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Courtney Adler

Western Michigan University, celizabeth604@yahoo.com

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The Role of Physician Assistants on Limiting the Risk of Surgical Errors

Honors Thesis

Courtney Adler

Western Michigan University

### Abstract

Surgical errors existed long before physician assistants (PA) starting joining surgical teams. However, the addition of PAs to surgical teams added a team member with a medical perspective that was different from everyone else's. PAs are able to follow surgical patients through all the steps of the surgical process. This allows them to have a deeper knowledge of the patient's case, putting them in a position to promote a culture of safety and reduce the risk of surgical errors. This study generates an idea of how the PA plays a role in lowering the risk of surgical errors by promoting a culture of safety. Their role was examined through research and interviews to determine what PAs do to promote patient safety. The results show PAs play an important role in the continuity of care and patient safety. Their position on the surgical team allows them to see patients before, during, and after care. This prolonged time spent with the patient gives the PA an opportunity to recognize possible complications and increase communication with the surgical team.

### The Role of Physician Assistants on Limiting the Risk of Surgical Errors

When *To Err is Human: Building a Safer Health System* was published in 1999, the immensity of medical errors rapidly became a vast issue in health care. According to Aronson (2009), a medical error is “a failure in the treatment process that leads to, or has the potential to lead to, harm to the patient” (p. 601). Medical errors cover a wide variety of errors including, surgical errors, prescription errors, wrong dose, wrong patient, and many more. They are the eighth most common cause of death in the United States, causing nearly 100,000 unintentional deaths each year (Schuer, Doll, & McNellis, 2010). *To Err is Human* initiated a major change in the health care system to increase patient safety. It suggested the implementation of system-wide changes based on the strategies of preventing, recognizing, and mitigating harm from error. Safe practices were put in place in systems to reduce the amount of errors.

In the late 1960s, physician assistants (PA) began careers practicing medicine alongside physicians (Larson, Coerver, Wick, & Ballweg, 2011). In 1970, their role expanded to include surgery and now nearly 25% of PAs practice in surgery. The purpose of this study is to focus on surgical errors and the role of the surgical team, specifically the PA, in lowering the risk of errors. PAs are in a unique position to increase safety because they are more involved in the patient’s care.

### **Types of Surgical Errors and Approaches to Patient Safety**

According to *Understanding Patient Safety*, more than 20 million Americans experience a surgical error annually (Wachter, 2008). Despite the overall safety of surgery increasing as medicine has advanced, the number of actual surgical errors has not been improving. A study by Thomas et al. (2000) found that 45% of adverse events were in surgery and half of them were preventable. Surgical errors are categorized as anesthesia-related, wrong-site and wrong-patient,

retained foreign bodies, and surgical fires. Other forms of surgical errors also include medication errors, diagnostic errors, communication errors, and infections (Wachter, 2008). Research on anesthesia-related errors shows patterns which suggest there is poor machine design, poor education, lack of standardization, and lack of guiding policies (Wachter, 2008). These results led to the creation of the Anesthesia Patient Safety Foundation in 1983. This group works with healthcare professionals to adapt practices to break the patterns seen in the research.

Retained foreign body errors occur in one out of every 5,500 surgeries (Cima et al., 2008). Surgical teams now do four separate counts throughout the operation to ensure that all foreign material is removed from the body. Surgical teams generally consist of the surgeon, an anesthesiologist, nurses, and PAs and all members of the team are present to participate in the counts. New technology may allow for greater decreases in this type of surgical error. Some companies equip their sponges with radio-frequency identification tags which can be detected by the surgeon by waving a detector wand over the patient (Greenberg et al., 2008). New sponges with radiopaque thread are being used so the sponges can be seen in x-rays. There are also barcoded sponges to help keep count of the number of sponges being used (Greenberg et al., 2008).

Surgical fires are the least frequent surgical error noted. Most surgical fires come from the use of lasers and cauterization with a patient on oxygen (Landro, 2009). These fires are being prevented by storing ignition sources away from patients, allowing alcohol-based solutions to dry, and keeping oxygen concentrations low (Caplan et al., 2008). Wrong-site and wrong-patient errors are the most common surgical errors which could have been prevented. They are classified as “never events” because they should not occur under any conditions (Wachter, 2008). The Joint Commission has adopted Universal Protocol to prevent these errors from

occurring. Universal Protocol includes pre-operative patient verification, the surgeon signing the surgery site and leaving all other parts of the body unmarked, and time outs. Time outs are when every member of the surgical team gathers to discuss the patient and procedure (Wachter, 2008). Time out methods require a culture of safety where every member of the team feels comfortable speaking up without fear of retribution.

The World Health Organization's Surgical Safety Checklist was designed to improve communication and decrease surgical errors by 50% (Haynes et al., 2009). While checklists are vital in decreasing surgical errors, many organizations agree that teamwork and culture also play a large role in the process. PAs contribute to the team by doing pre- and post-operative work for the surgeon as well as assisting with operations.

