accounts for less than 1% of cancer in men in the U.S. with recent statistics reporting approximately 2200 new cases a year and about 460 deaths annually. The disease typically presents as a painless lesion such as a lump or ulcer and/or skin abnormality such as erythema of the penis. Other less common clinical manifestations include: rash, bleeding, or balanitis. A majority of the new cases will already be metastatic with a 5-year survival rate of 50% or less depending on extent of disease. Given its rarity and advanced disease on presentation, it is important to be aware of the various ways penile carcinoma can present in order to seek treatment in a timely fashion. We present a case of penile carcinoma in a 45 year old male who presented with complaints of acute scrotal pain and swelling. He was subsequently admitted for management of scrotal abscess. During this admission, CT imaging demonstrated a mass at the glans of the penis and significant inguinal adenopathy. IR guided biopsy of the inguinal lymph nodes confirmed squamous cell carcinoma of the penis. He was promptly referred to oncology for management. After four cycles of chemotherapy and two surgeries for resection, disease progressed to involve the abdominal cavity. Patient died from complications eight months after initial diagnosis was made.
THE EFFECT OF PRESCRIBING PATTERNS ON UTILIZATION OF OPIOID MEDICATION IN ACL RECONSTRUCTION: A RANDOMIZED, PROSPECTIVE TRIAL

Donghoon Lee, BS; Joseph Brutico, BS; Richard Gawel, BS; Ryan Paul, BS; Matthew Pepe, MD; Bradford Tucker, MD; Kevin Freedman, MD; Fotios Tjoumakaris, MD

MD Class of 2022, Western Michigan University Homer Stryker M.D. School of Medicine; Rothman Orthopaedic Institute

Introduction: The relationship between the opioid pill count prescribed after orthopaedic procedures and post-operative consumption has not been thoroughly investigated. This study sought to determine what relationship exists between the number of prescribed opioids and post-operative consumption for patients undergoing anterior cruciate ligament reconstruction (ACLR).

Methods: This is a prospective, randomized trial investigating the use of 3 different opioid prescription amounts following ACLR. Patients were randomized to one of 3 groups pre-operatively: 15, 25, and 35 oxycodone-5mg tablets. Adductor canal or femoral nerve blocks using bupivacaine/ropivacaine were utilized in all patients. Patients were asked to complete a pain and medication log for 14 days post-operatively, a pain management satisfaction survey, and IKDC questionnaires pre-operatively through 6 months post-operatively.

Results: 74 patients (24: 15-oxycodone, 18: 25-oxycodone, 21: 35-oxycodone) were enrolled. The difference between groups in the IKDC score did not differ pre-operatively (P=0.62) or at 6 months (P=0.56). Reported daily pain logs did not differ at any time point in regard to pain (P=0.16 to P=0.99) or satisfaction with pain management (P=0.20 to P=0.92) throughout the first 14 days. Mean consumption of opioids in MME (morphine milligram equivalents) in the first 14 post-operative days was 76.6mg ± 69.8 for all patients, and there was no difference in consumption between groups (P=0.578). There was no difference when asked about satisfaction with the initial prescription amount (P=0.415).

Conclusion: There is no difference in consumption of opioids or satisfaction with post-operative pain management based on initial prescription amount of oxycodone following ACLR.
MENISCAL ROOT REPAIRS: FUNCTIONAL OUTCOMES AND PROGRESSION TO TOTAL KNEE ARTHROPLASTY

Donghoon Lee, BS; Ryan Kovacik, BS; Richard Campbell, MD; Morgan Leider, MD; Matthew Pepe, MD; Fotios Tjoumakaris, MD

MD Class of 2022, Western Michigan University Homer Stryker M.D. School of Medicine; Rothman Orthopaedic Institute

Introduction: Meniscal root tears can lead to earlier onset of osteoarthritis; repair of these injuries is crucial for the prevention of arthritic changes. There is limited literature regarding meniscal root repair (MRR) techniques and their outcomes. The purpose of this study is to report minimum one-year outcomes of transosseous pull-out MRR technique performed by two surgeons at our institution.

Materials and Methods: Retrospective chart review identified patients who underwent primary MRR during 5-year period (2013-2017), performed by two board certified orthopaedic surgeons using the same technique. Patients with concomitant ligament repairs were excluded. Identified patients were asked to complete the IKDC form and Lysholm. Patients also reported any subsequent procedures on the operative knee.

Results: A total of 75 patients were identified and 57 completed follow-up. 7 patients underwent subsequent knee arthroplasty. The mean age was 52.52 (+/- 10.81) years and mean BMI was 32.35 (+/- 6.07) kg/m2 for the study population. Mean follow-up survey was conducted at 41.27 (+/- 16.99) months post operatively, ranging between 18 and 88 months. There was a significant improvement between pre-operative and post-operative outcome scores measured on the IKDC (P<0.01), Lysholm (P<0.01). Age (P=0.11, P=0.30), BMI (P=0.23, P=0.06), gender (P=0.21, P=0.40), and follow-up time (P=0.43, P=0.72) was not associated with worse outcomes on the IKDC or Lysholm, respectively. Worse pre-operative Kellgren-Lawrence grades was associated with worse outcomes on the IKDC (P<0.01) and Lysholm (P<0.01).

Conclusion: Our technique of meniscal root repair is effective at achieving positive clinical outcomes in patients with meniscal root tears (regardless of demographic factors) with low conversion rates to total knee replacement.
**PREDICTORS OF PATIENT EXPECTATIONS FOR FUNCTIONAL OUTCOMES FOLLOWING HYALURONIC ACID INJECTIONS**

Donghoon Lee, BS; Brandon Smith, BS; Ryan Paul, BS; Richard Campbell, MD; Morgan Leider, MD; Kevin Freedman, MD; Bradford Tucker, MD; Matthew Pepe, MD

MD Class of 2022, Western Michigan University Homer Stryker M.D. School of Medicine; Rothman Orthopaedic Institute

Introduction: Hyaluronic acid injections (HA) are a widely utilized non-operative treatment for knee osteoarthritis. Patient expectations and emotional stress may affect functional outcomes after treatments. The purpose of this study was to identify factors predictive of greater patient expectations for knee function after HA injections.

Materials and Methods: This was a prospective cohort study of patients receiving HA injections. Exclusion criteria included prior history of HA injections or rheumatoid arthritis. Prior to treatment, Knee Osteoarthritis Outcome Score (KOOS), a KOOS expectation at 6 months (exp-KOOS), and Perceived Stress Scale (PSS) were completed. KOOS was re-evaluated 6 months post-injection.

Results: 142 patients enrolled (52 male, 90 female), with mean BMI 30.82 (± 8.02) and age 61.51 (± 11.55). Expected mean KOOS subscale improvements were 30.73 (± 18.56) pain, 20.37 (± 17.51) symptom, 26.27 (± 19.98) ADL, 33.22 (± 25.40) Sports, and 37.13 (± 25.60) QoL; actual improvements were 8.52 (± 18.38), 4.80 (± 16.81), 7.96 (± 18.31), 7.81 (± 28.30), and 10.64 (± 22.05), respectively. KOOS 6-month outcomes were significantly improved for all subscale items (P < 0.006), although fell short of expectations (P < 0.001). Expectations weakly, but significantly, correlated with outcomes. Rho correlations ranged 0.20-0.37 for subscales (P < 0.043). Age, BMI, and PSS were not correlated to expectations at (P < 0.05). Older age was correlated with worse actual outcomes for pain, symptom, sport, and QoL subscales (P < 0.029).

Conclusion: Patient expectations at for HA is higher than actual outcomes, although higher expectations were predictive of better outcomes. No single measure was predictive of expectations, and older age was predictive of worse actual outcomes.
SYSTEMATIC REVIEWS IN ORTHOPAEDIC SPORTS MEDICINE: AN UPDATE

Donghoon Lee, BS; Ryan Paul, BS; Adam Lencer, BS; Fotios Tjoumakaris, MD; Kevin Freedman, MD

MD Class of 2022, Western Michigan University Homer Stryker M.D. School of Medicine; Rothman Orthopaedic Institute

Introduction: The volume of systematic reviews and meta-analyses published has continued to increase, including the field of sports medicine. These reviews are utilized by clinicians to guide clinical decision making. In 2009-2013, the quality of reviews in orthopaedic sports medicine was analyzed, and opportunities for improvement were identified.

Methods: We sought to evaluate the quality of systematic reviews published in the field of sports medicine in the five-year period from 2015-2019 and compare to those evaluated from 2009-2013. All clinical orthopaedic sports medicine and meta-analyses published from 2015 to 2019 published in The American Journal of Sports Medicine, Arthroscopy, Knee Surgery Sports Traumatology Arthroscopy, The Journal of Bone and Joint Surgery, and Sports Health were reviewed. These were evaluated according to guidelines from Oxford Centre for Evidence-Based Medicine, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement, and the Assessment of Multiple Systematic Reviews (AMSTAR) tool.

Results: A total of 516 systematic reviews and meta-analyses were included in this study, compared to 200 in 2009-2013. Of these, 17.1% of studies included level 1 or 2 evidence only, while 39.5% included level 4 or 5 studies. This represents a significant decrease in the level of evidence from 2009-2013 (P<0.001). Both the average PRISMA scores (87% to 81%) and the average AMSTAR scores (73% to 56%) declined (P<0.001, P<0.001).

Conclusion: There has been an increase in the volume of systematic reviews and meta-analyses published in orthopaedic sports medicine. This has coincided with significant declines in the level of evidence, as well as declines in methodological and reporting quality.
SUPRAGLOTTIC AIRWAY DEVICE USE AMONG EMERGENCY MEDICAL RESPONDERS WITHIN A SOUTHWEST MICHIGAN

Sarah DiMezza, MD; Joshua Mastenbrook, MD; Michael Bentley, MPA, CCEMTP, IC; William Fales, MD

Emergency Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction  An i-gel is a blindly inserted supraglottic airway (SGA) utilized in prehospital airway management. The 2019 National Emergency Medical Services Scope of Practice Model includes SGA insertion for Advanced Emergency Medical Technicians (AEMTs) and Paramedics, although in Michigan, EMTs may also insert SGAs. Emergency Medical Responders (EMRs) provide immediate lifesaving care while awaiting ambulance arrival. Kalamazoo County Medical Control Authority (KCMCA) has created a training system and protocol for use of SGAs by EMRs. The literature on EMR-level SGA insertion is sparse.

Objective: We sought to evaluate the success and complication rates of EMR prehospital SGA use to determine if EMRs can include SGA insertion in their regular scope of practice.

Methods: Data between November 2019 and September 2020 were retrospectively abstracted from KCMCA prehospital airway database, which contains the elements from electronically submitted EMR i-gel insertion reports. Descriptive statistics were computed with Microsoft Excel.

Results: EMRs logged 105 SGA insertions, with an success rate of 93.3%; 16% of attempts required adjustment/reinsertion due to complications. Although the dataset included limited data on EMT SGA insertions, rates were comparable (94.5% and 14.8%).

Discussion: Our analysis of EMR SGA insertion suggests success rates are similar to that of higher-trained prehospital providers. The majority of EMR SGA insertions were successful, indicating EMRs can be trained to utilize these devices as a part of their scope of practice for prehospital airway management.
A RARE CASE OF PLUMMER-VINSON SYNDROME IN AN AFRICAN AMERICAN WOMAN

Keshav Patel, MS; Mahmoud Kassir, MD; Wesley Eichorn, DO

MD Class of 2021, Family and Community Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Plummer-Vinson syndrome (PVS) is a rare condition that presents with the classic triad of iron-deficiency anemia, dysphagia, and esophageal webs. (1) This syndrome classically affects Caucasian women between the age of 40 and 70 and very few cases have been reported in African Americans. (2,3) In this case study, we present a rare case of Plummer-Vinson Syndrome in an African American woman.

Case: A 63-year-old patient with a past medical history of coronary artery disease, stroke, and untreated Hepatitis C presented with worsening shortness of breath, cough, and dysphagia for several weeks. The dysphagia was primarily to solids and was accompanied by sharp left-sided chest pain. Chest x-ray was negative, and the patient was found to have a hemoglobin of 7.0 g/dL with a mean corpuscular volume of 62 fL and a ferritin level of 6 ng/mL. Fecal occult blood test was negative. Barium swallow revealed a proximal esophageal web. Esophagogastroduodenoscopy was performed and the esophageal web was dilated.

