

Waking Up With A Nightmare: A Literature Review of Emergence Delirium in Military

Personnel with Preexisting Post Traumatic Stress Disorder

Rachel Elizabeth Jones

Radford University Honors Academy

### Abstract

This paper introduces a systematic review of literature about the phenomena of emergence delirium in patients with existing post-traumatic stress disorder and military experience.

Emergence delirium is a rising concern that is now being brought to light by not only military anesthesia providers, but also civilian anesthesia providers who work with veterans in civilian hospitals. Post-traumatic stress disorder (PTSD) is presented in this manuscript as it relates to incidence, prevalence, and impact on the patient's perception of quality of life. A discussion of balanced anesthesia occurs, focusing on the types of anesthesia, phases of anesthesia, and potential complications of anesthesia, including emergence delirium. The role of anesthesia providers is reviewed, targeting their part in limiting emergence delirium. Ways to prevent emergence delirium becomes the focal point of the paper. Implications for practice to determine the best way to deliver anesthesia and life-saving procedures to the population who have existing PTSD, and more exclusively, military combat experience. Patients with military combat experience and preexisting PTSD have been shown to have an increased likelihood of experiencing emergence delirium.

Keywords: emergence delirium, post-traumatic stress disorder, combat, military, anesthesia

### Waking Up With a Nightmare

In a world with constantly changing and advancing medical practices, nurses must remain adaptive, educated, and aware. Increasing research and medical advances help to ensure nurses are equipped and prepared to apply critical thinking skills in the hospital setting. Patients do not always respond as readily to newly implemented evidence based practices such as policies and procedures in the operating room. One patient group that is heavily affected by the perioperative tools and emerging technologies is patients with post-traumatic stress disorder. Of this cohort with PTSD, a large majority of patients have served in the United States military in some form or fashion. Veterans or active duty military personnel with post-traumatic stress disorder face many exclusive difficulties. Unique challenges such as difficulty sleeping and reaction and response to sudden noises attribute to several changes the veterans face when completing tasks as a civilian. Hospitalization and perioperative stressor exacerbate the existing sensory overstimulation. It is crucial for all healthcare personnel, especially anesthesia providers, to be aware of the impact post-traumatic stress disorder places on the operative process for military personnel. Previous military experiences resulting in post-traumatic stress disorder may predispose a person to experience emergence delirium when resurfacing from general anesthesia.

#### **Post-Traumatic Stress Disorder in Military Veterans and Active Duty Military**

##### **Post-Traumatic Stress Disorder**

According to the Anxiety and Depression Association of America, posttraumatic stress disorder, or PTSD, is a serious potentially debilitating condition that can occur in people who have experienced or witnessed a natural disaster, serious accident, terrorist incident, sudden death of a loved one, war, violent personal assault such as rape, or other life-threatening events. Research has recently shown that PTSD

among military personnel may be a physical brain injury, specifically of damaged tissue, caused by blasts during combat. Most people who experience such events recover from them, but people with PTSD continue to be severely depressed and anxious for months or even years following the event. (2016, para. 4)

### **Occurrence of Post-Traumatic Stress Disorder**

Post-traumatic stress disorder affects 7.7 million Americans over the age of eighteen (Anxiety and depression association of America [ADAA], 2016). Sixty-seven percent of people exposed to mass violence developed PTSD. This is a higher rate of PTSD than those exposed to natural disasters (Anxiety and depression association of America [ADAA], 2016). PTSD entails many frightening experiences for the individual.

Post-traumatic stress disorder is generally considered a chronic condition characterized by the recurrence of vivid emotions that are affixed to a particular sound, image, smell, or other triggering event, such as the loss of a loved one or scene of an accident. Symptoms must be present for more than one month after the lived event and must provoke vivid emotions (Porth, 2015). With combat-related PTSD, soldiers have experienced a traumatic event, such as a fallen comrade, a personal injury, or a threat of imminent danger or harm (Lovenstrand, Phipps, and Lovenstrand, 2013). Post-Traumatic Stress Disorder can affect any military personnel, not just soldiers involved in direct combat. PTSD is a common accompaniment of traumatic brain injuries. The United States Army is anticipating a surge of these types of injuries as well as the accompanying mental health disorders in the coming years (Leaman, Kearns, & Rothbaum, 2013). This expected increase is due largely to the advanced weaponry, which creates greater destruction with no additional soldier effort because of the ease of weaponry handling. PTSD occurs in approximately 13.8% of all United States military personnel (Leaman, Kearns, &

Rothbaum, 2013, p. 321). This percentage does not seem like an overwhelmingly large number of soldiers to an average civilian crunching numbers in an office, but one must remember this statistic only includes the reported cases of post-traumatic stress disorder.

