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PATIENT-BASED INTERVENTIONS IN THE TREATMENT OF ANV

The Implication of Patient-Based Behavioral Interventions Leading to a More Effective
Treatment of Anticipatory Nausea and Vomiting in Cancer Patients

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Abstract

In the last thirty years, greater attention has been drawn to the aggressive methods of cancer treatment and the aversive conditioned symptoms they come to elicit. Anticipatory nausea and vomiting is one such aversive conditioned side effect and is significantly prevalent in cancer patients who undergo treatments like chemotherapy. In response to the ineffectiveness of pharmacological interventions to control these symptoms, behavioral intervention methods have grown as a topic of research. The implications of these behavioral interventions (including cognitive/attentional distraction, meditation and systematic desensitization) have proven effective in the treatment of the anticipatory nausea and vomiting and reducing patient anxiety. However, the choice of these interventions fails to take into account a patient's individual characteristics, backgrounds and risk factors. The strength of a patient's anxiety and preconceived expectations of treatment can also have an effect on the development of ANV and should be considered. Analyzing how anticipatory nausea and vomiting develops and the associated risk factors for its development can establish a better understanding of which intervention will be most effective. A more tailored treatment plan might increase effectiveness and overall quality of treatment for cancer patients undergoing chemotherapy. In the age of evidence-based practice, when the gold standard randomized control trial speaks only to the most general case, it is appropriate to draw upon suitable case studies to assist adapting empirically supported interventions to the individual case. Such is the aim of this review with respect to selecting the choice of behavioral interventions for ANV.

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The Implications of Patient-Based Behavioral Interventions Leading to More Effective Treatment of Anticipatory Nausea and Vomiting in Cancer Patients

Most people are somewhat familiar with cancer; what a diagnosis involves; and the most popular methods of treatment. Still, there are many facets of this diagnosis that remain unknown except for those who study, observe or experience them first hand. While it is common knowledge that chemotherapy causes many undesirable side effects such as nausea and vomiting following treatment, what is less known is that for some, these symptoms can start before the chemotherapy is even administered in a condition known as anticipatory nausea and vomiting (ANV) (Morrow & Dobkin, 1988; Carey & Burish, 1988).

The prevalence of ANV can be hard to determine. The absence of a precise definition of ANV as well as the many different ways ANV is measured in different studies has led to a variety of different estimations (Burish & Carey, 1986). Also, patients with different types of cancer, and therefore different chemotherapy treatments, are often lumped together in the same data or there is only data for one specific type of cancer and chemotherapy. A study by Burish and Carey (1986) took 3 prospective, longitudinal studies on ANV (Andrykowski et al., 1985; Jacobsen et al., 1985; Love et al., 1985) and combined their data, which showed a prevalence rate in adults that may be as high as forty-five percent. Another study estimated that ANV occurs in approximately one out of every three patients receiving chemotherapy, while anticipatory vomiting appears to occur in about one in every ten (Morrow et al., 1998). Prevalence rates matching Morrow's estimations seem to be used most frequently in various studies on ANV.

It is the primary thesis of the present paper that anticipatory nausea and vomiting (ANV) can be best described through classical conditioning. A neutral stimulus (smell of the chemotherapy environment) is paired with an unconditioned stimulus (chemotherapy drugs) that elicits an

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unconditioned response (post chemotherapy nausea and vomiting). After a few pairings, the smell of the chemotherapy room becomes a conditioned stimulus and is able to elicit a conditioned response. A variety of previously neutral stimuli that are seen, heard, smelled or even tasted before or during the first few chemotherapy infusions are paired with the nausea and vomiting induced by the chemotherapy and are then able to elicit these aversive effects, even when the chemotherapy drugs are not present. An environmental stimulus paired with the drug can be the smell of the car used to drive to treatment, the sight of the chair in which the chemotherapy is administered, or even food and drink consumed at times surrounding the treatment.