Conclusion: We highlight a rare case of Plummer-Vinson Syndrome in an African American woman. (3) Plummer-Vinson Syndrome is pre-cancerous and therefore early recognition is crucial. This case highlights the importance of maintaining a comprehensive differential diagnosis that includes rare diseases. Dysphagia in PVS usually responds to iron supplementation. Her dysphagia did not immediately improve significantly despite IV iron supplementation and esophageal web dilation.
REPAIR OF A GIANT PARAESOPHAGEAL HERNIA

James Le, BS; Mohamed Rahal, BS; Saad Shebrain, MD

MD Class of 2023, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Hiatal hernias (HH) are a protrusion of the stomach through the diaphragmatic hiatus with an estimated prevalence of 10% in the adult population in the USA. Paraesophageal hernias (PEH) are subset of HH characterized by herniation of the gastric fundus with possible involvement of the GE junction and other viscera. They are associated with increased morbidity and mortality if not treated. We report a case of a 78-year-old female with a giant PEH with herniation of nearly 100% of her stomach into the thorax.

Case Description: A 78-year-old female with history of GERD presented with abdominal pain and symptoms of gastric outlet obstruction. Upper GI series (UGI) with barium swallow revealed a giant PEH with organoaxial volvulus. Nearly 100% of the stomach was found in the thorax. She was treated initially with gastric decompression and slowly advancing diet to full liquids and was discharged home. She underwent preoperative workup including EGD, UGI, and medical optimization. 2 weeks later, an elective laparoscopic repair with partial (Dor) fundoplication was performed, and the patient was discharged on PODReti.

Conclusions: Large PEHs carry a high risk of serious complications, such as volvulus, obstruction, bleeding, and ulcerations. When diagnosed, large PEH should be repaired electively, even if asymptomatic. Emergency repair of symptomatic PEH is associated with higher morbidity and mortality, and therefore, every effort should be made to optimize the patient medical conditions preoperatively. Our patient tolerated the procedure well, showed resolution of reflux symptoms, and is doing well one year after repair.
iPoster 120

INTEGRATED MULTIDISCIPLINARY AFTER VISIT SUMMARIES: A TOOL TO IMPROVE PATIENT ENGAGEMENT IN CYSTIC FIBROSIS CLINIC

Carolina Herrera, RRT; Debbie Wells-Schmidt, RN; Kristi Homan, Pharmacy Technician; Teresa Bailey, PharmD; Nicole Vess, RN; Julie Hovey, Medical Assistant; Sally Bonnema, RD; Sheryl Lozowski, PhD; Niecia Anjorin, Social Worker; Mariam Ischander, MD

Pediatric and Adolescent Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Purpose: The purpose is to improve patient care, communication and safety by providing easily understood plan of care via the After Visit Summary (AVS) instructions at WMed Health Cystic Fibrosis Program.

Methods: The Cystic Fibrosis (CF) team members document their plan of care for the patient under wrap up portion in EPIC. The CF Coordinator reviews the documented plan of care of the CF team members with the patient and provides a copy for the patient to take home. The CF Coordinator documents in her clinic notes if the AVS was reviewed during the visit or via phone call and informs physician if any difficulty with the process.

Results: A patient satisfaction survey was randomly conducted on five CF patients via phone asking the following questions with a choice of Yes or No: 1. Did the new detailed AVS give you a clear direction of your plan of care? 2. I understood the instructions of my plan of care given to me at my appointment? 3. Did you refer back to your AVS for your plan of care as a reminder? All patients stated that they have referred back to the AVS as a reminder and that they like the new detailed AVS.

Conclusion: Our new detailed multidisciplinary AVS has proven itself to be a promising method of achieving increased patient engagement in their plan of care, patient satisfaction, and decrease miscommunications and errors. It is important because we want to partner with our CF patients to improve their health.
INTRODUCTION: Stroke is one of the leading causes of morbidity, mortality, and disability. There are a multitude of well-defined risk factors for cardioembolic stroke, including atrial fibrillation and rheumatic heart disease. Given the rarity of cardiac tumors, these tumors are often an overlooked source of cardioembolic stroke. As our case highlights, one such tumor, papillary fibroelastoma, can present with multifocal stroke.

CASE HISTORY: A 68-year-old woman with a past medical history significant for lung cancer, hypertension, and benign paroxysmal positional vertigo presented with dizziness, ataxia, diplopia, headache, diaphoresis, and elevated troponin. After admission she was diagnosed with a multifocal stroke with magnetic resonance imaging of her head. A transesophageal echocardiogram (TEE) discovered two papillary fibroelastomas of the aortic valve. Following recovery from her stroke, the patient underwent surgical excision of the valve tumors.

DISCUSSION: This case highlights the importance of a thorough workup for patients presenting with complex neurological symptoms, including dizziness and ataxia that in this case were signs of stroke. Although the incidence of cardiac tumors has been reported around 0.1%, the potential cardiovascular sequelae of these tumors from embolization are significant, including stroke, transient ischemic attack, myocardial infarction, and cardiac arrest. For this reason, in a patient without a clear cause of multifocal stroke, a TEE is warranted if papillary fibroelastoma is a consideration on the differential diagnosis. If detected early, surgical treatment may prevent recurrent cardioembolic strokes.
BILATERAL LIPOMA ARBORESCENS IN A PEDIATRIC PATIENT WITH OBLIGATE PATELLAR INSTABILITY AND JUVENILE IDIOPATHIC ARTHRITIS: A CASE REPORT

Khusbu Patel, BA; Guston Zervoudakis, MD; Karen Bovid, MD
MD Class of 2023, Orthopaedic Surgery
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Lipoma arborescens is characterized by benign proliferation of synovium and replacement of the subsynovial connective tissue with adipocytes. Typical presentation consists of an adult patient with painless unilateral joint swelling with progression to painful effusion. Though the exact etiology remains elusive, lipoma arborescens has been linked to both post-traumatic and chronic inflammatory disease processes, suggesting a possible genetic component. Here, we report an unusual case of bilateral lipoma arborescens in a pediatric patient with concurrent obligate patellar instability and juvenile idiopathic arthritis (JIA).

Case Description: A 14-year-old female with history of autosomal recessive congenital ichthyosis presented with four months of right knee pain and edema. On exam, she had bilateral obligate patellar instability and large effusions. MRI without contrast revealed diffuse synovial thickening of both knees, lateral patellar subluxation, and chondral loss of the patella and trochlea. Pediatric Rheumatology consultation diagnosed JIA given the disproportionally advanced degree of inflammation compared to what would be expected from mechanical stress related to patellar instability alone. She underwent right knee arthroscopic synovectomy, open patellar realignment and stabilization, and osteochondral drilling. Postoperative course was complicated by arthrofibrosis that responded well to manipulation under anesthesia. Patient reports significantly improved pain, minimal effusion, and maintained patellar stability postoperatively.

Conclusions: Lipoma arborescens associated with JIA and obligate patellar instability was successfully treated with arthroscopic synovectomy, patellar realignment, and medial patellofemoral ligament reconstruction in a 14-year-old girl. With future genetic testing planned, a unifying diagnosis may provide valuable insight into the etiology of this uncommon entity.
Introduction: Lyme disease is an infection by the spirochete Borrelia burgdorferi transmitted by the Ixodes tick in the Northeast and upper Midwest. Of the estimated ~300,000 cases/year, ~4% develop Lyme carditis manifesting as atrioventricular block (AVB) and less frequently as myopericarditis or valvular disease. We present a case Lyme disease presenting as a new-onset AVB.

Case: A healthy 18-year-old male presented to the emergency department with acute-onset palpitations, night sweats, and shoulder pain. Physical exam demonstrated tachycardia to 116 bpm with irregular rhythm, blood pressure of 102/62, and numerous erythema migrans rashes. Laboratory workup revealed increased inflammatory markers and a normal troponin. Electrocardiogram (ECG) demonstrated a 2nd degree AVB with fixed 2:1 A-V conduction. Following admission for presumed Lyme carditis, empiric ceftriaxone resulted in symptomatic improvement and serial resolution of ECG abnormalities. Lyme serology returned positive for IgM and negative for IgG. He was discharged with oral doxycycline to complete a 3-week antibiotic course.

Discussion: Identification of Lyme carditis is challenging as only 40% of patients present with erythema migrans. Per Besant et al., the Suspicious Index in Lyme Carditis predicts the likelihood of Lyme carditis in patients presenting with high-degree AVB with a sensitivity >93%. If present, patients with AVB require hospitalization for cardiac monitoring and parenteral antibiotics until restoration of 1:1 A-V conduction before transitioning to oral antibiotics. Notably, persistent high-degree AVB may necessitate pacemaker implantation. Our patient’s case highlights a rare but reversible cause of high-degree AVB in healthy individuals.
Electronic-cigarettes or vaping associated lung injury (EVALI) had a sharp increase in cases in 2019 linked to Vitamin E acetate additive in tetrahydrocannabinol containing products. Diagnostic criteria and management remain limited to case series. Here we present a case series of two patients diagnosed with EVALI after admission to our community children's hospital with non-specific symptoms.

Case description: A 17-year-old previously healthy male presents with one week of worsening abdominal pain, intractable vomiting, fever, night sweats, chest pain and dyspnea with exertion. History of chronic diarrhea and significant unintentional weight loss. Baseline labs inflammatory markers were elevated. Chest XR remarkable for peri-bronchial disease. CT scan of chest showed patchy ground glass pulmonary opacities and small volume ascites. 15-year-old male with history of five days of nausea, vomiting, diarrhea, abdominal pain and unintentional 15 lb weight loss. Physical exam significant for jaundice and had tenderness to palpation over right upper quadrant. Initial labs were significant for transaminitis and elevated CRP and ESR. Chest x-ray showed interstitial edema and small pleural effusions. Later both patients endorsed vaping THC based cartridges for 1-2 years. Mainstream therapy included supportive treatment, supplemental oxygen and steroids. Improvement of symptoms was noted within 24-48 hours since initiation of steroids.

Discussion: Vaping products are popular within the adolescent population. Even though dyspnea is the most commonly reported presenting symptom, in our two patients gastrointestinal preceded respiratory symptoms. More research needs to be conducted to establish standardized diagnostic criteria and management to promote early diagnosis and prevent further deterioration.
SYNTHESIS OF A NOVEL GO/DMSO-DOPED PEDOT ELECTROACTIVE NANOCOMPOSITE FOR BIOELECTRICAL STIMULATION

Mitchell Kenter, BA; Adil Akkouch, PhD

Medical Engineering, Western Michigan University Homer Stryker M.D. School of Medicine

Electrical stimulation is being evaluated in regenerative medicine for its potential to promote stem cells adhesion, migration, and proliferation. Poly(3,4-ethylenedioxythiophene) (PEDOT) is a conductive polymer with excellent stability and biocompatibility. To enhance its conductivity, dopants such as dimethyl sulfoxide (DMSO) and graphene oxide (GO) can be introduced as oxidants to enhance conductivity and mechanical properties. We hypothesized that the use of different solvents in the polymerization of PEDOT composites will affect the ultramorphology and the polymerization yield. Our goal is to synthesize a novel GO/DMSO-doped PEDOT nanocomposite and assess physicochemical properties and in vitro cytotoxicity. Various PEDOT nanocomposites were synthesized by oxidative polymerization of 3, 4-Ethylene dioxythiophene (EDOT) in the presence of GO, DMSO, and ferric chloride (FeCl3). FeCl3 was dissolved in different solvents and added to EDOT (1:3 ratio) under stirring overnight at 70 °C. The solvents studied were H2O, ethanol, methanol, 50/50 H2O/ethanol, 50/50 H2O/methanol, and 50/50 ethanol/methanol. The resultant dark solutions were washed with methanol/H2O, then dried in vacuum oven. Nanoparticles were weighed to determine the reaction yield and characterized by a combination of spectroscopic and microscopy techniques (SEM, TEM, EDS, and XPS). Cell adhesion and proliferation were assessed by MTT assay and DAPI fluorescence staining on human mesenchymal stem cells (hMSCs). The H2O/ethanol solvent resulted in the highest reaction yield. Different solvents resulted in different morphologies. hMSCs cultured in contact with GO/DMSO-doped PEDOT nanoparticles show an increase of proliferation overtime. The novel GO/DMSO-doped PEDOT nanocomposite could potentially be used as an electroconductive substrate for electrical stimulation therapy.
Eczema herpeticum (EH), historically known as Kaposi varicelliform eruption, is a severe, rapidly progressing, infection of eczematous skin with herpes simplex (HSV). Lesions are sometimes atypical and lead to delayed diagnosis, increasing mortality due to viremia, vision loss, and organ involvement. A 24-year-old male with a history of atopic dermatitis presented to the emergency department with diffuse erythema, edema, full thickness sloughing, and yellow exudate on the face, ears, neck, and upper chest with sparing of the mucosa. Hyperpigmented excoriated vesicular lesion remnants on the hand, elbow, upper arm, and shoulder were also present. He had previously contacted teledermatology to treat a supposed eczema flare via two visits that ended in recommendations of hydrocortisone and doxycycline. Laboratory results were significant for low WBCs, low absolute lymphocyte count, high lactate, and positive culture of Staphylococcus aureus. He was started on IV vancomycin for assumed septic cellulitis secondary to eczema. Infectious disease was consulted after no improvement on antibiotics, raising concerns for Steven Johnson Syndrome. Lastly, dermatology was consulted to obtain an inpatient impression, immediately revealing recent HSV exposure from his girlfriend and vesicular lesions of EH on arm and shoulder. The patient was started on IV acyclovar and PCR confirmed HSV infection. The patient was slowly transitioned to oral acyclovar once no new lesions appeared and discharged to follow up outpatient. This represents a delay in diagnosis that may be attributed to teledermatology practices and unfamiliarity, which was ultimately resolved by an inpatient dermatology consult highlighting its utility in emergent conditions.
ASSESSMENT OF IMPLEMENTATION OF STANDARDIZED POST-CESAREAN SECTION PAIN MANAGEMENT ORDERS ON MORPHINE MILLIGRAM EQUIVALENTS (MME) IN THE POST-OPERATIVE PERIOD