To avoid medication errors, medication reconciliation is done to review every medication a patient takes to ensure there will not be any drug interactions during surgery. Diagnostic errors occur from a wrong, missed, or over diagnosis. They are more difficult to prevent but can be improved by having highly trained clinicians and by utilizing computerized support.

Communication errors commonly occur in rigid hierarchies where people do not feel safe speaking up. Leaders can be left without vital information which causes safety errors to occur. In an operating room (OR) with an extreme hierarchy, PAs or nurses may not feel comfortable speaking up when they believe the surgeon is making a mistake because the surgeon is the leader.

Communication errors also result in poor teamwork. Surgical time outs include the surgeon introducing him or herself and welcoming input from others to lessen the hierarchy. At the end of surgery, the surgical team will complete a debriefing, which is a blame-free way to discuss what went right and what went wrong. Debriefings lead to improved teamwork and

communication between the members of a surgical team (Wachter, 2008). Surgical site infections are the most common adverse event in patients and cause an increase of readmission and mortality rates (Wachter, 2008). The rates are even higher in patients with comorbidities and in prolonged surgeries.

Surgical site infections can be reduced by proper use of prophylactic antibiotics, the use of clippers instead of razors for any necessary hair removal, regulating the patient's body temperature, and glucose control in the postoperative period (Wachter, 2008). PAs may be involved in the preoperative orders for antibiotics and are also able to monitor the patient's body temperature and glucose levels as they follow the patient through postoperative procedures.

Surgical errors cannot be prevented without the cooperation of the entire surgical team. This study specifically focuses on the PA's role in reducing surgical errors. Many facilities utilize PAs to improve access to care, improve continuity of care, to manage patients, and to improve safety (Bunnell, 2016). On a surgical team the PA is generally involved in operating, educating patients and staff, and managing the surgeon's services.

### **Physician Assistants and Continuity of Care**

*Physician Assistants in Orthopedic Practice* surveyed a random sample of 1,200 PAs working in orthopedic surgery. The researchers collected information based on educational background, practice characteristic and activity, and the level of physician supervision. Results indicate 87% of PAs surveyed practice in surgery (Larson, Coerver, Wick, & Ballweg, 2011). They also indicate 59.4% of PAs participate in hospital rounds and 75.5% of PAs complete the preoperative history and physical. PAs are also involved in patient education and writing prescriptions. They are able to perform a majority of activities without the supervision of a

surgeon. Many PAs are able to reduce fractures and close surgical incisions without the physician present.

James, MacGregor, Postlethwait, Hofrichter, and Aldana (2012) studied PAs and nurse practitioners (NP) in pediatric neurosurgery. Over an eight-year period they looked at the amount of participation in the outpatient and inpatient setting, call schedule, interventions both in and out of the operating room, quality improvement sessions, continuing education, clinical research and databases, presentations, and teachings. The researchers found that in surgery office settings PAs/NPs participated in clinics by conducting patient evaluations, including health histories and physicals. They passed this information on to the neurosurgeon allowing the surgeon to conduct a more focused assessment. The information and assessments conducted by the PAs and NPs allow for the surgeons to have more efficient appointments with maximized contact time. When inpatient activities were examined, it was found that PAs and NPs were involved in pre- and post-operative management, patient rounds, discharge planning, and follow-up care. They were vital in ensuring that patients and families were educated.

Within the operating theatre, PAs/NPs acted as first or second assistants to the surgeon. The PA was also involved in maintained the computerized database of operative interventions, coding, morbidities, and outcomes. The information obtained from these records can be evaluated by the PA to see where the team is experiencing the most errors and guidelines can be created to help increase patient safety. The presence of the PAs and NPs allows for a cohesive approach to patient care which increases patient satisfaction. According to James et al. (2012), PA's have been active in developing clinical pathways, nursing protocols, guidelines for interventions and procedures, all of which are beneficial to patient safety and the decrease of surgical errors. The time PAs/NPs spend in the operating room (OR) in turn gives them the

knowledge to comprehend the post-operative needs of the patient further enhancing the continuum of care. Having the PAs/NPs involved in pre-operative care also allows them to quickly recognize if there is a wrong-patient or wrong-site error about to occur in the OR.

### **Development of Best Practices by Physician Assistants**

Unlike a surgeon, a PA is more involved in multiple aspects of a patient's care. This gives them a more in-depth perspective of patient care and gives them the opportunity to recognize areas where systems can be improved to increase safety. Many PAs have also developed practices that have decreased complications, surgical errors, and mortality.