In one experimental study, breast cancer chemotherapy outpatients were exposed to a distinctive stimulus (a novel beverage) before each infusion. After repeated infusions of chemotherapy, patients' responses to the experimental stimulus were assessed. They were shown to have had increased nausea following the presentation of the beverage even when no chemotherapy infusion took place (Bovberg et al., 1992). Bovberg et al. (1992) stated that, "This conditioning model of anticipatory nausea bears witness to the relevance of classical conditioning in clinical medicine". It is true that classical conditioning remains one of the best explanations for the development of this condition. Based on classical conditioning experiments conducted on animals, the severity of anticipatory nausea should increase as the time for the scheduled chemotherapy infusions draws near. Results in a study by Montgomery and Bovberg (1997) revealed such a pattern. Anticipatory nausea became stronger in the time period closest to the chemotherapy infusion. Nausea in the clinic before treatment infusions was the greatest, while nausea at home the morning of chemotherapy showed moderate increases, and nausea experienced the night before chemotherapy did not increase significantly. Findings from this study indicate that the severity of anticipatory nausea increases with the number of infusion cycles received and that the nausea is relative to the time that the patient's scheduled infusion is to take place. These results are consistent with conditioned learning. In addition, ANV prior to any chemotherapy is

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rare, and post-treatment nausea or emesis must occur before development of ANV can take place (Morrow & Rosenthal, 1996). Once these previously neutral stimuli have been paired and are able to produce the conditioned response it can be hard or even impossible to avoid them, especially if there are a variety of different conditioned stimuli acting concurrently. The patient's routine as well as stable features of their environment likely remain unchanged on treatment days, making these pairings even more probable and intense.

One question surrounding the development of ANV and its prevalence is that if classical conditioning is at work, why doesn't everyone experience ANV? Shouldn't ANV occur in all patients who undergo chemotherapy? While there is no definite answer to these inquiries, certain risk factors can in fact increase the likelihood of ANV. Identifying patients who are more likely to develop the conditioned symptoms can allow for early and targeted use of interventions, and provide a greater understanding of how this condition develops. Preventing nausea and vomiting from the very first exposure to chemotherapy is ideal, and as a result, knowing who is more susceptible to its development can have a key influence in its treatment. One characteristic that increases the risk of developing conditioned responses is being younger rather than older (Cohen et al., 1986). Younger patients who experience severe or frequent nausea or vomiting after their treatment are at particularly high risk (Roscoe et al., 2011). Other risk factors include being female, the patient's pre-treatment expectation about nausea (Hickok et al., 2001; Montgomery et al., 1998), a patient's level of anxiety (Andrykowski, 1990), having an inhibitive rather than facilitative coping style, having parents with high anxiety levels (in pediatric or young adult patients), and susceptibility to motion sickness or nausea during pregnancy (Carry & Burish, 1988). Knowing which factors may have caused an individual to be more susceptible to ANV can help narrow down the most effective treatment plan to combat the conditioned responses. For instance, if a patient is known to suffer from high levels of anxiety in day-to-day life, facilitating relaxation before treatment can be considered since it is known that anxiety during the infusions plays a

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key role in the development of ANV. Screening following the first chemotherapy infusion could therefore identify those patients at increased risk.

Pharmacological and Nonpharmacological Interventions

Commonly, only pharmacological interventions are used to treat the nausea and vomiting caused by chemotherapy. Aversive, post-chemotherapy side effects can be treated with nausea medication or anti-anxiety pills and are also used to control the anticipatory nausea, vomiting, anxiety and distress that take place before a chemotherapy infusion. The use of these medicines provides some relief for chemotherapy-induced nausea and vomiting, but does not seem to control ANV (Figueroa-Moseley et al., 2007). It was anticipated that pharmacological interventions would decrease the prevalence of ANV, but studies have reported mixed results. Despite the advances of pharmacological interventions, ANV is still a clinical problem for those undergoing chemotherapy (Bovbjerg et al., 1992). The conclusion that these interventions are not proven to be effective in treating ANV makes behavioral interventions an even more important area of study and is one of the leading reasons as to why behavioral intervention procedures are now among the most widely offered services at some cancer centers.

Nonpharmacological interventions based on behavioral research and theory have grown in popularity and have proven effective, however they tend to focus on the application on the population at large and not on what works best for different individuals. An analysis of how and why ANV responses are elicited in an individual along with that patient's history, environment and individual development of ANV can lead to a better understanding of what interventions might be used to optimize treatment given different patient backgrounds and experiences. This would allow for a more effective, individual-based treatment plan instead of using a "one-treatment-fits-all" intervention. Again, risk factors like past experiences with nausea, existing anxiety disorders, or lack of effective coping strategies can all affect the development and intensity of ANV. A greater understanding of these

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The Role of Anxiety and Expectation

