Anesthesia Awareness-Induced Posttraumatic Stress Disorder

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ABSTRACT

While the incidence of anesthesia awareness has been well documented, information related to posttraumatic stress disorder (PTSD) symptoms resulting from anesthesia awareness is limited. Particularly scarce are descriptions of specific techniques to treat anesthesia awareness-induced PTSD. This article reviews an individual example of a woman who was experiencing anesthesia awareness-induced PTSD symptoms for 10 years. Treatment included supportive psychotherapy, psychoeducation, psychopharmacology, and group therapy with other individuals experiencing PTSD symptoms. Although this patient responded to these treatment approaches, additional studies are needed to identify optimal treatment options for patients with anesthesia awareness-induced PTSD.
Failure of general anesthesia to render a patient insensate can contribute to intraoperative experiences that may include the inability to communicate, along with feelings of helplessness, terror, and pain. This experience, whereby the patient is aware of events occurring during an intraoperative experience, is most commonly referred to as anesthesia awareness and can cause great distress for the patient.

The occurrence of anesthesia awareness is uncommon and reports vary as to its frequency. However, regardless of geographical location or differences in anesthesia or techniques, awareness with anesthesia is generally thought to occur in 1 to 2 cases per 1,000 (Sebel et al., 2004). The occurrence of anesthesia awareness is significant because it can lead to symptoms of posttraumatic stress disorder (PTSD). The purpose of this article is to educate nurses about the occurrence of anesthesia awareness and the potential for development of PTSD symptoms. Nurses can then institute screening protocols, which can promote identification of anesthesia awareness. Once identified, appropriate interventions can be implemented.

BACKGROUND
Anesthesia Awareness

Several contradicting factors have been associated with an increased risk for anesthesia awareness. In a study of 4,183 claims of awareness during anesthesia, Domino, Posner, Caplan, and Cheney (1999) reported a higher incidence occurring with women and patients treated with nitrous-narcotic-relaxant techniques. However, a later study by Ghoneim, Block, Haffarnan, and Mathews (2009) found no increased risk with the use of nitrous oxide. Younger ages, Cesarean sections and general anesthesia, and surgery performed at night have been reported as risk factors (Errando et al., 2008). In contrast, an earlier study by Sebel et al. (2004) reported no correlation between sex and age and the incidence of anesthesia awareness.

Conversely, Sebel et al. (2004) found an increased risk of awareness with the “sicker patients” who underwent major surgery. Beta-blockers and calcium channel blockers have been identified as potential agents that may interfere with the identification of inadequate anesthesia and therefore contribute to a greater incidence of anesthesia awareness (The Joint Commission on Accreditation of Healthcare Organizations [JCAHO], 2004). Additionally, light anesthesia and a history of awareness have been identified as risk factors (Ghoneim et al., 2009).

While several risk factors are known, effective interventions to avoid anesthesia awareness have not been clearly identified. The type of anesthesia used has not conclusively been identified as a risk factor. According to Mashour et al. (2009), the use of general versus other types of anesthesia did not contribute to the development of anesthesia awareness.

Although light anesthesia has been identified as a major factor in the development of anesthesia awareness (Ghoneim et al., 2009), there is considerable controversy about effective management of this factor. Light anesthesia is defined as anesthesia with bispectral index values greater than 60 (Avidan et al., 2008). Bispectral index (BIS) monitoring is one of several types of brain function monitoring using processed electroencephalogram or evoked potential to assess anesthetic depth. Monitoring techniques that include BIS-guided general anesthesia may reduce the incidence of awareness and have been recommended (Ekman, Lindholm, Lenmarken, & Sandin, 2004).

For example, an absolute risk reduction of anesthesia awareness occurred among high-risk patients to whom general anesthesia was administered according to a BIS-guided protocol; however, the cost of this monitoring has been viewed as prohibitive for general use (Myles, Leslie, McNeil, Forbes, & Chan, 2004). In addition, in research conducted by Avidan et al. (2008), the use of BIS monitoring was not supported. In their study involving randomly assigned patients (N = 2,000), anesthesia awareness occurred even with BIS monitoring and end-tidal anesthetic gas concentrations within target range. Although findings have not conclusively supported the use of BIS-guided anesthesia to minimize anesthesia awareness, JCAHO (2004) has asked the American Society of Anesthesiologists and the American Association of Nurse Anesthetists to continue to address the current monitoring practices of anesthesia levels.

In addition to JCAHO’s (2004) recommendations for improved monitoring of anesthesia levels, identification of the occurrence of anesthesia awareness is recommended following any procedure with anesthesia. This practice is endorsed by JCAHO (2004) to identify and acknowledge the patient’s symptoms. Once identified, medical and nursing staff should provide emotional support and referral information to a psychiatric practitioner, if indicated. If the patient is distressed about the experience, he or she should be referred for evaluation immediately. All patients who experience anesthesia awareness should be educated about the potential for psychological sequelae and encouraged to seek treatment if symptoms occur.

The patient’s surgeon, nurse, and other key personnel should be notified if an incident of anesthesia awareness is reported. Because such a low percentage of patients spontaneously report the occurrence of anesthesia awareness (Moerman, Bonke, & Oosting, 1993),
screening is recommended in the recovery room. Nursing staff caring for post-anesthesia patients are best positioned to identify and respond to patients who have experienced anesthesia awareness and should incorporate an assessment for it into their practice.

It should be noted that detection of anesthesia awareness, even when the patient is interviewed, may only occur half of the time (Sebel et al., 2004). Therefore, the use of a structured interview is recommended to improve frequency of detection (Sebel et al., 2004). Besides improved detection, more data are needed to understand and intervene therapeutically when subsequent untoward psychological consequences occur. Future studies of the psychological sequelae following anesthesia awareness-induced PTSD will benefit from standardization of information with the use of classification instruments for anesthesia awareness events (Mashour et al., 2010).