Lauren Piper, DO; Hira Khan, MD; Mahmoud Kassir, MD; Cameron Stump, MD; Duncan Vos, MS; Melissa Sherfield, BS

Family and Community Medicine, Epidemiology and Biostatistics, Western Michigan University Homer Stryker M.D. School of Medicine

Primary objective: Evaluation of the change in opioid use in hospital after Cesarean delivery following implementation of multimodal pain management orders.

Secondary objective: Evaluation of patient pain score ratings in the post-implementation period.

Intervention: The standard post-C/Section Order set was changed to include pre-checked orders for NSAIDs and acetaminophen. IV morphine, IV hydromorphone, and PO oxycodone remain available but require providers to actively prescribe them. Also available was infiltration of incision with local anesthetic. MME utilized post-C/Section and daily maximum pain scores were reported. Data was collected by manual chart review.

Results and Discussion: Average MME was 108 pre-intervention and 135 post-intervention, a statistically significant increase. Subgroup analysis was performed in the post-intervention group including only patients treated with incisional local anesthetic, and those who did not utilize opioid PCAs. Median MME was not significantly different in those with and without opioid PCAs. Patients with local infiltration of lidocaine received significantly greater total MME than those without. The difference between the mean maximum pain scores during the pre-intervention and post-intervention was not statistically significant.

Conclusion: Use of standardized post-C/Section multimodal pain management orders resulted in increased opioid use. However, patients treated without PCA had no significant change in opioid use. Pain scores were unchanged suggesting that non-PCA management is satisfactory. Additional analysis should be done into cost comparisons and other benefits of non-PCA management of post-operative pain.
iPoster 132

OUTCOMES OF SPLENECTOMY ON HEMATOLOGIC AND NON-HEMATOLOGIC SPLENIC CONDITIONS

Derek Tessman, DO; Gordon Liu, BA; John Dewey, BS; Saad Shebrain, MD; Robert Sawyer, MD

Surgery, MD Class of 2022, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Splenectomy is an important surgical procedure for many splenic conditions. We hypothesized that 30-day post-splenectomy outcomes are different based on surgical indications for splenectomy.

Methods and Procedures: Using the ACS-NSQIP database (2017), patients who underwent splenectomy were identified. The outcomes examined included 30-day mortality, morbidity, readmission rates, and reoperation.

Results: A total of 703 patients, of which 370 were males (52.6%) underwent splenectomy. A laparoscopic approach (LS) was performed on 389 patients (55.3%). All trauma patients underwent open procedures (OS). Indications for splenectomy were ITP (198 patients, 28.2%), splenomegaly/hypersplenism (113 patients, 16.1%), splenic abscess/infarction, (91 patients, 12.9%), leukemia/lymphoma (87 patients, 12.4%), and trauma (77 patients, 11.0%). The 30-day mortality was highest among patients with leukemia/lymphoma (10.3%), and trauma (5.2%). No mortality was noted in patients with hemolytic anemias or benign splenic lesions. The mortality rate was higher in the OS group compared to the LS (4.8% vs. 1.3%, p=0.006). Overall morbidity was higher in trauma (70%), splenic abscess/infarction (66%), leukemia/lymphoma (40%), or splenomegaly/hypersplenism (40.2%). Overall morbidity was higher in OS vs. LS (57.6% vs. 20.1%, p <0.001). No difference in readmission rate or reoperations between various groups who underwent splenectomy was noted.

Conclusion: Overall, the 30-day mortality and morbidity after splenectomy were higher in patients with leukemia and lymphoma, trauma, and splenic abscess and infarction. Patients with leukemia/lymphoma may benefit from prehabilitation and careful procedural timing. LS was associated with lower morbidity and mortality; therefore, it should be attempted if feasible in all non-emergent conditions.
MIXED METHODS ANALYSIS OF OPEN ENDED RESPONSES ON A PEDIATRIC BEHAVIORAL RATING SCALE

Christine Schmitt; Megan Burke, MD; Neelkamal Soares, MD

MD Class of 2023, Pediatric and Adolescent Medicine
Western Michigan University Homer Stryker M.D. School of Medicine

Objective: Child behavior rating scales often contain both forced-response and open-ended prompts, however there is little data on the utility of analyzing the open-ended responses. This preliminary study explores mixed-methods analysis of the sentiment of open-ended responses (concerns about behaviors, strengths of child) and correlation with the composite scores on the Behavior Assessment System for Children - Third Edition (BASC-3).

Methods: This retrospective cross-sectional study included 174 subjects from an eligible pool of 185 caregivers and teachers of children/adolescents under 18 years old. The participants were referred to an academic behavioral health clinic of an academic health system and completed BASC-3 assessments over a period of 18 months. Two human raters rated the sentiment of open-ended responses. T-scores were calculated for the Behavioral Symptoms Index, Internalizing Problems, Externalizing Problems, and Adaptive Skills Composite, and subsequently classified as "clinically significant", "at risk", or "average". Spearman correlation was used to correlate sentiment with T-scores via and simple linear regression was used to evaluate the linear relationship between sentiment and each T-score of interest.

Results: The authors found a positive correlation between the Adaptive Skills and Strengths comment sentiment. Additionally, the Concerns comment sentiment demonstrated greater correlation with Externalizing Problems than with Internalizing problems. Word count did not significantly impact the correlation.

Conclusion: Analysis of the sentiment of open-ended responses can complement the quantitative data of behavior rating scales and contribute to clinical decision making.
A RARE CASE OF BILATERAL SPONTANEOUS ADRENAL HEMORRHAGE

Dilpat Kumar, MD; FNU Warsha, MD; Faizan Shaikh, MD

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Interfaith Medical Center

A 57-year-old man with history of peripheral vascular disease presented with acute onset of severe, diffuse, tearing abdominal pain. His pain was radiating to his back and was associated to nausea, vomiting and diarrhea. On presentation, his blood pressure was 216/119 mm of Hg which later dropped to 90/50’s. Exam was significant for bluish colored diffuse abdominal rash with diffuse abdominal tenderness. On labs, his hemoglobin dropped from 12.0 to 6.5 on day 3 of hospitalization with creatinine increasing from 0.94 to 1.95, and sodium of 129. Initial CT on arrival showed extensive vaso-occlusive disease in abdomen, but no active bleeding. Repeat CT scan was done when hemoglobin dropped showed new bilateral adrenal nodules measuring 38mm on right and 30mm on left likely representing adrenal hemorrhage and moderate to large peritoneal hemorrhage. His antiphospholipid and HIT screen were negative, so were his blood cultures. TEG scan and platelet mapping showed no coagulopathy. He was started on corticosteroid and aldosterone supplements. Surgery and interventional radiology were consulted, but patient had no drainage or surgical procedures. His bleeding improved by itself. Adrenal hemorrhage is a rare but potentially lethal medical condition, if left untreated can result in adrenal insufficiency, acute adrenal crisis, and mortality due to distributive and hemorrhagic shock. Classically, it is linked to trauma, severe sepsis mainly associated to meningococcus, adrenal tumors, antiphospholipid syndrome, heparin associated thrombocytopenia and anticoagulant use. In our case, no particular etiology was identified and he was diagnosed to have spontaneous bilateral adrenal hemorrhage.
STREPTOCOCCUS PNEUMONIAE INFECTION PRESENTING AS CAUDA EQUINA SYNDROME DUE TO EPIDURAL ABSCESS - A CASE REPORT

Mariana Camelo Pereira, MD; Thales Nogueira Gomes, MD; Benjamin Avner, MD PhD

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Case report: 49-year-old female presented to the emergency department with a 3-day history of back pain, cough, urinary retention, and lower extremity weakness. She denied IV drug use. On physical exam, she was tachycardic, febrile, and tachypneic. Neurologic examination showed bilateral lower extremity weakness, left worse than right. Reflexes were decreased from T6 level downward. Labs were significant for WBC count of 21.7, hemoglobin of 7.9, and sodium of 123. On straight cath, patient voided 1.2L of urine. Chest MRI showed a large paraspinal mass centered at T6/7 involving vertebral bodies and an epidural abscess causing cord compression at the same level. Neurosurgery was consulted and patient underwent cervicothoracic laminectomies for abscess drainage (C4-T8). Swab culture from surgical site grew pan-sensitive Streptococcus pneumoniae. CT chest performed postoperatively revealed a fluid collection in the left lower lobe at the T7 level suspicious for pulmonary abscess. Patient was treated with 6-week course of ceftriaxone and metronidazole, achieving significant improvement.

Discussion: The infectious diseases team hypothesized that S.pneumo, presumably from a primary pulmonary source, might have caused contiguous osteomyelitis/discitis and epidural abscess on the thoracic spine. Alternatively, patient might have had initial S.pneumo bacteremia from primary lung infection leading to hematogenous osteomyelitis and epidural abscess. Immediate surgical intervention in the setting of cauda equina syndrome and appropriate antibiotic therapy were critical for this patient's recovery. This is a rare case of S.pneumo infection causing epidural abscess and osteomyelitis with favorable clinical outcome even after delayed surgical debridement.
INFLUENCE OF ALCOHOL ON HOSPITAL ADMISSIONS, IN-HOSPITAL DEATH, AND LIVER TRANSPLANT FOR PATIENTS WITH WILSON DISEASE: NIS ESTIMATES FROM 2002-2014

Eric Martin Sieloff, MD; Christine Maisano, BA; Ashina Singh, MD; Cuyler Huffman, MS; Ross Driscoll, MD; Thomas Melgar, MD

Internal Medicine, MD Class of 2023, Epidemiology and Biostatistics, Medicine Pediatrics Western Michigan University Homer Stryker M.D. School of Medicine; Henry Ford Health System

Background: Wilson disease (WD) is an uncommon genetic disorder of copper metabolism that causes liver damage. Alcohol consumption can compound hepatotoxicity in these patients. The implications of alcohol use in WD have not been described; we performed this study to estimate how alcohol can affect liver disease in patients hospitalized with WD.

Methods: Using the National Inpatient Sample database, we investigated the association between alcohol use and in-hospital outcomes in WD and non-alcoholic liver disease (WD-NALD) in terms of hepatitis or cirrhosis and in WD with alcoholic liver disease (WD-ALD) in terms of hepatitis, fatty liver disease, or cirrhosis.

Results: Between 2002-2014 there were 19,206 hospital discharges for WD: 15.9% and 5% included diagnoses of WD-NALD and WD-ALD, respectively. In-hospital mortality was 4.14% for WD-NALD and 5.11% for WD-ALD (p=0.409). Median age at admission was 43 years old for WD-NALD and 46 years old for WD-ALD (p=0.0102). Liver transplant was performed for 7.70% and 1.88% of WD-NALD and WD-ALD patients, respectively (p=0.003). Liver failure complications included spontaneous bacterial peritonitis, hepatic encephalopathy, portal hypertension, and hepatorenal syndrome.