In a research study by Andrykowski et al. (1985), it was found that except for post treatment nausea, state anxiety level was shown to be the best predictor of any single variable in determining whether a patient developed anticipatory nausea. Although anxiety is not necessary for development of ANV (Andrykowski & Redd, 1987), it is clear that it plays an important role in the development of conditioned responses. Several studies found that patients who develop ANV are more likely to be higher in state or trait anxiety than patients who do not develop ANV (Ingle, Burish, & Wallston, 1984; Van Komen & Redd, 1985). Nerenz et al. assessed chemotherapy patients' levels of anxiety and noted whether the patients developed anticipatory nausea before each of their first six infusions. Among mildly anxious patients, the incidence of anticipatory nausea averaged 9.8%; among the highly anxious, the incidence averaged 18.1%. Andrykowski et al. (1985) concluded that "anxiety contributes to the development of anticipatory nausea". Decreasing anxiety through behavioral interventions is promising in reducing the risk of anticipatory nausea and vomiting.

Preconceptions and attitudes that exist post-treatment can have an effect on the development of ANV. Cognitive expectations have been shown in experimental settings to directly contribute to the development of conditioned responses in humans. A study by Montgomery et al. (1998) asked breast cancer patients to rate their expectations of chemotherapy-induced nausea on a scale of one to three; one being no expectation of nausea, two not being sure what to expect, and three being a strong expectation of nausea. The patient's pre-treatment expectations of nausea were predictive of their development of anticipatory nausea. "Pretreatment expectations made a unique contribution to

PATIENT-BASED INTERVENTIONS IN THE TREATMENT OF ANV conditioned nausea, after accounting for the strongest conditioning predictors" (Montgomery et al., 1998). The authors also assessed a patient's personal history of nausea and vomiting. Past life experiences like motion sickness, pregnancy or anxiety that cause nausea have been linked to a greater prevalence in anticipatory nausea and vomiting (Carry & Burish, 1988). If someone has had significantly negative or a great number of experiences with nausea and vomiting in these types of situations, expectations can carry over and affect the development of ANV. However the relationship between expectation and ANV development is not clear. For one, it could be that since the patient has had notable experiences with nausea in the past, it improves a patient's ability to rightfully predict their response to chemotherapy. That is, if a patient is familiar with their tendency to become nauseated, say when pregnant, feeling anxious, or consuming alcohol, they may be better apt to more accurately predict anticipatory nausea during chemotherapy. Therefore their expectations are founded in being familiar with and able to predict their somatic symptoms.

Behavioral Interventions

Interventions based on behavioral theory are some of the most promising approaches to the effective management of the aversive effects of cancer treatment. A meta-analysis of over fifty studies showed results that indicated behavioral interventions can effectively control ANV in both adult and pediatric cancer patients and that interventions that integrate behavioral methods can alleviate anxiety and distress associated with invasive treatments like chemotherapy (Redd et al., 2001). The focus of many of these interventions is to alter coping skills and environmental and cognitive factors that have an effect on a person's behavior. Since you cannot change the cancer treatment an individual receives, focus is put instead on teaching patients behavioral coping skills necessary to control the anxiety, nausea, and vomiting that the chemotherapy may produce. The patient can then use these coping skills during the aversive procedures. These interventions can be used in a variety of situations, such as helping a parent cope with their child's illness or helping a patient deal with pain. In the case of ANV,

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the anxiety and nausea are not eliminated, but behavioral coping skills can help control and alleviate them.

Several specific interventions that have been used to reduce the aversive side effects of cancer treatment include cognitive/attentional distraction, hypnosis/distraction imagery, cognitive management, systematic desensitization, relaxation training and cognitive restructuring. For the sake of this paper's length, only the most commonly studied or proven effective interventions will be reviewed. Many similarities exist across these different interventions, along with many procedural variations when they are implicated to treat patients. There are usually no set guidelines for what constitutes as a specific intervention, and definitions for procedures like hypnosis and meditation can stir debate. More needs to be done in narrowing down what each of these interventions should entail and which method is most empirically sound. In other words, therapy manuals specific to interventions with ANV would be desirable. Even so, these interventions can be easily summarized into the following six categories. Each one will be discussed in terms related to treating patients with anticipatory side effects and a brief review of a corresponding research study will be included.