### **Reporting Post-Traumatic Stress Disorder**

An alarmingly high number of veterans living with PTSD have received little to no therapy. Many of these veterans fail to report their PTSD idealizations to healthcare providers or even family friends. Many cases go undiagnosed and untreated for years with patients living in constant recurrent turmoil because of images and sounds they cannot work through in their minds. The author of this manuscript was witness to several patients at the Richmond Veteran's Affairs Medical Center during the summer of 2016. These individuals electively reported flashbacks instigated by hearing certain sounds, smelling specific smells, or seeing particular images. These veterans shared they had not sought out treatment for fear of being perceived as feeble. Military personnel are known as being prideful and worry that they will be viewed differently if they have a documented mental health disorder. Many patients at the Richmond VAMC shared they "felt as if they were labeled with PTSD and that their medical treatment was altered or viewed differently than those who did not have a documented mental health disorder" (Jones, 2016). Another reason given for failure to seek treatment by the patients at the VAMC in Richmond was simple treatment unavailability. "For the last decade, the United States has been involved in war in Iraq and Afghanistan. However, the US healthcare system is only recently recognizing the traumatic psychological effects of battlefield stress on soldiers" (Wilson & Pokorny, 2012, p. 260). Some veterans, such as those who were involved in the Korean War and previous wars, did not have the support available to today's men and women. It is important for healthcare providers to understand this disparity when providing support to patients. As a

prudent nurse, it is also important to understand generational and societal viewpoints. Service personnel trained during a different generation may have a different view on healthcare altogether. Military personnel may also believe that financial constraints will prevent them from being able to access support services and other types of treatment for PTSD.

The federal government provides many free mental health services to the veterans and active duty military under the Veteran's Care Act of 1992 (Veterans' health care act of 1992, 1992). The coverage of care and services offered under the Veteran's Care Act does not take away from the challenges that accompany living with post-traumatic stress disorder.

### **Living with Post-Traumatic Stress Disorder**

Living with post-traumatic stress disorder presents challenges for both active and inactive or veteran service members. Both active duty military and veterans have been taught to protect their country from all enemies, foreign and domestic (Enlistment oath, 1956). Active military are put through strenuous boot camps, taught to sleep with one eye open, trained to kill, and sent into areas that civilians could never imagine. Some soldiers returned home as heroes. Soldiers from World War II were socially revered as heroes. Soldiers of later wars came home to social ridicule, hatred, and disrespect (Valentine, 2013). The service men and women serving in the Vietnam Conflict were not seen as heroes. Rather, they were viewed as "baby-killers or woman murderers," per unnamed veteran in 2016 (U. V. One, personal communication, summer, 2016). Soldiers of the later wars saw, heard, and did acts that are nearly unfathomable to today's generation. The same unnamed patient shared in conversation with the manuscript author that "he was not proud of his actions," but in the same breath reported, "He did what he had to do to protect his fellow comrades" (U. V. One, personal communication, summer, 2016).

Military personnel, like this patient, are still fighting battles today within their minds. For many of these men and women, their minds are in a constant state of fight or flight created by combat. Some of these individuals do not leave their homes, cannot be in busy public places, and will not be around certain sounds. They often have difficulty falling asleep and staying asleep since even the softest noise can startle them (Leaman, Kearns, and Rothbaum, 2013). These men and women are living in a state of fear and discomfort resulting from previous experience. An anonymous patient at the Salem VAMC was battling PTSD and had periods of selective silence because of his lived military experiences. He worked in the morgue overseas and was responsible for identifying the bodies of fallen soldiers, even if there were only pieces of their bodies left. This significantly impacted this young man. He shared, " after several months as an inpatient psychiatric patient, he still saw all of the bodies during the day and when he went to sleep" (U. V. Two, personal communication, summer, 2016). A third unnamed Vietnam veteran said, "every time he closes his eyes he is in a river of blood" (U. V. Three, personal communication, summer, 2016). This patient shared, "his nightmares were so vivid and uncontrollable that he attempted suicide three times" (U. V. Three, personal communication, summer, 2016).