Conclusion: We found no statistically significant difference in in-hospital mortality between WD-NALD and WD-ALD. Age at hospital admission was three years younger for WD-NALD versus WD-ALD, which may be due to a delay in diagnosis of WD masked by acute alcoholic liver disease. Alcohol use was associated with a more critically ill hospital course once admitted. Physicians should reinforce alcohol avoidance in patients with WD to optimize patient outcomes.
ERAS (enhanced recovery after surgery) protocols have improved post-operative outcomes by refining pre-, peri- and postoperative patient care. In 2018, our institution implemented an ERAS protocol to evaluate and improve postoperative (POP) outcomes of hysterectomy patients. Chart reviewed patients who underwent hysterectomies (abdominal, laparoscopic, robotic, vaginal) with or without Bilateral-Salpingo-Oophorectomy, who visited the Emergency Department (ED) within a 30-day window after surgery. We compared the POP causes of admission, length of stay, and use of narcotic analgesia before and after the ERAS protocol.

Data was collected from June 2017 to June 2018 for pre-ERAS and January 2019 to January 2020 for post-ERAS. 295 pre-ERAS hysterectomies were compared to 210 post-ERAS hysterectomies. Of the pre-ERAS hysterectomies, 28 ED visits and 11 readmissions (8 related to complications) occurred. Of the post-ERAS hysterectomies, 26 ED visits and 12 readmissions (11 related to complications) occurred. Pain was the most common cause of POP ED visits (2% pre and 3.8% post ERAS). Surgical site infections (pelvic abscess and cellulitis) are the most common cause of readmission (1.7% pre- and 2.9% post-ERAS). Narcotic prescriptions were written in 10% of POP ED visits in pre- and 12% of post-ERAS. Chi-square tests demonstrated no statistically significant difference in ED visits, pain, narcotic prescription, readmission rates, or related complications between pre and post-ERAS protocol. In the US, surgical site infections are the most common cause of readmissions. The ERAS protocol implementation in our community hospital has not reduced the readmission frequency for surgical site infections, nor narcotic prescriptions.
Chronic back pain and overuse of narcotics have become a growing concern for primary care providers and their patients. This is due to complications linked to increased length of treatments, and inadequate relief of symptoms. The study suggests up to 80% of the population in the United States will experience low back pain or lower extremity pain at least once in their lifetime. Low-back pain has a major impact on healthcare costs to Americans, which exceeds $50 billion. However, when factors such as loss of wages and productivity come into play this figure will exceed $100 billion. A thorough physical exam by primary care physicians (PCPs), an accurate diagnosis, and appropriate follow-ups remain the critical factors for reduced costs, decreased morbidity, and possible mortality relating to back pain diagnosis and treatment.

Many studies blame sciatica as the most common cause of back pain, however, in clinical practice, the vast majority of our patients experienced significant relief with physical therapy and injections targeted for sacroiliac (SI) joint symptoms, despite some literature citing only 10-25% of back pain below L5 is due to SI joint pain. This retrospective observational QI/QA project will analyze the proportions of patients diagnosed with sciatica or radiculopathy. Then we will determine which percentage of them were adequately treated with SI join interventions; thereby confirming the diagnosis of SI joint pain, in comparison to sciatica or radiculopathy.
EXPECT THE UNEXPECTED? AN UNUSUAL CASE OF SPONTANEOUS DISTAL ESOPHAGEAL PERFORATION

Jasmine Saeedian, BA; Prashant Patel, DO

MD Class of 2021, Internal Medicine
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Effort rupture of the esophagus, known as Boerhaave syndrome, is the spontaneous perforation of the esophagus following due to a pressure gradient between the esophagus and thorax. Often associated with severe straining or vomiting, these perforations are transmural and involve all layers of the esophageal wall. Spontaneous perforation is rare, comprising only 15% of cases.

Case: A 45 year-old former basketball player presents with hemoptysis, diaphoresis, and sharp epigastric abdominal pain in the setting of a lodged food bolus. CT scan showed paraesophageal air and pneumomediastinum, and a gastrographin study confirmed diagnosis of a distal esophageal perforation. Cardiothoracic surgery was consulted, and they recommended non-operative management due to the location of this spontaneous perforation. He remained stable and improved with strict medical management and total parenteral nutrition through a PICC line. During the morning of his planned discharge, he experienced new arm pain, which was discovered to be from multiple catheter-associated DVTs. Orchestration with the Cardiothoracic Surgery, Vascular Surgery, and Nutrition teams took place to formulate a plan in the context of his upper GI bleed, iatrogenic hypercoagulability, and large body habitus. He began anticoagulation, stopped antibiotics, and was discharged home with TPN through a tunneled catheter and close outpatient follow-up.

Discussion: Spontaneous Boerhaave syndrome is rare, but the series of events that ensued for our patient seemed even more unlikely. This case shed light on the importance of teamwork in the setting of serial changes and potentially conflicting recommendations, and also that physicians must always remember to expect the unexpected.
SELECTIVE THORACIC FUSION IN ADOLESCENT IDIOPATHIC SCOLIOSIS LENKE 1 AND 2 CURVE PATTERNS

Harrison Seltzer, BS; Natalie Finazzo, BS; Aditya Mehta, BS; Raymond Bayer, BS; Joseph Weistroffer, MD; Dale Rowe, MD; Karen Bovid, MD

MD Class of 2022, Orthopaedic Surgery
Western Michigan University Homer Stryker M.D. School of Medicine

Background: The Lenke classification informs surgical planning in adolescent idiopathic scoliosis (AIS) by separating structural inflexible curves from nonstructural, flexible, compensatory curves. Lenke 1 and 2 patterns include structural thoracic curves and nonstructural lumbar curves. In selective thoracic fusion (STF), only the thoracic curve(s) are instrumented allowing the lumbar curve to spontaneously adjust to the correction of the thoracic curve. Surgeons must consider a balance between stability and mobility in choosing which vertebral levels to fuse.

Objective: Describe rate of achievement of published optimal radiographic outcomes following STF. Methods: The WMed orthopaedic spine surgery database was queried for surgically-treated patients with Lenke 1 and 2 AIS. Deidentified data including surgical information and radiographic measurements were analyzed.

Results: 3/10 (30%) patients met all 4 criteria for optimal radiographic outcome, including 0/1 (0%) treated with nonselective fusion and 3/9 (33%) treated with STF. All patients achieved lumbar cobb angle <26°. 7/10 (70%) achieved coronal balance within 2cm (7/9 STF). Deformity-flexibility-quotient<4 was achieved in 5/9 (56%) STF patients. Lumbar correction >37% was attained in 7/10 (70%), 1/1 Nonselective and 6/9 (67%) STF. The STF patients that achieved all 4 optimal radiographic outcomes did so an average of 25 days following surgery.

Discussion: Short-term follow up of this small cohort demonstrated achievement of optimal radiographic outcomes in the majority of patients treated with STF, however only 30% met all 4 criteria. Further investigation is needed to determine the clinical and patient reported outcomes associated with both ideal and suboptimal radiographic parameters.
A CASE OF SMALL VESSEL VASCULITIS DUE TO STAPHYLOCOCCUS AUREUS.

Dilpat Kumar, MD; Akshaya Gadre, MD; FNU Warsha, MD; Susan Bannon, MD

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Interfaith Medical Center

Systemic vasculitides are a complex group of disorders that involve multiple organs. The origin of these primary vasculitides is not fully understood, there is a combination of genetic, immunological, and environmental factors, including infections, which may trigger them. An 87-year-old man with a complex medical history presented with confusion, worsening erythema of the lower extremities and decreased urine output. Five-days prior to this presentation, he was hospitalized for right lower extremity cellulitis and abscess, requiring intravenous antibiotics, incision and drainage; cultures of which grew Staphylococcus aureus and group B streptococcus. Exam findings included periorbital edema, end expiratory wheezes, 2+ pitting edema in right lower extremity and palpable, blanching petechiae with purpura involving both lower extremities with associated necrotic lesions. Lab work showed elevated creatinine and BUN compared to his baseline. Urinalysis showed 3+ hemoglobin without proteins and casts. Autoimmune disease and myeloma workup was negative. Hepatitis B, C and HIV were negative. C3 and C4 compliment were 49 and 15 respectively, while total compliment level was normal. Skin biopsy of the two lesions showed concerns of small vessel vasculitis with rare eosinophils. He was diagnosed with Staphylococcus-associated vasculitis, and he was treated with antibiotics. Kidney function failed to improve and hemodialysis was initiated. Staphylococcus-associated vasculitis is mostly linked to immune complex formation and continued antigen production in setting of active infection. Diagnosis requires a biopsy, hypocomplementemia and recent history of staphylococcal infection. Treatment of staphylococcus-associated vasculitis should focus on eradicating the infection while immunosuppressive therapy has no clear benefit.
THE PROXIMAL HUMERUS PLATE: USEFULNESS IN POSTERIOR MALLEOLAR AND POSTERIOR PILON FRACTURE VARIANTS

George Borrelli, MD; Jason Roberts, MD; Robert Gorman III, MD; Tyler Snoap, MD
Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine; Orthopaedic Surgery, Bronson Methodist Hospital

Introduction: Pre-contoured locking plates have, in many ways, revolutionized fixation of complex peri-articular fractures. One such plate, the proximal humerus plate, has been known to have utility in more areas than just the proximal humerus. To expand its indications, the authors have found use for it placed inverted on posterior malleolar fractures or in posterior pilon fracture variants.

Case Description: The case depicts a 49 year-old male who sustained a closed, unstable, trimalleolar ankle fracture as a result of a motorcycle accident. An inverted pre-contoured proximal humerus plate was applied to the posterior distal tibia to augment fixation based on fragment size and the instability pattern. Clinical and radiographic follow up demonstrated near anatomic reduction and fracture union.

Conclusion: The case depicts the utility of the inverted pre-contoured proximal humerus plate for fixation of the posterior distal tibia. The plate is low profile, anatomically fits the area well with minimal need of additional contouring, and accepts relatively large diameter screws. In addition, the plate's ability to accept locking screw fixation may be used to further augment constructs in patients with osteoporosis, alcoholism, and diabetes mellitus.
iPoster 152

RADIOGRAPHIC OUTCOMES OF SPINAL FUSION FOR ADOLESCENT IDIOPATHIC SCOLIOSIS WITH LOWEST INSTRUMENTED VERTEBRA AT THE THORACOLUMBAR JUNCTION.

Raymond Bayer, BS; Harrison Seltzer, BS; Aditya Mehta, BS; Natalie Finazzo, BS; Joseph Weistroffer, MD; Dale Rowe, MD; Karen Bovid, MD

MD Class of 2022, Orthopaedic Surgery
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Selective thoracic fusion (STF) is a technique used in adolescent idiopathic scoliosis (AIS). Compared to longer fusions, STF preserves mobility of the lumbar spine. Concern remains that stopping fusions near the thoracolumbar junction could lead to junctional kyphosis, curve progression, and need for future revision.

Objective: Evaluate radiographic outcomes and reoperation rate for patients with AIS treated with posterior spinal fusion and lowest instrumented vertebra (LIV) near the thoracolumbar junction. Methods The WMed orthopedic spine surgery database was queried for patients with AIS and LIV between T11-L1. De-identified data were evaluated for optimal correction of lumbar curve (Cobb angle below fusion<26°), magnitude of lumbar curve progression from first to last post-operative radiograph, and need for further surgery.

Results: Ten patients were identified; three with a LIV at T11, five at T12, and two at L1. Optimal post-operative lumbar curve correction was achieved in 7/10 patients. One patient had lumbar curve progression from 45° to 55° treated with revision surgery extending the fusion to L4. The remaining 90% of patients did not have clinically significant progression of curves above or below the fusion and did not require revision surgery.