Cognitive/Attentional Distraction

Cognitive or attentional distraction attempts to control a patient's nausea and distress by engaging them in a concurrent highly interesting task. The patient's awareness of the aversive stimuli is blocked and attentional capacity that would otherwise be devoted to pain, nausea, and distress is instead focused on the activity. Video games are a medium that has been proven effective along with guided imagery and storytelling. There are many options that can be chosen based on the patient's interests and skills, making this an individualized treatment where certain distractions (music, crosswords) may work better than others (reading, drawing). Whatever the distraction, it is only necessary that the patient's attention is completely involved in the task; otherwise the symptoms can return as soon as their focus is lost. If full attention cannot be achieved the symptoms cannot be

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controlled since the positive effects of distraction usually only last as long as the patient is actively engaged. For this reason, using distraction for short procedures like blood draws or injections may be more effective than trying to maintain distraction during entire chemotherapy infusions. Once a distraction method is chosen, it can be presented when the patient is most likely to begin feeling anxious or nauseas.

In the investigative article published by Redd et al. (1987), two studies were conducted to explore the use of cognitive/attentional distraction using video games to control anticipatory nausea in pediatric cancer patients receiving chemotherapy. Researchers chose an Atari computer and the children were allowed to pick popular, commercially available video games to play. In the first study, nausea was measured in children who played video games during chemotherapy against a control group of children who did not play video games. In the second, a repeated-measures reversal design incorporated baseline and intervention measurements in a single chemotherapy session. In other words, during a single treatment session the children were given video games to play for ten minutes, and then the video game equipment was disconnected and the patient was reassessed. In both studies, the children who played video-games reported significantly less nausea. Since the second study collected data as they introduced and withdrew the video games, causing notable changes in nausea, it can be concluded that the video games solely influenced the outcome. They also found that the video game children reported less anxiety while playing.

Hypnosis/Distracting Imagery

When using hypnosis, the patient learns to focus on thoughts or images unrelated to the source of distress. This intervention usually incorporates the description of quiet, pleasant scenes suggested by the therapist, but interventions employing hypnosis vary considerably in the treatment strategies (Redd et al., 2001). Many would categorize the methods hypnosis use as cognitive distraction or relaxation training. However, a meta-analysis revealed that simply using the term 'hypnosis' when describing the

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intervention can increase its beneficial impact (Kirsch et al., 1995). Still for some, using the word

hypnosis can have a negative connotation that may hinder participation (Hendler & Redd, 1986).

Unlike popular cognitive distraction techniques, hypnosis distracts the patient with guided imagery or suggested thoughts, not exclusively through absorbing activities.

Marchioro et al. (2000) evaluated the impact of hypnosis on the control of anticipatory nausea and vomiting using sixteen adult cancer patients. A one hour hypnosis program was initiated after a two hour progressive muscle relaxation training session. Hypnosis included induction of eye weariness and eyelid heaviness and suggestions aiming to create a light stage of hypnosis. The therapist also verbalized pleasant emotional experiences belonging to the patient's personal background. Their results revealed that ANV symptoms completely disappeared in all patients. Also, responses were greatly reduced in most patients regarding post chemotherapy nausea and vomiting.

Relaxation Training

There are a number of different relaxation procedures; some of the most popular include passive relaxation and active relaxation. They mainly differ in the way relaxation is induced. Passive relaxation uses hypnotic-like suggestions of relaxation, while in active relaxation the patient is first taught how to tense and release certain muscle groups to induce a relaxed state, which after training can be called forth as needed in practical situations without the tense-release exercise used during training. The patient learns to focus on these soothing images and thoughts or on the tensing and relaxing of their muscles. The patient is then able to control their level of relaxation by harnessing this skill during aversive procedures. These techniques reduce physiological arousal and attempt to distract or stop the effect of the stimuli that elicit the ANV and other negative sensations. There are currently no guidelines for which intervention to use, how they could be combined, or which is most effective, so much is left up to the therapist. It is known that these interventions work, so a clearer analysis of what to use and when is needed. Relaxation training involves active patient participation and can help a

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patient feel as though they play a major role in reducing the severity of their side effects. This realization is important, because the sense of mastery; that is, that a patient can exercise some control over their symptoms, can help with feelings of depression and helplessness that often manifest in cancer patients (Burish & Lyles, 1980). Relaxation training and guided relaxation imagery are often paired together and even considered a single intervention type. Many published articles (Lyles et al., 1982; Yoo et al., 2005) combine or explore the effectiveness of relaxation training combined with guided imagery and its positive effects when treating anticipatory symptoms.