The aforementioned veterans are a small representation of a large group who suffer with post-traumatic stress disorder every day. Individuals living with PTSD can see images or hear related sounds at any time during any activity. Because of PTSD's rather unpredictable nature, unless the victim knows exactly what triggers memories of the event, completely preventing the flashbacks can be next to impossible. This creates complicating factors in many aspects of everyday living, including aspects of healthcare. The experience of anesthesia for patients with PTSD can be specifically challenging.

## **Anesthesia Administration**

### **Types of Anesthesia**

Men and women of the military who experience PTSD can have many frightening flashbacks each day, many of which come without warning. Anesthesia has the potential to create a comparative frightening situation. When a person is emerging from anesthesia, he or she can experience emergence delirium. Emergence delirium can be a startling experience for those who have harbored post-traumatic stress disorder. Anesthesia is one of the most useful tools utilized in modern day invasive medicine. There are two main categories of anesthesia: general anesthesia and local anesthesia. The main difference between local and general anesthesia is that local anesthesia targets a group of nerves, blocking painful stimuli, while general anesthesia induces a complete loss of consciousness while also providing amnesia, analgesia, and a loss of reflexes (Karch, 2013). This loss of consciousness and amnesia predisposes patients to auditory and visual changes. General anesthesia acts on the central nervous system to produce a state of unconsciousness and total loss of sensation, both of which are ideals for surgical procedures to eliminate memories of the procedure, painful stimuli, and possible reflexes that could impede the surgical procedure (Karch, 2013). Changes in the patient's level of consciousness has the potential to alter the patient's perception of reality, making PTSD patients who are already sensitive to overstimulation more vulnerable to experiencing negative reactions (Wofford, Hertzberg, & Vacchiano, 2012). Karch 2013, notes the combination of several anesthetic agents will achieve balanced anesthesia and "the most effective anesthesia with the fewest adverse side effects" (p. 444). Balanced anesthesia can include the use of anticholinergic agents to lessen secretions and allow for intubation, sedatives to promote amnesia and relax the patient, antiemetic medications such as Zofran to prevent nausea, antihistamines to reduce the chance of

an allergic reaction, and narcotics to create analgesia and sedation. Balanced anesthesia is the most successful and safe way to administer anesthesia, regardless of the population, as is necessary to achieve a desirable state of anesthesia. As patients with military experience transition through the different stages of anesthesia, certain physiologic or environmental processes can create overstimulation, which could trigger PTSD symptoms.

### **Stages of Anesthesia**

To achieve a desirable state of anesthesia, anesthesia providers deliver drugs to the patient, which allow for altered levels of consciousness and pain perception. Anesthesia providers are also skilled in advanced life-supporting interventions (Karch, 2013). General anesthesia is composed of four stages, each stage reaching a new depth of anesthesia. The first stage is where the patient loses pain sensation. During this phase the patient is still conscious and able to communicate effectively with providers. The second stage of anesthesia is the excitement phase where a sympathetic nervous system response is elicited producing tachycardia, tachypnea, and hypertension. The patient may also display combative behavior during the excitatory phase of anesthesia. Patients with PTSD may experience exacerbations of the second stage of anesthesia. The third stage is where surgical procedures most often occur. There is a relaxation of skeletal muscles, “return of regular respirations, and progressive loss of eye reflexes and pupil dilation” (Karch, 2013, p. 446). There are only rare instances where stage four anesthesia is reached. In these special circumstances, CNS depression is maximized and medullary paralysis occurs. This experience creates a critical situation where loss of respiratory and vasomotor center stimuli occurs. Stage four is not a desired anesthesia level for this reason (Karch, 2013). All patients undergoing general anesthesia progress from stage one through stage

three. Emergence is a regressive progress back to stage one (Karch, 2013). Balanced anesthesia is made possible by the maintenance of anesthesia, amnesia, analgesia, and muscle paralysis.

### **Maintaining Anesthesia**

Anesthesia is divided into three phases: Induction, maintenance, and recovery. The induction period is from the time anesthesia is initiated until the patient reaches stage three. The most dangerous stage of anesthesia is usually stage two for all patients because of the risk of overstimulation in the operating room or post-anesthesia care unit. Patients with existing PTSD, especially military personnel, are at risk for increased stimulation during the second phase of anesthesia when regaining consciousness. Anesthesia providers typically try to keep patients from remaining in this stage for too long by administering rapid acting anesthetics. The maintenance phase or phase three of anesthesia lasts until the surgical procedure is complete. During this time, the patient is hemodynamically predictable and most often more stable overall. The last phase of anesthesia is recovery. Here the patient is weaned off of the anesthetics until he or she has regained consciousness, is able to move spontaneously, and is able to communicate (Karch, 2013). PTSD presents an added challenge during the recovery process because they will once again experience the excitatory phase. The patient must be monitored closely during the recovery phase for any adverse reactions, failure of systems to return to normal functioning, or changes in acuity. A patient who successfully and uneventfully emerges from anesthesia may require some stimulation to awake, such as a gentle shake of the shoulder, but will typically awake on his own. They will require reorientation to their environment and may require a reminder of what procedure they had done. Normal anesthesia emergence is not aggressive, violent, or dangerous to patients. However, emergence in those with PTSD creates increased incidence of aggression, agitation, and acting out. During the excitatory phase, bright lights,