Conclusion: This small retrospective cohort analysis demonstrates overall good radiographic outcomes and low risk of revision surgery at short term follow up for AIS patients treated with posterior spinal fusion ending at the thoracolumbar junction. Further long-term study is needed to determine clinical and patient-reported outcomes to evaluate the safety of ending long fusions at the thoracolumbar junction.
Case report: 70-year-old female with a long-term history of rheumatoid arthritis and psoriasis presented to rheumatology office for assessment. She had been off any medications for the past 2 years, after using methotrexate for many years previously, and stated her symptoms were worsening. Patient was started on methotrexate; her initial CBC was unremarkable except for mild thrombocytopenia (125-10^9/L). She showed clinical improvement, however subsequent CBC showed platelets of 103-10^9/L and absolute neutrophil count of 0.1-10^9/L; methotrexate was held. A blood smear was obtained which showed absolute lymphocytosis with increase in large granular lymphocytes (LGLs). Peripheral blood flow cytometry suggested the diagnosis of T-cell granular lymphocytic leukemia (T-LGLL) and bone marrow biopsy confirmed the diagnosis, with findings of a hypercellular marrow with a discrete monoclonal CD8+ lymphocyte population which did not express CD4 or T-cell receptor. Patient was started on cyclosporine and G-CSF since she had no response while taking methotrexate for autoimmune disease. Patient achieved stability in both clinical symptoms and cell counts after treatment.

Discussion: LGL leukemia is a rare indolent lymphoproliferative disease first described in 1985 as a process including blood, marrow and spleen. It is classically associated with autoimmune disorders, specifically rheumatoid arthritis, which is present in 11-36% of patients with LGLL. Neutropenia is a common finding in T-LGLL, and opportunistic infections are usually the reason patients seek medical attention. In our case, the patient had T-LGLL as an incidental finding while undergoing treatment with methotrexate, which is first-line therapy for this condition.
OCCULT CERVICAL LEIOMYOSARCOMA FOUND ON HYSTERECTOMY FOR VAGINAL PROLAPSE

Annika Nuler, BA; Melinda Abernethy, MD; Laura Bauler, PhD

MD Class of 2022, Medicine Obstetrics and Gynecology, Medical Education
Western Michigan University Homer Stryker M.D. School of Medicine

Background: Cervical leiomyosarcoma is rare, accounting for less than 1% of all cervical cancers and typically more aggressive than squamous cell and adenocarcinomas. Often presenting with abnormal uterine bleeding and a palpable cervical mass, it is an unusual tumor to find incidentally at hysterectomy. The rarity of this cancer has led to a lack of knowledge on prognosis and optimal management for these patients.

Case History: We present a case of asymptomatic cervical leiomyosarcoma found incidentally at the time of vaginal hysterectomy performed for treatment of pelvic organ prolapse. Preoperatively, there was no history of abnormal vaginal bleeding, pelvic pain, or abnormal pap smear and no mass palpated on pelvic exam. The tumor was encountered at the time of posterior cul-de-sac entry. Hysterectomy and bilateral salpingo-oophorectomy were successful in removing the tumor, with no recurrence observed in 13 months of follow-up for this patient.

Discussion: Cervical leiomyosarcoma is an aggressive tumor with a 5-year survival of only 55.6%. Given the rarity of their incidental presentation at the time of hysterectomy for benign indications, treatment of these malignancies presents a challenge in determining intensity of intervention and timing of post-treatment surveillance. Careful documentation of treatment and outcomes is essential to improve future patient outcomes.
LIBMAN-SACKS ENDOCARDITIS AS THE INITIAL PRESENTATION OF METASTATIC ADENOCARCINOMA

Michelle Helbig, DO; Prashant Patel, DO

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Nonbacterial thrombotic endocarditis (NBTE), "marantic", or "Libman-Sacks" endocarditis is a rare entity describing endocarditis that is non-infectious and usually secondary to advanced malignancy or systemic lupus erythematosus (SLE). NBTE usually is found on autopsy, however some patients are diagnosed antemortem. The most common malignancy associated with NBTE is adenocarcinoma including lung, colon, ovary, biliary, prostate, and pancreatic.

Case: 63-year-old female with past medical history of recently diagnosed pulmonary embolism and multivessel DVT's on Eliquis presented with SOB and chest tightness. She was found to have bilateral pleural effusions, thrombocytopenia, and splenic infarcts. Echocardiogram showed severe mitral regurgitation with two large mitral valve vegetations suggestive of Libman-Sacks endocarditis. Four sets of blood cultures had no growth during the hospitalization, and other atypical causes of infectious endocarditis were ruled out. Rheumatological work-up was nonrevealing including SLE and anti-phospholipid antibody syndrome. Thoracentesis of right and left pleural effusions demonstrated metastatic adenocarcinoma, likely secondary to an upper gastrointestinal source.

Discussion: NBTE is characterized by endothelial injury leading to the deposition of thrombi on heart valves. It is a separate entity from culture-negative endocarditis and infectious causes, including atypical organisms, must be ruled out to diagnose NBTE. NBTE can present as an atypical manifestation of malignancy and must be differentiated from infective endocarditis. When presented with endocarditis without a clear etiology, advanced malignancy must be ruled out. Treatment of NBTE secondary to neoplasm consists of systemic anticoagulation as well as treatment directed against the underlying malignancy.
THYROID STORM IN PREGNANCY IN A NONCOMPLIANT PATIENT

Katherine Holden, DO; Melanie Schwier, DO; Silvia Linares, MD; James Goodspeed, MD

Obstetrics and Gynecology, Western Michigan University Homer Stryker M.D. School of Medicine; OBGYN, Bronson Methodist Hospital

Introduction: Thyroid disease in pregnancy is a complex endocrine disorder due to inherent maternal physiologic changes. Hyperthyroidism is relatively rare in pregnancy with an incidence of 0.2%, thyroid storm is even more rare without an exact incidence. It can advance quickly, dangerously, and fatally to thyroid storm if not managed properly by physician and patient. Due to its rarity, quick identification and treatment are imminently important to maternal and fetal well-being.

Case Description: A multiparous 24-year-old G3P202 was diagnosed with Graves' disease, a form of hyperthyroidism, at 16 weeks gestation. The patient presented with thyroid storm at 25 weeks of gestation following a period of noncompliance. Due to escalating concern for maternal and fetal morbidity and mortality in the setting of a thyroid storm, the patient was admitted to medicine for aggressive management. Initial continuous external fetal monitoring was warranted with noted fetal tachycardia. The patient received standard doses of propylthiouracil, hydrocortisone, and propranolol. With appropriate treatment regimen, maternal and fetal status improved throughout the remainder of her two-day admission. She was discharged in stable condition on methimazole with further outpatient management of Graves' disease involving coordination among obstetrics and endocrinology.

Conclusion: Hyperthyroidism can be complicated by thyroid storm with severe, and possibly fatal, maternal or fetal outcomes. Therefore, early recognition and treatment, extensive counseling, and involvement of the entire healthcare team, are vitally important to patient outcomes.
iPoster 159

DELAYED ANCA POSITIVITY: A CHALLENGING CASE OF MULTISYSTEM EGPA

Blair Graham, DO; Adam Ladzinski, DO; Natasha Haris, BS; Gabe Kousourou, DO; Nicholas Helmstetter, MD

Medicine Pediatrics, Internal Medicine, MD Class of 2022 Western Michigan University Homer Stryker M.D. School of Medicine; Indiana University

Introduction: Vasculitides are often misdiagnosed until the disease process is advanced. Testing for antineutrophil cytoplasmic antibodies (ANCA) reactivity is a common practice, though only 30 to 60 percent of patients with eosinophilic granulomatosis with polyangiitis (EGPA) are ANCA positive which can lead to diagnostic delay. We report a case of EGPA with multisystem involvement in a patient with an initially negative ANCA.

Case Description: A 56-year-old female with a medical history of hypertension, epilepsy, asthma, chronic hepatitis C, and nasal polyps initially presented to the emergency department (ED) for dysuria and shortness of breath. Urine cultures and ANCA were negative, she followed up with nephrology outpatient who recommended renal biopsy due to increasing hematuria and proteinuria. She returned to the ED one month later with weight loss, arthralgias, diarrhea, hemoptysis, elevated troponins, and oliguria. She was discharged with steroids and her hydralazine was discontinued due to concern for drug-induced lupus. Her repeat ANCA came back positive, she returned to the hospital. She was anemic requiring transfusion, in hypertensive urgency with severe acute kidney injury, requiring oxygen, and had likely diffuse alveolar hemorrhage on imaging. Renal biopsy supported a diagnosis of EGPA.

Discussion: ANCA positivity is a hallmark of EGPA. Unfortunately, some cases of EGPA present with a negative ANCA which can be falsely reassuring of disease absence. Awareness of this irregularity allows the clinician to keep EGPA on the differential despite a negative ANCA. To overcome this, early biopsy permits prompt therapy and potential reduction of morbidity and mortality.
CASE REPORT: HYPERTROPHIC NONUNION FOLLOWING POSTERIOR SPINAL FUSION RESULTING IN COMPLETE AND RAPID PARALYSIS, A CALL FOR INCREASED AWARENESS

Guston Zervoudakis, MD; Adam Misseldine, MS; Michael Kasten, MD

Orthopaedic Surgery, MD Class of 2023, Western Michigan University Homer Stryker M.D. School of Medicine; Orthopedic Spine Surgery, Bronson Methodist Hospital

Posterior spinal fusion (PSF) with instrumentation is one of the most widely performed procedures in the realm of Orthopaedic Spine Surgery. Whether performed alone or in combination with other various decompressive modalities, PSF can be utilized to treat numerous spinal conditions including discogenic low back pain, foraminal stenosis, trauma, neoplasm, and a spectrum of spinal deformities. Similar to other fusion procedures, a potential complication of PSF is hypertrophic nonunion and primarily due to inadequate stability as a result of hardware failure. Significant neural injury as a direct result of hypertrophic bony overgrowth is exceedingly uncommon and any resulting neurologic compromise often follows a slowly progressive assumingly predictable course. Thus, asymptomatic hypertrophic nonunion following PSF is primarily treated with close observation and regular follow-up in the outpatient setting. All of these aspects have led to the general acceptance of hypertrophic non-union following PSF as a benign entity with very sparse discussion in literature. However, rapid neurologic compromise due to hypertrophic nonunion of the spine remains a possibility and can lead to devastating outcomes for the patient, stressing the importance of a potential paradigm shift in treatment and observation protocols. Here, we present the unusual case of an 88 year-old female with history of known thoracolumbar nonunion from a prior T3-pelvis arthrodesis who presented with rapidly progressive lower extremity weakness that ultimately progressed to complete paralysis following CT myelogram. Despite immediate steroid treatment and operative decompression/stabilization patient remains completely paralyzed from the level of T9 down.
Introduction: Racial healthcare disparities have been observed across many medical subspecialties. The frequency of reporting and analyzing race and ethnicity in orthopaedic clinical trials has not been previously been reported. The purpose of this study was to determine the frequency that race and ethnicity are reported and analyzed in orthopaedic clinical trials.

Methods: The top ten orthopaedic journals by impact factor were manually screened from. Published clinical randomized controlled trials from 2015-2019 related to orthopaedics were included. Studies were evaluated using the Cochrane Risk of Bias tool and reported/analyzed demographics, including age, sex, race, and ethnicity, were recorded.

Results: 482 articles met inclusion criteria. Of these 482 trials, 460 (95.4%) reported age and 456 (94.6%) reported sex, while 35 (7.3%) reported race and 15 (3.1%) reported ethnicity. 79 studies (16.4%) analyzed age and 72 studies (14.9%) analyzed sex, while 6 studies (1.2%) analyzed race and 1 study (0.2%) analyzed ethnicity. The orthopaedic subspecialty of spine was found to report race (23.5%) and ethnicity (17.6%) more frequently than all the other subspecialties, while sports medicine reported race and/or ethnicity in only 3 out of 150 trials (2.0%).

Conclusion: Race and ethnicity are not frequently reported or analyzed in orthopaedic randomized controlled trials. Social context, personal challenges, and economic challenges should be considered while analyzing the impact of race and ethnicity on outcomes.
GENETIC CAUSES OF CHRONIC LIVER DISEASE IN PEDIATRICS

Casey Fealko, BS; Mahmuod Abdeljaber; Eric Martin Sieloff, MD; James Dalton Boyer, DO; Dana Maajali, MD; Cuyler Huffman, MS; Shibani Kanungo, MD, MPH; Thomas Melgar, MD

MD Class of 2021, MD Class of 2022, Internal Medicine, Epidemiology and Biostatistics, Pediatric and Adolescent Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; University of Jordan

Background: While nonalcoholic fatty liver is the leading cause of chronic liver disease in children and adolescents, genetic diagnoses remain an important cause. Genetic diseases that commonly cause cirrhosis in the infant population include metabolic disorders while the older pediatric population is generally affected by Wilson's disease and alpha-1-antitrypsin deficiency.