A study by Burish & Lyles (1980) also explores the use of both active and passive relaxation to control anticipatory side effects. Cancer patients that exhibited anticipatory nausea, vomiting and anxiety were chosen and randomly assigned to either the relaxation training or the no relaxation training condition. A pre-training (baseline) session included both the patient and nurse reporting on the patient's nausea. Following the pre-training session, a training session was implemented. Progressive muscle relaxation training and guided relaxation imagery were given to patients approximately forty five minutes before the chemotherapy was about to begin. The therapist started the session by explaining that this interventions goal was to induce a calm and relaxed state, thereby making the chemotherapy experience less unpleasant and reducing anticipatory symptoms. It was explained that the ability to relax was a learned skill and would require active participation and practice on behalf of the patient. Then the therapist demonstrated and discussed the progressive muscle relaxation training procedure. After the muscle tensing and relaxing procedures were completed, the guided relaxation imagery procedure began. Shortly after the guided imagery had begun, the nurse would enter and begin chemotherapy. The therapist would continue with the guided imagery instruction for the entire duration of the chemotherapy infusion and for five minutes after it had ended. The patient was then told to practice these techniques at home. During the next two chemotherapy treatments, the patients would no longer be directed by the therapist and it was up to them to induce a relaxed state. The control group

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received no training and the participants were brought to the same quiet room where they waited for forty five minutes before their infusion. They were simply told to relax quietly until their treatment was to begin. At the end of the chemotherapy treatments, patients in the relaxation training condition reported feeling significantly less anxious, nauseated and distressed. The results suggest that the relaxation procedures were highly effective in reducing emotional distress typically experienced by cancer patients before, while being infused with, and immediately after the chemotherapy.

Meditation/Mindfulness

Meditation and mindfulness procedures consist of a broad collection of practices. Activities considered meditation could include focused breathing or a concentrated effort toward “being” in the present moment. For mindfulness and meditation, the goal is to self-regulate attention on immediate experience that allows the patient to recognize events arising in present moment awareness. An openness to and acceptance of these moment-to-moment experiences is the goal. An important practice of mindfulness is that the patient is taught to "sit with" their thoughts, feelings and anxiety by learning to become aware of and accept these stimuli, without trying to control them. This intervention has been shown to have a positive effect on many facets of physical and mental health in cancer patients (Brown & Ryan, 2003; Carlson et al., 2003; Speca et al., 2000). Research articles investigating the effects of meditation and mindfulness on the quality of life of cancer outpatients outside of treatment are common, but articles that discuss the implications for patients with anticipatory nausea and vomiting are less so. More research using this procedure in the treatment of anticipatory symptoms needs to be done.

The impact of mindfulness-based stress reduction on the sleep, mood, stress and fatigue symptoms in cancer out patients was explored in an investigative article by Carlson & Garland (2005). Cancer patients underwent an eight week mindfulness-based stress reduction program in the hopes that it would improve their sleep. Not only was there a significant improvement in sleep, but there was also

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a significant improvement in stress, mood and fatigue. The associations among these changes and implications for improving quality of life of cancer patients were discussed. Although this study did not focus on anticipatory nausea and vomiting, it still showed that mindfulness can have a strong effect on patient's overall wellbeing. Since, as cited earlier in this review, much research has studied the link between anxiety and the development of ANV, mindfulness can be considered an important intervention since it has been shown to reduce stress, which could help patients who are susceptible to conditioned symptoms.

Systematic Desensitization

This intervention is well known for its use in diminishing the fear and anxiety comprising phobias and other fears, by systematically desensitizing a person to particular objects or situations they fear. When treating ANV, the patient's discomfort, anxiety and nausea brought on by chemotherapy can gradually lose their effect through systematic exposure and counter conditioning. First, a hierarchy is created where the patient identifies which stimuli are most and least aversive. Creating an anxiety hierarchy allows the therapist to first expose the patient to stimuli that produce the least amount of anxiety, fear, or nausea and gradually work up to those stimuli that are most powerful. The feared stimuli or events can be tangible (in which case the therapist would use re-exposure to the stimuli or situation) or imagined (in which case exposure to verbal descriptions would be used). Next, the patient is taught a relaxation technique, like progressive muscle relaxation or meditation, to be used when therapeutic exposure to the stimuli occurs. The theory of systematic desensitization assumes that since a state of relaxation cannot exist at the same time as a state of high anxiety, the imagined or real stimuli that once induced anxiety or fear lose their ability to do so when repeatedly paired with relaxation. Procedurally, once an incompatible response has been mastered (relaxation or meditation), the therapist pairs the anxiety provoking stimulus with the meditation through counter conditioning. To do this, the patient relaxes completely and the stimulus placed lowest on the hierarchy is presented. The client must

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reach a state of relaxation before being exposed to the next level stimuli. The patient continues to practice the relaxation technique while systematically visualizing or being exposed to increasingly aversive stimuli along the hierarchy. The pre-existing conditioned association will gradually diminish the conditioned symptoms with repeated exposure. New learned associations are thought to have arisen; those between the relaxation/meditation and the once anxiety provoking stimuli (now neutralized).