noises, and talking could trigger certain memories or feelings, producing a flashback that could result in violence, confusion, and overall agitation in the operating room or post-anesthesia care unit. This violence, confusion, and agitation during anesthesia recovery is emergence delirium and poses a major risk for military personnel, especially those with existing PTSD.

### **Emergence Delirium in Patients with PTSD**

#### **Emergence Delirium**

Emergence delirium is a growing concern for anesthesiologists, nurse anesthetists, operating room nurses, and surgeons. Emergence delirium occurs immediately as the patient is emerging from general anesthesia. Emergence delirium's hallmark signs are agitation, confusion, and violent behavior (McGuire, J., 2012). It was first referred to in healthcare as "post-anesthetic excitement" in the 1960s and has since then been selectively researched, with research in the combat veteran population being miniscule (Wilson, 2014, p. 355). All healthcare providers should be aware of this possible result of anesthesia in the combat or non-combat military oriented patient. The bright lights, noises, or loud voices in the operating room or post-anesthesia care unit can induce emergence delirium. While emergence delirium affects both children and adults, there is an increased risk factor in patients with existing anxiety, PTSD, or depression (p. 355).

Because of its common occurrence with PTSD, emergence delirium is also becoming more prevalent in military personnel. McGuire (2012) studied a sample of 130 military personnel with combat experience. Of this 130, twenty percent experienced emergence delirium upon waking up from anesthesia (McGuire, 2012). These results indicated that the incidence of emergence delirium among combat veteran populations is significantly higher than the general population, where it occurs about five percent of the time, assuming that the individual has no

pre-existing mental health disorders (McGuire, 2012). McGuire's study did have limitations including a small sample size of only 130 combat veterans. This study could be used, however, to support the need for further research of emergence delirium in the combat veteran population. Wilson's 2014 study indicated, greater than 78% of surveyed active-duty Army anesthesia providers noticed emergence delirium in their practice" (Wilson, 2014). This study has been used to drive the force of research by attempting to quantify the severity of this seemingly recurrent anesthesia problem among military personnel. These studies will help drive research to further investigate this phenomenon, as there is little doubt that it has occurred previously in history, as long as anesthesia has been utilized.

### **Nurses in Peri-Operative History**

Historically, nurses first provided anesthesia to soldiers during the Civil War. Since, the profession has grown and has continued to serve both civilian and military citizens of the United States. Since WWI, nurse anesthetists have been providing anesthesia care to soldiers. Post-traumatic stress disorder, however, has been a very recent recognition by healthcare, so it is logical to believe that nurse anesthetists have long since been encountering emergence delirium. Emergence delirium was not considered a topic that merited investigation until the usage of post-anesthesia care units (PACU) after World War II. Observation of psychomotor agitation immediately after procedures requiring general anesthesia led to descriptive studies that pioneered further research (Wofford & Vacchiano, 2011). Nursing is an evolving profession that has been around for centuries, with nursing research being a more recent duty of nurses. With continuing support and reporting, nurses will ultimately help steer the research of anesthesia complications, including emergence delirium. Nurses and nurse anesthetists alike will continue

to evolve and implement better practices, including best operative practices to help decrease the occurrence of emergence delirium.