Objective: Identifying the underlying genetic causes of chronic liver disease in children is important because early identification can help prevent long-term complications. Our goal is to identify the most common diagnoses associated with chronic liver disease and their associated complications in children to advocate for additional funding for research.

Methods: Using the HCUP-KID database, we aimed to characterize hospital admissions of children with chronic liver disease from genetic causes. We also planned to evaluate the frequency of potential complications that may arise from chronic liver disease such as malnutrition and portal hypertension. Results: ~11% of pediatric hospitalizations involving chronic liver disease were associated with a genetic disorder/syndrome diagnosis. The next largest group was complex molecule disorders (2.48%), followed by urea cycle defects (1.59%). Hospitalizations associated with chronic liver disease and a diagnosis of carbohydrate disorders, mitochondrial disorders, disorders of fatty acid oxidation, organic acid disorders, and protein metabolism/amino acid disorders totaled less than 1% each.

Discussion: Genetic syndromes including cystic fibrosis, alpha-1-antitrypsin deficiency, and hereditary hemochromatosis were the most common group of diagnoses associated with pediatric hospitalizations involving chronic liver disease. Further characterization of the complications and outcomes of chronic liver disease can aid in research and eventually treatment.
THE IMPORTANCE OF TARGETED INTERVENTIONS DURING THE DEPLOYMENT OF THE SPANISH MYCHART.

Sorabh Singhal, BS; Andrew Lynch, BS; Cheryl Dickson, MD
MD Class of 2022, MD Class of 2023, Pediatric and Adolescent Medicine
Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Epic's Electronic Health Record (EHR) patient portal, MyChart, offers patients a way to actively participate in their care. Epic offers a Multilingual MyChart, including Spanish. As of November 2019, the Family Health Center (FHC) in Kalamazoo, Michigan had not implemented the Spanish translation of MyChart.

Objective: The objective was to observe changes in MyChart usage rates, throughout the deployment of the Spanish MyChart at the Family Health Center (FHC). Methods: A three-phased approach was implemented to deploy the Spanish MyChart. In December 2019, Spanish MyChart was turned on. In phase two, a brochure campaign occurred at the FHC. In phase 3, we involved a Spanish community organization to advertise the change. Approximately one month lapsed between each phase of the project.

Results: Less than 15 patients utilized Spanish MyChart 6 months after it was deployed. One new patient created a new account in MyChart. The remaining utilizations had an existing English MyChart account and switched the language to Spanish.

Conclusion: We postulate the reasons for low Spanish MyChart utilization are multifactorial, including social determinants of health and the COVID-19 pandemic. We recommend targeted interventions including in-person engagement with the Spanish-speaking community to more effectively address their unique social determinants of health, such as language barriers and diminished access to preventative healthcare. We additionally postulate that the COVID-19 pandemic negatively impacted the advertisement campaign for the Spanish MyChart, as in-person gatherings were limited. Our results highlight the importance of targeted interventions in improving health equity for the Spanish-primary population.
Background: Black women experience higher rates of infant mortality and adverse birth outcomes compared to white women. Structured inequity, along with interpersonal discrimination, are primary contributors. Within Kalamazoo County, black mothers are twice as likely to live in poverty, report experiencing discrimination on a regular basis and are significantly more likely to have inadequate prenatal care. Research aims: To understand women's personal experiences with medical providers, explore their expectations of medical providers and practices, and examine variations by race/ethnicity and socioeconomic status.

Methods: One-hundred-and-seventy-eight women were pre-recruited from the Mom's Health Experience Survey. Fifty-seven of them participated in Community Voice Panel (CVP) focus groups. Twelve focus groups were conducted by two female facilitators and discussed women's experiences spanning from home life to medical office experiences and back. All focus groups were recorded, transcribed, and consensus-coded for themes.

Results: Thematic analysis revealed differences in treatment of women of color (WOC) in the health care system and differences in their responses to this treatment. Powerlessness and invisibility were pervasive feelings in WOC, described as feeling "like a mouse in a corner." Despite the power differential they experience in their healthcare experiences, WOC were understanding and willing to justify the actions of their providers.

Conclusion: WOC described systematic discrimination within the healthcare system and gave suggestions for improving quality of care. Their extension of grace to providers in response to poor experiences and treatment demonstrates a coping mechanism that may be unique to WOC.
EMPOWERING WOMEN'S SELF-AGENCY IN PRENATAL CARE WITH A TRUSTING PATIENT-PROVIDER RELATIONSHIP

Claudia Waters, BS; Silvia Linares, MD; Lynette Gumbleton, BA; Joi Presberry, MPH; Megan Sandberg, BS; Drew Moss, BS; Catherine Kothari, PhD

MD Class of 2022, MD Class of 2023, Obstetrics and Gynecology, Division of Epidemiology and Biostatistics, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: During pregnancy, women often feel that their needs and opinions are disregarded by their health care providers. As a result, women may grow to distrust their providers. This distrust obstructs communication while leaving patients to manage concerns, goals, and health barriers on their own. In this study, we examine the fundamental aspects of a trusting patient-provider relationship that empower women to be leaders on their health care team during pregnancy.

Methods: Twelve focus groups were conducted with a representative sample of women who gave birth in Kalamazoo, MI between January and September 2017. Four groups of 6 to 12 participants discussed expectations of prenatal care.

Results: Women who had trusting relationships described experiences of positive communication with their prenatal care providers. One participant shared that having her opinion valued gave her the comfort "to be open and honest and seek out the help and the support that [she] need[ed]." Women with distrusting relationships shared experiences about poor communication. Another participant expressed her desire for this support: "Listen to us. Even though it might seem crazy or stupid, just listen and be the person we can come to for our problems. [. . .] Just be the person we can lean on during that time, like a backbone."

Conclusion: A trusting relationship in prenatal care empowers women to control their health decisions. Providers who focus their approach on respect and communication are more likely to earn this fundamental trust and ensure that their patients' needs are met.
IMPACT OF COVID-19 ON PSYCHOTROPIC USE IN THE ELDERLY

Andy Jan, BA; James Le, BS; David Huan, BA; Daniel Brauner, MD

MD Class of 2022, MD Class of 2023, Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Background: Nursing homes have been especially impacted by COVID-19 given disproportionate numbers of residents with cognitive impairment. Additionally, pandemic safety measures have increased staff burden and decreased availability of non-pharmacological interventions. Although psychotropic medications are highly regulated and seen as therapy of last resort, a gap exists in our knowledge of whether our use of psychotropic medication in nursing homes has increased during the pandemic.

Objective: To review existing literature on COVID and older persons and summarize the impact on psychological health and psychotropic usage in preparation for a Kalamazoo study.

Methods: We performed a PubMed search with the terms "pandemic OR COVID" AND "elderly OR aging OR dementia" generating 2,947 results. Inclusion criteria required at least 2 of 5 of the aforementioned terms and specific mention of psychotropic drug use.

Results: 14 articles met inclusion criteria, and an additional 14 were found by referencing bibliographies. 13 of these papers demonstrated the vulnerability of elderly patients to pandemic-related psychiatric morbidity. A national survey study in Italy showed 5.7% of nursing homes reported increases in psychotropic drug use. A population study in Ontario demonstrated absolute increases in use of several antipsychotics. A community study in Argentina found a 20.2% increase in new antipsychotics and 15.1% increase in benzodiazepines.

Discussion: Our literature review suggests an increase in psychotropic prescription amongst the elderly during the pandemic, coinciding with evidence that COVID-19 has introduced widespread mental health challenges. Our findings warrant further research into changes in psychotropic usage in Kalamazoo.
OUTCOMES FROM OUTPATIENT TREATMENT OF COVID-19 WITH MONOCLONAL ANTIBODY THERAPY: A STATEWIDE SURVEY

Benjamin Root, BS; Rachel Foshee, BS; William Fales, MD; Shanna Cole, PharmD; Michael Klepser, PharmD; Victoria Addis; Andrew Alfred; Lindsay Christensen; Bretton Dempsey; Tam Doan; Jessica Gierka; Matthew Gray; Endira Hebovija; Christine Schmitt; Gina Shoemaker; Jessica Zicarello

MD Class of 2022, MD Class of 2023, MD Class of 2024, Emergency Medicine, Biomedical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine; Pharmacy Practice, Ferris State University; Pharmacy Student, Ferris State University

Introduction: Over 500,000 people have died from COVID-19 in the U.S. Few treatments are available beyond supportive care. Three neutralizing monoclonal antibody (mAb) therapies have been authorized by the U.S. Food and Drug Administration for emergency use to treat mild to moderate COVID-19 in high-risk patients. There is little evidence for their safety and efficacy.

Purpose: Describe clinical outcomes among patients receiving mAb therapy for COVID-19 in Michigan.

Methods: Brief telephone scripted interviews were conducted by medical and pharmacy students from WMed and Ferris State University, respectively. Telephone numbers of mAb patients were obtained from the Michigan Department of Health and Human Services (MDHHS). Patients from long-term care facilities were excluded. Data were entered into an electronic database (REDCap) and basic statistical analyses performed. This study was approved by the MDHHS IRB. Results: Of 472 mAb therapy recipients called, 327 (69%) answered the call. 291 (62%) agreed to be interviewed. 137 (47%) respondents were male. The median age was 65 (IQR 57-72). 11 (3.9%) respondents were hospitalized within 14 days of mAb therapy, median length of stay 4.25 days (IQR 2.25-9.75). 184 (63%) respondents reported feeling better two days after mAb infusions, and 247 (85%) reported feeling 'considerably better' at the time they were interviewed. No deaths were identified.

Conclusion: In one of the first reports outside of clinical trials, we describe low hospitalization rates and good clinical improvement following mAb therapy in high-risk patients with COVID-19 who received mAb therapy. These results are consistent with the limited published evidence.
DIFFERENTIAL IMPACT OF SARS-COV-2 (COVID-19) WITHIN THE KALAMAZOO
COMMUNITY

Brittany N. Sullivan, BS; Amy J. Lin, MS; Justin R. Mak, BS; Catherine Y. Lee, BS; Jacob Baxter, BS;
Joi Presberry, MPH; Katie Corbit, MPH; Terra Bautista, BA; Shanika Lucas;
Komal Razvi, MPH, Catherine Kothari, PhD

MD Class of 2021, MD Class of 2023, Biomedical Sciences, Western Michigan University Homer
Stryker M.D. School of Medicine; Kalamazoo County Health and Community Services Dept.;
YWCA

Introduction: Research studies examining social impacts of the COVID-19 pandemic on families
have described wide variation by community and population groups.

Purpose: To assess COVID-19 impact on day-to-day life and perceptions of SARS-CoV-2 risk.
Methods: Study design was mixed methods: one-on-one phone interviews (n=26 low-income
mothers) and electronic questionnaires (n=42 mixed-income mothers) conducted May-October
2020. Audio-taped interviews were thematically analyzed. RedCap questionnaires prioritized
qualitative themes, quantifying them with scales developed by COVID-19 researchers. Pearson
Chi-Square compared quantitative responses across demographic groups, with a p<0.10
significance threshold.

Results: The following themes dominated COVID-19 concerns: lower quality of remote learning,
financial/employment burdens, access to preventive healthcare, and staying COVID-19-free.
Questionnaires revealed 54.8% perceived SARS-CoV-2 avoidance "difficult," and were more
likely to be people of color (POC) (p=0.089), be lower socioeconomic status (SES) (p=0.039),
and know someone with COVID-19 (p=0.106) than those responding SARS-CoV-2 avoidance
was "easy." Difficult-to-avoid responders had significantly less confidence in local institutions'
and professionals' ability to handle COVID-19. Participants across the board were most worried
about overloaded health systems, loved ones, and the economy/jobs. Participants agreed the
CDC was the most useful COVID-19 information source, followed by primary care doctors, local
news, and the state health department.

Conclusion: Improving health equity during COVID-19 for POC and low SES groups requires
focused outreach, given historical marginalization and institutional distrust. Understanding
Kalamazoo-specific systemic shortfalls will allow medical providers and health institutions to
customize engagement strategies for these groups.
STATEWIDE OUT-OF-HOSPITAL CARDIAC ARREST DURING THE BEGINNING OF THE COVID-19 PANDEMIC

Lindsey Rauch, MD; William Fales, MD

Emergency Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Introduction: Little is known about out-of-hospital cardiac arrests (OOHCA) during a global pandemic.