Morrow (1986) investigated systematic desensitization in the treatment of anticipatory nausea (AN) in cancer patients and compared the results to patients who underwent relaxation, counseling and no treatment. Cancer patients undergoing chemotherapy and who had developed AN were assigned to one of four conditions: systematic desensitization, relaxation only, Rogerian counseling, and a no treatment control. Patients in the systematic desensitization group reported a significant decrease in severity and duration of anticipatory nausea. Both systematic desensitization and relaxation were found to help post treatment nausea relative to those who were only given counseling. Morrow's results supported the view that systematic desensitization is effective when it comes to the control and reduction of anticipatory emesis developed during chemotherapy (1986). The article further supported that both the eliciting stimulus hierarchy and counter conditioned relaxation are effective parts of systematic desensitization treatment of AN.

Cognitive Restructuring

In cognitive restructuring, a patient is encouraged by a therapist to restructure their negative thoughts and beliefs that contribute to the patient's distress. Beliefs about medical treatments or procedures can be reviewed in order to identify those that elicit fear and distress. The therapist then guides the patient to consider other ways of viewing these stressful thoughts in order to reduce the negative feelings and expectations. Since negative expectations can affect ANV's development, changing these beliefs can have a beneficial impact when treating anticipatory symptoms.

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Chen et al. (1999) was interested in reducing children's distress during a painful medical procedure by reframing certain aspects of the children's memory. Children diagnosed with leukemia had their physiological and observable distress measured before and after a painful lumbar procedure. To reduce distress, the children were made to recall, and then more realistically appraise, their responses to their most recent lumbar procedure. The children's confidence and beliefs regarding their ability to cope effectively with the pain and distress was enhanced. The intervention group showed reductions in anticipatory physiological distress and self-report ratings of anxiety compared to the control group. "These results suggest that (a) a simple memory-based intervention is efficacious at reducing children's distress and (b) benefits from this intervention are maintained over one week without continued intervention" (Chen et al., 1999).

Potential Case Studies

The following potential case studies take a patient's individual characteristics, background and risk factors into consideration and use this information to select the most viable intervention. Anxiety plays such a large role in ANV development that many interventions include some type of technique to reduce it. Three fictional case studies and their chosen interventions are as follows:

1) A twenty four year old female diagnosed with non-Hodgkin's lymphoma is going to undergo her first chemotherapy infusion in the following week. She exhibits high anxiety towards treatment and expects that the chemotherapy infusions will make her very sick. She says that in the past, she has often suffered from car sickness and that she simply "doesn't have the stomach for this type of thing". When measured, her trait and state anxiety were shown to be high. Being under the age of fifty and female puts her at a higher risk for developing ANV and should be taken into account, but there are other factors to take into consideration as well when choosing the best intervention plan. Besides her age and gender, the patient's anxiety level and expectations put her at an even higher risk of developing anticipatory symptoms. Knowing this, an intervention can be put together before chemotherapy starts

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to better the chances of stopping ANV from occurring or at least diminishing the effects of these conditioned responses once treatment begins.

Relaxation training is the best intervention in this case because it will help reduce the patient's anxiety. The patient also has a feeling that she will not be able to physically handle the chemotherapy and the treatment is something she has little control over. When deciding between an active or passive relaxation technique, active relaxation will be most effective because it engages the patient and creates a sense of control over the symptoms. The therapist should coach the patient, who will learn to gradually tense and relax her muscles and become able to control her anxiety before it reaches an uncomfortable level. The therapist will instruct her to practice this relaxation technique at home in the week following up to her treatment start date. She will then use her new found coping ability when she feels stressed or anxious before her first chemotherapy session. Her active participation will help distract her from her anxiety and give her a sense of control that can lead to a more positive outlook. Relaxation training is commonly used because anxiety plays such a large role in ANV's occurrence and simply reducing anxiety can lead to a better treatment experience.