The *Journal of the American Academy of Physician Assistants* published an article by Moote et al. (2010) titled "PA-driven VTE risk assessment improves compliance with recommended prophylaxis." Venous thromboembolism (VTE) is a major cause of mortality that postoperative patients are at risk for. In VTE blood clots form in veins, break off, and travel to the lungs to cause a pulmonary embolism. Physicians at the University of Michigan designed a risk assessment tool to reduce VTE. The risk assessment was conducted by PAs because they are front-line providers of care which puts them in the ideal position for implementing patient safety initiatives. During the PA's preoperative history and physical examination of the patient they assessed for any risk of VTE, assigned a risk score, and the PA prescribed any necessary perioperative VTE prophylaxis, or preventative treatment, like antibiotics, heparin, and preoperative laboratory studies. A risk score of three or higher required high-risk pharmacologic prophylaxis orders from the PA for heparin. Moote et al. examined this pathway to determine if PAs were able to reduce the rates of VTE complications. Surgeries conducted between July 2005 and June 2007 at the University of Michigan were examined. The VTE assessment was implemented in 2006 so the year before and after were able to be compared. The results indicate

PAs were prescribing orders for prophylaxis 40.6% more often after the clinical pathway was implemented and that incidence of VTE decreased from 2.2% to 1.6%. The VTE prophylaxis pathway increased the PAs awareness of patient risk, increased preventative orders, decreased risk of VTE for the patient, and decreased unnecessary returns to the OR.

These studies indicate that PAs are actively researching and pursuing methods to make surgery safer for patients and reduce diagnostic errors. Their presence on a surgical team allows them to have hands-on experience and knowledge of guidelines or policies that may be putting patients at risk. They have a unique perspective of the patients that other members of the surgical team may not have because they are not involved in as many areas of the patient's care. This perspective is what gives PAs the ability to research, create, and implement the most practical guidelines that will help surgeries become more seamless and error-free.

### **Methods**

This study was conducted by interviewing two PAs who work in or who have previously worked in surgery. The PAs volunteered to be interviewed after being recruited through e-mail. The 30-minute interviews were conducted at the PA's convenience, usually at their place of employment. Each interview was recorded so it could be played back again for analysis.

The interview questions included, but were not limited to:

1. How long have you been working as a PA in surgery?
2. Have you ever been present when a surgical error occurred in the operating room? Please describe the error and any way it could have been prevented.
3. What are some processes you go through in the operating room that help keep patients safe?
4. How is what you do different from what the surgeon does?

5. How does a PA benefit the surgical team?
6. Do you believe PAs could be doing more to help prevent errors from occurring? Why or why not?
7. From your experience as a PA, what are some of the most important steps you take to prevent errors?
8. Do you have any suggestions about additional practices PAs could be doing to further limit the number of surgical errors occurring?

Using the background information on surgical errors compiled before the research the answers were compared for similarities and differences and conclusions were drawn about the role PAs perform to limit surgical errors.

### **Results**

Of the two PAs interviewed, one works in cardiothoracic surgery and the other works in bariatric surgery. There were four consistent themes identified during the analysis of the interviews. The first theme was the tasks that the PAs do. Each PA was involved in pre- and post-operative care, as well as the surgery. The second theme was the importance of communication. Both interviews revealed that communication may be just as important as safety measures like checklists. The third theme was the benefit that PAs have to the surgical team. The final theme is the need for PAs to continue educating themselves and doing research. They have a unique perspective of medicine that allows them to identify areas where improvements can be made to reduce errors.

#### **Theme 1: Physician's Assistants Role on the Surgical Team**

Both of the interviews revealed a list of similar tasks surgical PAs complete to prevent errors. The PA is involved in the patient's care from the very beginning. Through meetings in

the office, the PA is able to get a complete history and physical of the patient and educate the patient about the surgery they will be having. In the case of bariatric surgery, having an extensive history and physical of the patient allows the PA to predict any possible complications that could occur in the OR. They also get a complete list of medications the patient is taking so they can make sure medications are stopped, if necessary. According to the first interviewee, once it is time for surgery, the PA visits the patient in pre-operative holding area where the patient and family are again told what will be occurring. In the operating room, the PA leads a second safety check which includes verifying the patient, the procedure, a check for materials and images, and verifies the medications being given are correct and present. The PA then asks the surgical team and the patient if anyone has any question or concerns. The patient is then put under anesthesia and the scrub nurse conducts the surgical time out and goes through the safety checklist before the operation begins. The time out includes another verification of the patient and procedure along with any risks and plans to prevent a possible complication. In the OR the PA is able to assist the surgeon with anything that needs more than one person to do. In the case of cardiothoracic surgery the PA directs the surgeon on where to suture, makes sure the sutures are not snagging or tangling, ties knots, and provides suction to the area. In the cardiothoracic robotic operations, where the surgeon is operating the robot, the PA is at the patient's bedside with a different view of the surgical field.