Objective: To compare statewide OOHCA during the first three months of the COVID-19 pandemic to the same period in 2019. Methods: Data for non-traumatic OOHCA from Michigan were obtained and analyzed from the statewide EMS information system from 3/1 to 5/31/2020 (pandemic) and compared to the same period in 2019 (control). OOHCAs were identified using a validated data filter applied to 911 scene calls. Comparisons in common OOHCA characteristics were performed using descriptive statistics. Survival data were not available.

Results: There were 4,665 OOHCAs in the pandemic period compared to 3,261 in the control period. Bystander witnessed OOHCA occurred in 1,586 during the pandemic versus 1,076 in control (34.0% versus 33.0%, p=0.353). OOHCA involving black patients occurred more frequently (26.6% versus 18.6%, p<.00001). Shockable OOHCA was less common (8.6% versus 10.8%, p=0.0015). There was no difference in the rate of bystander CPR (38.0% versus 37.9%, p=0.991) or AED use (10.0% vs. 10.0%), p=0.991). The rate of endotracheal intubation (ETI) was lower (12.1% versus 30.4%, p<.00001) as was the return of spontaneous circulation (ROSC) (4.9% versus 8.1%, p<.00001). Termination of resuscitation occurred more often (58.7% versus 46.9%, p<.00001).

Conclusion: OOHCA in Michigan increased during the first three months of the COVID-19 pandemic compared to the same period in 2019. OOHCA involving the black race occurred more frequently. Rates of bystander witnessed OOHCA, AED use, and CPR did not change. EMS TOR increased, while ETI and ROSC decreased.
A PROPOSED SURGICAL DECISION-MAKING MODEL FOR ELECTIVE SURGERY CANCELLATION DURING THE COVID-19 PANDEMIC IN THE CONTEXT OF THE FOUR PILLARS OF ETHICS

Nolan Brown, BS; Bayard Wilson, MD; Stephen Szabadi, BM; Cameron Quon, BA; Vera Ong, BS; Alexander Himstead, BS; Nathan Shlobin, BA; Chen Yi Yang, BS; Brian Lien, MS; Shane Shahrestani, MS; Katelynn Tran, BS; Ali R Tafreshi MS, MD; Jack Birkenbeuel, BS; Seth C. Ransome, BS; Elliot Choi, MS; Ronald Sahyouni, MS, MD, PHD; Aaron Kheriaty, MD; Alvin Chan, MD; Isaac Yang, MD

Department of Neurological Surgery, University of California Irvine; Department of Neurological Surgery, University of California Los Angeles; MD Class of 2024, Western Michigan University Homer Stryker M.D. School of Medicine; John A. Burns School of Medicine, University of Hawaii at Manoa Department of Neurological Surgery, Northwestern University Feinberg School of Medicine; Keck School of Medicine of USC

There have been over 111 million cases and 2.5 million deaths worldwide since the start of the COVID-19 pandemic, postponing millions of non-urgent surgeries. Existing literature explores the complexities of rationing medical care. However, implications of non-urgent surgery postponement during the COVID-19 pandemic have not yet been analyzed within the context of the four pillars of medical ethics. The objective of this article is to discuss the ethics of elective surgery cancellation during the COVID-19 pandemic in relation to beneficence, non-maleficence, justice, and autonomy. We then propose a triage algorithm by building upon existing models that address elective surgical care. Non-urgent surgeries treat conditions that can become urgent if left untreated. Postponement of these surgeries can cause cumulative harm downstream. Beneficence is addressed by weighing local pandemic stressors within predictive algorithms to appropriately increase surgeries. The potential harms of performing non-urgent surgeries extend beyond the patient. Non-maleficence is maintained by using enhanced screening protocols and modified surgical techniques to reduce risks to patients and clinicians. Decisions concerning priority should be based on facility burden rather than value judgments concerning the nature of the surgery, such as cosmetic surgeries. Our model proposes a system to transfer patients from areas of high to low burden where possible to maintain justice. If given the choice, patients will often volunteer to cancel or postpone non-urgent surgeries. Alternatively, in the context of limited resources in a global pandemic, autonomy is not absolute. Non-urgent surgeries can ethically be postponed in opposition to the patient’s preference.
Background: Based on an analysis of the electronic health record (EHR), we recently discovered a low level of adherence to established practice guidelines for second-generation antipsychotics in children and adolescents. To address this gap in patient care, we chose to implement a Best Practice Advisory (BPA), an EHR-based alert that provides clinician decision support. The process for implementing a BPA is complex; it involves stakeholders from multiple disciplines including researchers, clinicians, physician leadership, and EHR analysts. We sought to highlight the importance of effective communication for a data-driven BPA implementation.

Aim: To discuss lessons-learned and create a researcher-focused implementation guide for executing a data-driven EHR-based alert for clinicians.

Results: We trialed a four-phase approach to creating a successful BPA: planning the intervention, attaining leadership approval, building the alert, and maintaining the alert. In the planning phase, we recommend developing the clinical inclusion criteria for their BPA, based on published or investigated data. In the leadership approval phase, we found success by identifying and educating members of the institutional EHR committee. In the building phase, investigators should include clinicians to test the workflow developed by the EHR analysts to ensure clinical relevance. In the maintenance phase, the BPA should be updated by the relevant clinical and research stakeholders as clinical guidelines evolve.

Conclusions: The disconnect between researchers and stakeholders in the BPA process can lead to erroneous alerts and alert-fatigue for clinicians. Educating clinicians on the BPA implementation process is vital to preparing researchers to improve the EHR through evidence-based interventions.
NAVIGATING DIFFICULT CONVERSATIONS OF CANCER SUSPICION IN THE EMERGENCY DEPARTMENT

Mfoniso Ekpo, MS; Laura Bauler, PhD; Kathryn Redinger, MD

MD Class of 2023, Biomedical Sciences, Emergency Medicine, Western Michigan University
Homer Stryker M.D. School of Medicine

Introduction: Emergency medicine (EM) physicians are trained to handle emergent medical conditions that will be at the detriment of the patient’s life if not rapidly treated. Although cancer is an important and life altering diagnoses, it does not typically present as an emergency. However, due to the use of imaging in the ED incidental detection of cancer is quite common. Subsequent proper assessment, diagnoses, and treatment of such findings typically occur after the ED visit with referrals to the patient’s primary care physician (PCP) and subsequently an oncologist. Yet, the EM physician must convey the cancer suspicion to patients to ensure appropriate follow-up while limiting patient fear.

Case History: Here, we present the case of a patient who presented to the ED with worsening abdominal pain and urinary complaints for evaluation of kidney stones but was found to have a 36cm ovarian mass that was suspicious for neoplasm on CT imaging. The mass likely compressed the ureters and intestines leading to disruption of urinary flow and bowel irregularity.

Conclusion: Suspicion of cancer is scary for patients. In the setting of an ED where doctor-patient relationships are short-lived, the EM physician must execute the right amount of urgency to ensure the patient follows-up and gets the right diagnoses and treatment without scaring them off. Proper communication with the patient, written instructions in the discharge paperwork, and follow-up with the patient’s PCP are ways to improve patient adherence to discharge recommendations.
SUCCESSFUL DESENSITIZATION IN A PATIENT WITH ADALIMUMAB HYPERSENSITIVITY

Samantha Woolery, MS; Laura Bauler, PhD; Roua Azmeh, MD; Patrick Jones, MD

MD Class of 2023, Biomedical Sciences, Pediatric and Adolescent Medicine, Western Michigan University Homer Stryker M.D. School of Medicine; Gastroenterology, Bronson Methodist Hospital

Background: Adalimumab is a fully humanized mAb against tumor necrosis factor alpha that is used to treat a number of immune mediated conditions including rheumatoid arthritis and Chrohn's disease. Hypersensitivity reactions to this fully humanized monoclonal antibody are rare but have been reported in the literature. To combat this, desensitization protocols have been developed and successfully implemented.

Case History: Here we report the case of a patient with Chrohn's disease who was refractory to initial therapies and was subsequently started on adalimumab. After the 4th dose of adalimumab, the patient developed a hypersensitivity reaction which manifested as a rash, pruritis, and persistent dermatographia. Due to the prolonged nature of our patient’s reaction a gentle desensitization protocol was necessary. A lack of similar cases in the literature necessitated a novel two-step desensitization protocol. An initial 7-step desensitization protocol was implemented, followed by a second 2-step desensitization, both administered in a monitored setting. Due to the long half-life adalimumab, a desensitized state was maintained between administrations. No further hypersensitivity reactions occurred in our patient over a two-year follow-up period.

Discussion: In 2017, more than 3 million Adalimumab prescriptions were written, so while rare hypersensitivity reactions still occur. While several desensitization protocols have been published for adalimumab, the protocol described in this case was unique as it involved a 2-part desensitization regimen due to a prolonged hypersensitivity reaction. After the intervention the patient successfully maintain adalimumab treatment to alleviate his Crohn's symptoms.
A RARE COMPLICATION OF HERPES ZOSTER: SEGMENTAL ZOSTER PARESIS

Keshav Patel, MS; Sarah Darweesh, MD; Darrin Lund, DO

MD Class of 2021, Family and Community Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Abstract Introduction: Herpes zoster (HZ) occurs when Varicella Zoster Virus reactivation causes a unilateral painful vesicular eruption that is restricted to a dermatomal distribution.1 Segmental zoster paresis (SZP) is a rare complication of HZ that results in focal weakness of the extremity in the myotome that corresponds to dermatomal involvement.2-4 Most cases of SZP occur on the face (~50%) and the second most common location of SZP is the upper extremity.2 In this case study, we present a unique case of SZP in the lower extremity.

Case: We Present a case of an 80-year-old female with past medical history of B-cell lymphoma in remission and a recent HZ rash on her left leg and buttocks that presented with left leg weakness for 2 weeks. The patient’s rash preceded the left leg weakness. Of note, the patient completed her valacyclovir course for the rash. Exam revealed a macular rash with well-healing lesions in the left L4/L5 distribution. The left thigh was flaccid, and the patient had decreased 1/5 knee extension strength with an absent patellar reflex. Lumbar spine magnetic resonance imaging revealed enhancement of the left L4 roots suggestive of inflammation or neuropathy. Patient was discharged on gabapentin and a 2-week prednisone taper.

Discussion: SZP is a rare complication that occurs in approximately 3% of patients with HZ.4,5 This case emphasizes the importance of maintaining a comprehensive differential diagnosis. This case also highlights that SZP should be considered in patients who present with acute weakness in the extremities.
WHAT GOES IN, MUST COME OUT: SUPERIOR VENA CAVA SYNDROME IN PATIENTS WITH RETAINED LONG-TERM IMPLANTED PORTS

Dilpat Kumar, MD; Muhammad Ebad Rehman, MD; Prashant Patel, DO

Internal Medicine, Western Michigan University Homer Stryker M.D. School of Medicine

Implanted central venous port catheters (ports) are widely used for chemotherapy, total parenteral nutrition, and blood monitoring. Immediate complications of port placement are well defined, including venous injury, pneumothorax, pneumomediastinum and injury to surrounding structures. Long term complications of ports include thrombosis which, if severe enough, can lead to superior vena cava (SVC) syndrome. We report this feared, potentially avoidable complication in two cases that developed in the setting of diffuse large B cell lymphoma (DLBCL) in remission in patients with retained long-term implanted ports. Both patients presented with positional headache, facial flushing and dizziness. Computed tomography (CT) of the chest with contrast revealed occlusion of the SVC due to thrombosis of the distal tip of the port catheter. Our patients had port catheters placed prior to the initiation of chemotherapy, however these were not removed following completion of chemotherapy or after positive-emission-tomography (PET) scan identified sustained remission. In response to their port catheter associated SVC syndrome, both patients were started on continuous unfractionated heparin on admission, followed by several months of an oral anticoagulant. Surgical port catheter removal was recommended, but it was deferred by one patient because of comorbidities, while the other patient elected to have the port catheter removed with significant improvement after removal. Our cases highlight the importance of removing the implanted port catheter soon after chemotherapy is completed, and remission is confirmed. This can prevent port catheter-related complications like thromboembolism and reduce the burden, risk and cost associated with systemic anticoagulation.
The COVID-19 pandemic forced OBGYN and all residency interviews in the 2020-2021 application cycle to transition from an in-person to virtual format. While removing time and cost barriers, virtual interviews may detract from more personal elements of the application process. We investigated OBGYN applicant perspectives of virtual interviews. We sent an electronic survey to 2020-2021 OBGYN applicants via Discord and the Organization of Student Representatives (OSR) message board. Questions assessed demographics, number of programs applied to and interviews accepted, and perspectives on the success of virtual interviewing and its use in the future using Likert scales. 158 OBGYN applicants responded, representing 8% of the OBGYN applicants documented according to previous NRMP match data. Applicants from 32 states were represented. The median number of programs applied to and interviews accepted were 60 and 12, respectively. Overall, respondents were satisfied with virtual interviews (74.5%) but were more likely to have neutral feelings about getting to know the program (39.9%) versus feeling they were able to (36.1%). Most would not recommend virtual interviews replacing in-person in the future (51.3%) but had mixed views, for, against, or impartial to using them as a screening tool (32.7%, 35.3%, 32%, respectively). Virtual interviewing did not change the number of programs applied to or interviews accepted and attended for OBGYN applicants compared to previous cycles. Overall, people felt the experience went well, however they were opposed to virtual interviews completely replacing in-person in the future.
EVIDENCE OF CONCEPT: AN EFFICIENT MODEL FOR ANATOMY LABORATORY COLLABORATION WITH CLINICIANS TO ADVANCE SURGICAL CARE

George Borrelli, MD; James Jastifer, MD; Erica Christensen, MS; Laura Scheid, MS; Joseph Weistroffer, MD

Orthopaedic Surgery, Pathology, Western Michigan University Homer Stryker M.D. School of Medicine; Orthopaedic Surgery, Ascension Borgess Hospital

Introduction: Bridging basic science to the advancement of surgical care is difficult. Advancing surgical techniques requires much time and resources to obtain the data necessary to make significant changes in surgical care. Therefore, this study aimed to create an integrated model incorporating medical trainees, basic scientists, and practicing surgeons to conduct multiple clinically relevant anatomic studies concurrently while minimizing resources.