To counter her negative expectations, a therapist would use cognitive restructuring that will alter her beliefs and negative attitudes contributing to her distress. The therapist might encourage her to examine what she imagines will happen when exposed to the anxiety-inducing stimulus (chemo) and allow her to replace the imagined catastrophic situation with more positive outcomes and expectations. The patient reframes the stressful life event as less threatening and, again, under her control.

2) A twelve year old boy is battling leukemia and, due to his overprotective upbringing, is extremely anxiety sensitive. His parents have instilled that anxiety is a feeling he needs to attempt to escape from immediately. The parents have unintentionally fostered inhibitive coping strategies and an anxiety temperament that negatively affects whether the boy is able to avoid or cope adaptively. Throughout the boy's young life, he watched his parents handle anxiety poorly. If he ever reported

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feeling anxious, his parents would take him out of the situation or remove the source of the anxiety as soon as possible. His leukemia treatment includes an extended hospital stay while he undergoes a stem cell transplant and chemotherapy. During certain procedures like blood-draws or bone marrow biopsies, he is hard to control and is in a state of extreme distress. While this goes on, the parents act in ways that increase his anxiety, such as crying or acting extremely upset instead of calm and comforting. These responses nurture his anxiety and this time there is no escape from the source. As suggested earlier, a parent's response to anxiety can have a great impact on their child's behavior.

Parents have a significant impact on a child's behavior, whether positive or negative (Manne et al., 1990). If a pediatric patient's parent reacts to their child's stressful medical procedures with high levels of anxiety, it can cause great distress for the child. It's possible to teach that parent proper coping skills to reduce anxiety but not possible or ethical to remove the parent. When the parent is taught to act as a behavioral coach for the child, both experience less anxiety and show less distress (Manne et al., 1990). The patient and his parents must learn to recognize, embrace, and cope with their anxiety because high state or trait anxiety levels may contribute to the development of anticipatory symptoms. Patients who are able to control or reduce their anxiety may therefore reduce the likelihood that they will develop conditioned symptoms.

This intervention should aim to teach the patient how to manage his anxiety, since the source (like chemotherapy or even the cancer itself) is out of their control. Anxiety is therefore realistically based, and it is important to learn to accept and embrace the anxiety. Mindfulness would be the intervention of choice in this case, but this method may be a bit too complex to explain and teach to a child. The parents, however, would be perfect candidates. They should be trained in mindfulness awareness and acceptance before the chemotherapy begins, and should be coach in recurring practice to a fluent level. This would allow them to provide better support to their child and have a positive impact on his behavior by realizing and better coping with their own distress. A popular and proven effective

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intervention for children is cognitive/attentional distraction. Video games or storytelling could be used whenever the child is undergoing a stressful event. Combined with the parents' efforts to reassure and support their child, this intervention could reduce his anxiety and distress during biopsies and other short procedures.

3) A forty year old male is undergoing chemotherapy to treat prostate cancer. After the third chemotherapy session, he begins to feel nauseous when he sits down in the chair in which the drugs are administered. By the sixth infusion, he begins to vomit as soon as he enters through the hospital doors. He notices that he can no longer drink iced tea outside of the clinic because he drank it often while undergoing chemotherapy. Even imagining the can of iced tea can elicit aversive effects for him. The sight of the sweatshirt he usually wears to treatment makes him nauseous and uncomfortable. He even feels sick when he meets one of the oncology nurses at a coffee shop a week after his last infusion. Many stimuli have now come to elicit conditioned responses and it is making treatment unbearable. He describes chemotherapy as worse than the cancer itself and he comes to dread treatment days. His family is concerned that he might decide to stop going to treatment all together. His ANV symptoms seem to be getting worse and are starting earlier and earlier before the treatment begins. The oncologist prescribes him Ativan (a popular anti-anxiety drug) to take when he wakes up on treatment days and the nurses try and administer anti-nausea medication when he arrives. However, no pharmacological intervention seems to be helping. On top of all of this, he feels psychologically weak because of these seemingly unjustified ANV responses.