### **Post-Anesthesia Considerations**

Anesthesia providers must be conscientious of potential anesthesia complications when serving Americans with PTSD. Emergence delirium can present several barriers between the anesthesia provider, the patient care team, and the patient including: self-extubation, unintentional removal of lines and tubes, injury to patient and staff, and extended stays in the hospital (Wofford & Vacchiano, 2011). To address these considerations, care providers must use an interdisciplinary approach to planning care. Interdisciplinary care planning and in the incorporation of evidence based nursing interventions will limit post anesthesia complications. Self-extubation poses many risks to the patient, with the largest being significant tracheal damage. If the patient removes lines or disconnects tubing, there can be a significant risk for bleeding, especially if they removed an invasive monitoring line. Line removal also presents an increased risk for infection. Lastly, combative patients always present a risk for injury to themselves and the nursing staff. Injury is something all hospitals strive to avoid. Each of these complications can cause a patient to experience an extended stay in the PACU and ultimately increase the length of their hospital stay. To prevent this, anesthesia providers in nature have to be astute and omnipresent in nature, constantly observing for the slightest change in patient status, whether it be neurologically or hemodynamically. Constant nurse awareness serves as both a protectant for the nurse and their patients. It can be assumed interdisciplinary perioperative care reduces the occurrence of emergence delirium and post-anesthesia complications.

### **Prevention of Emergence Delirium**

While there are currently no evidence-based practices to treat or prevent emergence delirium, there are ways to reduce the likelihood of patient experience. Recommendations include eliminating preoperative administration of benzodiazepines, as they can increase overall agitation (Karch, 2013). The prudent nurse should also rule out physiological causes of delirium such as hypoxemia or airway occlusion. Avoidance and elimination of noxious patient stimuli decreases the incidence of emergence delirium. Limiting noxious stimuli such as urinary retention, bright lights, and environmental noise can be useful preventative actions. While removing tubes and lines as soon as possible may reduce the patient's likelihood of becoming increasingly combative and aggressive when emerging from anesthesia (Wofford & Vacchiano, 2011). If removing or reducing the stimuli does not prevent emergent delirium, the patient may require administration of a sedative such as midazolam (Versed) or propofol (Diprivan) to reduce the risk of harming self and others. There are also no definitive ways to measure for emergent delirium in patients. The Richmond Agitation and Sedation Score as well as the Riker Sedation-Agitation Scale are both utilized to measure emergence delirium. These scales, which are measured by numerical value, rate patients with a seven or ten-point continuum ranging from unresponsive to combative (Wofford & Vacchiano, 2011). The best way to possibly prevent emergence delirium is to identify which patients are at an increased risk. Military personnel, particularly patients with PTSD, should be considered to have an increased risk of experiencing this post-operative complication. Knowledge of the occurrence of emergence delirium in military patients with PTSD provides many implications for practice.

### **Implications for Practice**

From literature review, implications for practice include being educated about military experiences creating PTSD, knowledgeable of the different types of anesthesia and its adverse

reactions, and cognizant of the complications that can arise from anesthesia. Reducing noise and stimuli, particularly when working with veterans or active duty military, may reduce or prevent the occurrence of emergence delirium in patients undergoing major procedures requiring anesthetic intervention. This should be included in the anesthesia provider's daily practice, regardless of the patient, to prevent potential post-operative complications. As evidence suggests, emergence delirium is most often caused by the actual noise of the patient's environment. A nurse should ensure that the minimum level of noise is occurring to prevent potential complications (Wofford & Vacchiano, 2011). This information should also be conveyed to all members of the operative team, as they too could help reduce the noise and stimuli in the operating room that could provoke a negative response from the patient. More research is needed to be conclusive on the exact cause of emergence delirium; the veterans and active duty military members could also benefit from further research on post-traumatic stress disorder and ways to treat it.

### **Summary**

Healthcare is ever changing. Increased research and evidence based practice recommendations serve to optimize patient experiences and outcomes. Over the past half-century, American healthcare has seen dramatic changes, including the recognition of post-traumatic stress disorder as an actual mental health issue, as well as increased research on anesthesia administration in these patients (Leaman, Kearns, & Rothbaum, 2013). A patient's surgical experience can be particularly affected by their encounter when recovering from anesthesia: For some military members, the atmosphere in the operating room paired with the excitatory phase of anesthesia produces a delirium that can best be compared to as waking up to a nightmare. Minimal formal research is available regarding this phenomenon of emergence

delirium in the combat veteran. However all evidence suggests that it exists in this population more often than in the civilian population (Wilson, 2014). Patients can become very confused, combative, and aggressive; they can also forcefully self-extubate or pull lines and IVs out of them. All of these factors usually increase the time that patient spends in the hospital which is not the healthcare providers goal. Understanding emergence delirium occurs extensively in military personnel can help prevent negative hospital outcomes. Emergence delirium occurring in patients with PTSD can present operative complications for all healthcare providers. Education about PTSD and understanding the implications created by this experience mandates that additional funding for evidence-based research and clinical education is secured. Patient protection is a nursing obligation, which is complicated in this unique population.

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