Following the operation there is a debriefing to discuss any complications or equipment malfunctions that occurred. In both interviews, the PAs discussed their involvement in the post-operative care of patients. In the first interview, PAs were described as being at the bedside "24/7" while the surgeon was "in and out." PAs of each surgery discipline round on their patients in the hospital following their operations. For bariatrics the post-operative process the

PA is involved in is much lengthier. After the patient leaves the hospital the PA sees them again for their 1-week, 1-month, 3-month, 6-month, 12-month, 18-month, and 24-month post-operative appointments and yearly appointments after that. Having PAs involved in more than just the operation gives them the ability to increase patient safety and promote a culture of safety.

### **Theme 2: Communication**

Both PAs interviewed stressed the importance of communication and a culture of safety. Before cultures of safety were more common there was a hierarchy in the OR that made PAs afraid to speak up in fear of retribution. Cultures of safety include incident reporting to promote punishment-free error reporting. Feeling safe to speak up about a possible error has reduced the hierarchy in the OR. The cardiothoracic surgical team was described as a closed team which requires an application and interview to be a part of. Someone chosen to join that team will have to be qualified, experienced, and must fit into the team culture. This example of a closed team creates a culture of safety where everyone trusts each other and does not feel like they need to compete with one another. Having PAs involved in many aspects of the patient's care also allows there to be detailed communication with the team allowing all members to learn valuable information about the patient. Without communication and a culture of safety, errors may be much more difficult to prevent. Both PAs agreed that although checklists are necessary in preventing errors, they are not as important as the communication of the team.

### **Theme 3: Benefit to the Surgical Team**

The work of PAs have many benefits to the surgical team. The biggest benefit is their ability to provide continuity of care. They see the patient through the whole process which allows them to have a unique perspective and monitor the patient to ensure errors are not occurring. PAs have an intricate knowledge of the surgeon and their routine which makes them

better able to make surgery seamless. Having a knowledge of the surgeon's routine prevents prolonged operations and decreases the risk of surgical site infections. They are present in surgery so they are more aware of things that should be watched for in post-operative care if anything abnormal occurred during surgery.

#### **Theme 4: Research and Education**

When each PA was asked if there was anything more that PAs could be doing to help prevent errors both responded with continuing education and conducting research. PAs see patient care from many different angles which provides them with the opportunity to recognize where errors are more frequently occurring or where there is a risk to patient safety. The cardiothoracic PA was involved in a research project that started from a realization that their patients were taking longer than normal to be weaned off ventilators after surgery. Through research with other PAs on the team they were able to implement a system that increased the number of nurses involved in post-operative care to remove the ventilator quicker and created protocols for what anesthesia medications are used. After their system and protocols were implemented they noticed decreases in the time their patients were on ventilators following surgery.

#### **Limitations**

Research has already shown PAs are beneficial to the surgical team, patient satisfaction and research. However, there are a limited number of studies that PAs, specifically, have any impact on whether or not errors occur. Most research points to the PAs involvement in the continuity of care and their role with best practices of prevention. Future research should connect how these interactions are actually being used to prevent errors from occurring. Having such a strong presence of PAs in all aspects of the patient's care gives them the opportunity to

see possible areas for errors to occur and allows them to stop an error before it happens.

Increasing research that connects the work PAs do to the amount of errors that occur on their operations could show how beneficial PAs are to the reduction of errors. Studies comparing surgical teams with PAs to surgical teams without PAs or surgical teams before and after the additional of PAs to the team could also give a clearer answer to how beneficial PAs are to surgical error reduction.

Other limitations of this case study include the limited number of participants. Only two PAs participated in the study. Results may vary or be more significant with the participation of more PAs.

### **Conclusion**

The themes of these interviews showed PAs are vital in the continuity of care and in promoting patient safety. Results of the study confirm PAs are involved in pre- and post-operative care, surgical assistance, patient history and physical examinations, and hospital rounding. Their presence before, during, and after surgery not only allows them to recognize when an error may occur but also gives them the opportunity to keep patients safe in other ways. They are present in the operating room when something unexpected derails the treatment plan. Having that knowledge allows them to pinpoint specific concerns when they are following a patient after surgery.

To further enhance the culture of safety promoted by PAs it would be beneficial for them to be involved in research. They are more aware of areas that are susceptible to errors and have an advantage in being able to create protocols which they believe would work in the hospital. The potential PAs have to create new protocols through research may have a future impact on diagnostic, communication, and medication errors.

Since PAs perform more than 90% of preoperative patient history and physical examinations they are in an important position to promote patient safety (Moote et al., 210). They participate in all of the surgical error preventative approaches, such as time outs and checklists, but also have an advantage of spending more time with the patient than other members of the team. Despite limited research on how PAs are affecting the amount of surgical errors occurring, it is clear that their role on a surgical team helps promote a culture of safety.

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