An intervention using systematic desensitization could help lower the patient's discomfort as the stimuli that cause these aversive symptoms can gradually lose their effect through systematic exposure. Again, the presence of anxiety and the development of conditioned responses have a strong connection and, in this case, treating one means treating the other. The patient, with the therapist's help, would create an anxiety inducing stimulus hierarchy possible starting with the can of iced tea as his least

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aversive stimulus and working up to the most aversive stimulus: sitting down in the chemotherapy chair. The therapist would induce a relaxed state through progressive muscle relaxation or meditation, which he learns to use when he is being exposed to the stimuli. Since a state of relaxation cannot exist at the same time as a state of high anxiety, the patient will be able to manage the anxiety before it reaches intolerable levels. Once an incompatible response has been mastered, the therapist connects the stimulus to the meditation through counterconditioning. While the patient is in a relaxed state, the can of iced tea is evoked. The patient looks at the iced tea, holds the iced tea, and may eventually drink the iced tea. If at any time the patient feels the conditioned aversive effects, the therapist will remove the iced tea, induce a state of relaxation once more and reattempt the exposure. Eventually, the patient will be able to sit in the chair with the once aversive stimuli present, and achieve a relaxed state. The nurse will gradually be able to walk over and insert the chemotherapy IV as the patient remains relaxed. The usual negative effects of chemotherapy will not follow, and so through exposure and counterconditioning his feelings of anticipatory nausea and vomiting will be reduced on actual treatment days.

Discussion

Further Study

The idea that customizing these interventions lead to a more effective management of ANV needs to be further studied. While this thesis is promising for ANV's treatment, there has been little done to prove if the individualization of these behavioral interventions is more effective than the current approach of using one intervention for all patients. Case studies comparing a group of patients who undergo individualized interventions and a group that undergoes one single intervention type will create more substantial evidence (although ultimately, well-designed randomized control trials will be necessary).

The behavioral interventions discussed in this paper do not yet have set guidelines and much of

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the procedures' direction and implication are left up to the therapist who implements them. More needs to be done to find out which combinations and components of these individual procedures are most efficient when treating conditioned symptoms. What exactly constitutes as hypnosis or meditation and what about these interventions work needs to be established so that the most effective procedure is used. Another promising area of study is whether combining certain interventions leads to a better outcome in alleviating symptoms. Patients don't come in neat packages. Knowing what interventions to combine and when to combine them may be important.

Development of Post-Traumatic Stress Disorder

A cancer diagnosis can have many negative psychological effects on a patient that can influence their treatment as well as their lives. A study conducted by Redd (1980) showed how cancer can negatively affect the quality of life after remission. The magnitude of this diagnosis, the patient's strong pre-conceptions about what it means to have cancer and their aversive reactions to treatment may lead some to develop PTSD or other related disorders. It's no secret that when left untreated cancer can be deadly, and this realization is hard to come to terms with. More fear comes with the thought that not all treatments end in remission, and even after remission is achieved, the fear of a recurrence can be strong. Because of these and many other factors, some patients may need help coping with life after remission. A sudden loss of weight or appetite can bring about the fear of recurrence, visits to a medical facility can bring back painful memories, and thoughts about life or death can be altered in a way that disrupts normal function. Cancer is something many patients carry with them after treatment. For survivors, behavioral interventions can be used to reduce negative symptoms while they undergo treatment along with symptoms that surface after remission (Smith et al., 1999). Issues like this need to be taken into account when considering the uses of interventions like systematic desensitization and relaxation training. During treatment, patients can be desensitized to stimuli or learn relaxation techniques so that treatment, and life after treatment, is easier. When a patient is desensitized or learns

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these techniques, stimuli that may cause distress after remission could be better coped with. Imagined or actual stimuli that can lead to fear, anxiety and distress can be controlled.

Conclusion

Cancer is a catastrophic diagnosis. Enduring the symptoms of ANV as well as experiencing the stress and discomfort caused by these conditioned responses can make this diagnosis far worse. Some come to describe the treatment worse than the cancer itself (Redd, 1988). The prevalence of ANV makes it a worthy area of study. If it can be treated, the quality of life of cancer patients will increase, and it will make the diagnosis that much easier to bear. Studying and applying interventions that can make chemotherapy infusions virtually free of anticipatory side effects is a worthwhile investment. ANV cannot be controlled by pharmacological interventions, making behavioral interventions an important area of study (Morrow, 1996). Analyzing how ANV develops and the risk factors a patient may have for its development can establish a better understanding of which intervention will be most effective. Using a patient's risk factors, coping ability, and personality traits could make it possible to avoid the development of ANV by adequately preventing both vomiting and nausea before the first chemotherapy (Roscoe et al., 1986). Identifying the risk factors a patient may possess before chemotherapy begins will better the chance of this prevention. Using this type of individualized intervention is a promising area of potential study, but has not yet been shown to be more effective than the traditional, one-treatment-fits-all method.

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