Methods: In one weekend day, twenty cadaveric specimens were dissected under the supervision of 2 fellowship trained Orthopaedic surgeons and basic science anatomy lab faculty. Dissection of the cadaveric specimens was carried out by medical trainees including students and resident physicians.

Results: Data was collected for 6 clinically relevant anatomic studies, each with a pre-formed hypothesis or clinical question. The results contributed to several published and publishable manuscripts. In addition, cadaveric dissection allowed trainees to practice surgical techniques and strengthen operative skills. Throughout the dissection process, teaching of the anatomy and proper surgical technique was provided to the medical trainees by the fellowship trained Orthopaedic surgeons.

Conclusion: The current work demonstrates an integrated model incorporating medical trainees, basic scientists, and practicing surgeons that was able to perform multiple anatomic studies concurrently on a minimal amount of surgical specimen. The results contributed to the creation of several manuscripts, and more importantly, to the advancement of modern surgical techniques. This framework serves as a template for future collaboration between basic scientists and clinical faculty, and in addition serves as a way to incorporate medical education with the conduction of scientific research.
PREDICTORS OF PATIENT EXPECTATIONS FOR FUNCTIONAL OUTCOMES FOLLOWING HYALURONIC ACID INJECTIONS

Donghoon Lee, BS; Ryan Paul, BS; Brandon Smith, BS; Richard Campbell, MD; Morgan Leider, MD; Kevin Freedman, MD; Matthew Pepe, MD; Bradford Tucker, MD; Fotios Tjoumakaris, MD

Introduction: Hyaluronic acid injections (HA) are a widely utilized non-operative treatment for knee osteoarthritis. Patient expectations and emotional stress may affect functional outcomes after treatments. The purpose of this study was to identify factors predictive of greater patient expectations for knee function after HA injections.

Materials and Methods: This was a prospective cohort study of patients receiving HA injections. Exclusion criteria included prior history of HA injections or rheumatoid arthritis. Prior to treatment, Knee Osteoarthritis Outcome Score (KOOS), a KOOS expectation at 6 months (exp-KOOS), and Perceived Stress Scale (PSS) were completed. KOOS was re-evaluated 6 months post-injection.

Results: 142 patients enrolled (52 male, 90 female), with mean BMI 30.82 ± 8.02 and age 61.51 ± 11.55. Expected mean KOOS subscale improvements were 30.73 ± 18.56 (pain), 20.37 ± 17.51 (symptom), 26.27 ± 19.98 (ADL), 33.22 ± 25.40 (Sports), and 37.13 ± 25.60 (QoL); actual improvements were 8.52 ± 18.38, 4.80 ± 16.81, 7.96 ± 18.31, 7.81 ± 28.30, and 10.64 ± 22.05, respectively. KOOS 6-month outcomes were significantly improved for all subscale items (P<0.006), although fell short of expectations (P<0.001). Expectations weakly, but significantly, correlated with outcomes. Rho correlations ranged 0.20-0.37 for subscales (P<0.043). Age, BMI, and PSS were not correlated to expectations at P<0.05. Older age was correlated with worse actual outcomes for pain, symptom, sport, and QoL subscales (P<0.029).

Conclusion: Patient expectations at for HA is higher than actual outcomes, although higher expectations were predictive of better outcomes. No single measure was predictive of expectations, and older age was predictive of worse actual outcomes.
Introduction: The volume of systematic reviews and meta-analyses published has continued to increase, including the field of sports medicine. These reviews are utilized by clinicians to guide clinical decision making. In 2009-2013, the quality of reviews in orthopaedic sports medicine was analyzed, and opportunities for improvement were identified.

Materials and Methods: We sought to evaluate the quality of systematic reviews published in the field of sports medicine in the five-year period from 2015-2019 and compare to those evaluated from 2009-2013. All clinical orthopaedic sports medicine and meta-analyses published from 2015 to 2019 published in The American Journal of Sports Medicine, Arthroscopy, Knee Surgery Sports Traumatology Arthroscopy, The Journal of Bone and Joint Surgery, and Sports Health were reviewed. These were evaluated according to guidelines from Oxford Centre for Evidence-Based Medicine, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement, and the Assessment of Multiple Systematic Reviews (AMSTAR) tool.

Results: A total of 516 systematic reviews and meta-analyses were included in this study, compared to 200 in 2009-2013. Of these, 17.1% of studies included level 1 or 2 evidence only, while 39.5% included level 4 or 5 studies. This represents a significant decrease in the level of evidence from 2009-2013 (P<0.001). Both the average PRISMA scores (87% to 81%) and the average AMSTAR scores (73% to 56%) declined (P<0.001, P<0.001).

Conclusion: There has been an increase in the volume of systematic reviews and meta-analyses published in orthopaedic sports medicine. This has coincided with significant declines in the level of evidence, as well as declines in methodological and reporting quality.
THE EFFECT OF PRESCRIBING PATTERNS ON UTILIZATION OF OPIOID MEDICATION IN ACL RECONSTRUCTION: A RANDOMIZED, PROSPECTIVE TRIAL

Donghoon Lee BS, Joseph Brutico BS, Richard Gawel BS, Ryan Paul BS, Richard Campbell MD, Morgan Leider MD, Matthew Pepe MD, Bradford Tucker MD, Kevin Freedman MD, Fotios Tjoumakaris MD

Introduction: The relationship between the opioid pill count prescribed after orthopaedic procedures and post-operative consumption has not been thoroughly investigated. This study sought to determine what relationship exists between the number of prescribed opioids and post-operative consumption for patients undergoing anterior cruciate ligament reconstruction (ACLR).

Materials and Methods: This is a prospective, randomized trial investigating the use of 3 different opioid prescription amounts following ACLR. Patients were randomized to one of 3 groups pre-operatively: 15, 25, and 35 oxycodone-5mg tablets. Adductor canal or femoral nerve blocks using bupivacaine/ropivacaine were utilized in all patients. Patients were asked to complete a pain and medication log for 14 days post-operatively, a pain management satisfaction survey, and IKDC questionnaires pre-operatively through 6 months post-operatively.

Results: 74 patients (24: 15-oxycodone, 18: 25-oxycodone, 21: 35-oxycodone) were enrolled. The difference between groups in the IKDC score did not differ pre-operatively (P=0.62) or at 6 months (P=0.56). Reported daily pain logs did not differ at any time point in regard to pain (P=0.16 to P=0.99) or satisfaction with pain management (P=0.20 to P=0.92) throughout the first 14 days. Mean consumption of opioids in MME (morphine milligram equivalents) in the first 14 post-operative days was 76.6mg ± 69.8 for all patients, and there was no difference in consumption between groups (P=0.578). There was no difference when asked about satisfaction with the initial prescription amount (P=0.415).

Conclusion: There is no difference in consumption of opioids or satisfaction with post-operative pain management based on initial prescription amount of oxycodone following ACLR.
FACTORS ASSOCIATED WITH READMISSION FOLLOWING SHOULDER ARTHROPLASTY

Peter Beck BS, Emma Swayze MS, Aaron Zebolsky MS, Dr. Christine Bowman MD, Dr. Mark Sytsma MD

Objectives: Because shoulder arthroplasty (SA) is a rapidly growing orthopedic procedure in the United States, it is crucial to identify patients at risk for postoperative complications. This study assessed risk factors that predicted emergency department (ED) encounters, hospital readmission, and revision surgery, following SA. Study Design: Single-center, retrospective chart review

Methods: All patients who had undergone SA at our institution from June 2012 - June 2017 were analyzed. Primary outcomes included ED encounters and hospital readmissions, occurring within 90 days post-SA. The secondary outcome was incidence of revision surgery occurring anytime post-SA. Patients were stratified by various characteristics and then analyzed via univariable (odds ratio [OR]) and multivariable (adjusted OR [aOR]) analyses with 95% confidence intervals (CI) in order to identify predictors of outcomes. All testing relied upon two-sided \( \alpha < 0.05 \).

Results: 505 SA's were performed over the study period. Total shoulder arthroplasty (TSA) (49.5%) was the most common procedure, followed by reverse total shoulder arthroplasty (RTSA) (41.8%) and hemiarthroplasty (HA) (8.7%). Within 90 days post-SA, 9.7% of patients were seen at the ED, 7.3% of patients were readmitted, and 3.0% of patients underwent revision surgery. Following multivariable analysis, obstructive sleep apnea (OSA) significantly predicted ED encounters 90 days post-SA (\( p=0.036 \)). Following multivariate analysis, American Society of Anesthesiology (ASA) class 3-4 (\( p=0.036 \)) and hospital length of stay \( \geq 3 \) days (\( p=0.009 \)) predicted hospital readmission. Both TSA (\( p=0.004 \)) and RTSA (\( p=0.033 \)) correlated with significantly decreased odds of revision surgery.

Conclusions: OSA, CHF, ASA score, and public insurance are predictors of ED encounters and hospital readmission within 90 days post-SA. HA correlated with need for future revision surgery. Awareness of these risk factors may allow the healthcare team to mitigate their consequences and improve patient outcomes following SA.
EPIGENETIC REGULATIONS IMPLICATE MUSCLE HEALING PROCESSES AFTER INJURIES

Haiying Pan, BS, Nariaki Nakamura MS, Keith Kenter, MD, Yong Li, MD, PhD

Abstract: Injuries result in micro-environmental changes and influences the release of niche factors that govern resident stem cell behavior during muscle healing. Our previous study suggests that cellular reprogramming can be initiated by the strong stimuli in the injured skeletal muscles. We successfully identified the injured muscle-derived stem cells (iMuSCs) and discovered their multipotent behaviors. However, the mechanism behinds the reprogramming is largely unknown, which has prevented the understanding of basic biology and pathogenesis as well as limiting the better therapeutic potential to repair the injured tissues. Epigenetic modifications can control the fate and behaviors of stem cells during development, in which histone methylations provided epigenetic regulation in stem cell-mediated regeneration of adult tissues. Epigenetics can regulate tissue homeostasis and stabilize stem cells function as well. We hypothesize that the injured milieu can influence the cellular reprogramming through epigenetic pathways that implicate muscle healing. We discovered the timeframe of histone methylation activations after muscle injury. Moreover, we detected the epigenetics synchronize the induction and behavior of iMuSCs, and Msh homeobox 1 (Msx1) is promoted and contributed as an epigenetic mediator in regulating cellular reprogramming. Our results suggest muscle injury mediates and influences the release of niche factors on transcriptional regulation through epigenetic modification, vs. histone methylation. Those intracellular processes associated with cellular reprogramming and determined the tissue healing. Thus, the strategy of targeting epigenetic pathways may impact the reprogramming stem cells, homeostasis, and functions in the injury site that significantly implicate the muscle healing processes.
THANK YOU!