PTSD

PTSD is described as:

The development of characteristic symptoms following exposure to an extreme traumatic stressor involving direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one’s physical integrity. (American Psychiatric Association [APA], 2000, p. 463)

Symptoms of PTSD include persistently re-experiencing the traumatic event, avoiding stimuli associated with the trauma, numbing of general emotional responsiveness, and ongoing symptoms of increased arousal. Other common symptoms include flashbacks, impaired sleep onset and maintenance, nightmares, and anxiety (APA, 2000).

Several risk factors have been associated with the development of late psychological sequelae or PTSD following anesthesia awareness. One of the factors identified is an acute emotional reaction following anesthesia awareness (Samuellson, Brudin, & Sandin, 2007). Reports of the inability to move, feelings of helplessness, weakness, and hearing voices during the intraoperative experience have also been associated with the development of late psychological symptoms such as sleep disturbances and fearfulness of future anesthetic procedures (Ghoneim et al., 2009). However, the occurrence of perioperative dissociative experiences has been the most significant factor predictive of the development of conditions meeting the full criteria for PTSD (Osterman, Hopper, Heran, Keane, & van der Kolk, 2001). Unfortunately, this dissociation also contributes to impaired recall of the event postoperatively, which reduces the likelihood that the anesthesia awareness event will be detected (Osterman et al., 2001).

Anesthesia Awareness-Induced PTSD

The incidence of the development of significant psychiatric symptoms related to anesthesia awareness has been identified as early as 1975. Observational reports by Blacher (1975) described symptoms of “anxiety and irritability, preoccupation with death, and repetitive nightmares” (p. 67) following awakenings from light anesthesia. Approximately one third of patients who experience anesthesia awareness have been reported to develop severe psychiatric symptoms (Lennmarken & Sydsjo, 2007). In a small study (N = 26) of reported occurrences of anesthesia awareness, 70% of patients experienced sleep disturbances, nightmares, flashbacks, and anxiety (Moerman et al., 1993). Schwender et al. (1998) reported that 3 of 45 patients developed PTSD and required medical treatment following anesthesia awareness.

Similarly, the development of PTSD symptoms including “persistent memories of vivid images, sensations, isolated thoughts and intense emotions” following anesthesia awareness have been identified by Osterman et al. (2001, p. 203). Their study reported an incidence of 56.3% (9 of 16) of participants who met criteria for PTSD up to a mean of 17 years after anesthesia awareness. Specific PTSD symptoms occurring more frequently as a result of anesthesia awareness included avoidance of television programs with hospital themes, sleep disturbances, easy startle responses, hypervigilance, and irritability (Osterman et al., 2001). Additional symptoms that may impact future health care outcomes for individuals include avoidance of hospitals and physicians (Osterman et al., 2001). Symptoms of fear and avoidance of any future surgical procedures requiring anesthesia could also interfere with an individual’s likelihood to seek needed health care (Schwender et al., 1998).

All patients who experience anesthesia awareness should be educated about the potential for psychological sequelae and encouraged to seek treatment if symptoms occur.

TREATMENT OF ANESTHESIA AWARENESS-INDUCED PTSD

Reports of evidence-based treatment strategies specifically designed for individuals with PTSD following anesthesia awareness are limited. Prominent treatments for PTSD—not specifically associated with anesthesia awareness—can include cognitive-behavioral therapy (CBT) and psychopharmacologi-
cital treatment with selective serotonin reuptake inhibitors. Combination of these treatments is considered to provide optimal results (Ebert, Loosen, Nurcombe, & Leckman, 2008).

Whether the interventions for PTSD described above provide therapeutic outcomes for anesthesia awareness-induced PTSD is not clear. Anesthesia awareness-induced PTSD treatment may require different approaches than those used for PTSD induced by other types of events. Blacher (1975) recommended prompt acknowledgement of the event, declaring it essential and maybe even curative. This approach continues to be supported by the JCAHO (2004). Explaining what happened and its reasons and assuring the patient of the credibility of their experience is recommended (JCAHO, 2004). In addition, a psychiatric assessment and long-term follow up should be standard practice for all patients who have experienced anesthesia awareness (Lennmarken, Bildfors, Enlund, Samuelsson, & Sandin, 2002). Treatments of choice for anesthesia awareness-induced PTSD recommended by Lennmarken and Sydsjo (2007) include eye movement desensitization and reprocessing and CBT.

Following a review of computer searches, books, and referenced articles, only one case study involving a specific treatment approach for a patient with anesthesia awareness-induced PTSD was identified. The case, described by Mashour, Wang, Esaki, and Naughton (2008), reported a 49-year-old woman with an awareness of a surgical event whereby she felt unable to move and experienced pain for a period of the surgery. She expressed relief when the anesthesiologist confirmed that there was a period when she could have been aware. Despite this reassurance, 2 months later during a follow-up visit, the patient was reporting distressful intrusive thoughts about the surgical event. She was fearful of future surgery and experienced distress when any events, such as television shows, reminded her of the surgery. She developed anhedonia and felt a sense of detachment. In addition, she had difficulty falling asleep and was hypervigilant.

 Exposure-based therapy was used with this patient. Avoided situations were constructed and ranked according to the degree of anxiety provoked. Lower-ranking behaviors were engaged initially. At the appropriate time, the patient was exposed to a magnetic resonance imaging (MRI) simulator once per month for desensitization. (MRI simulators, in addition to being used for staff training purposes, are used to help patients acclimate to the MRI environment by various feedback systems. Exposure to MRI equipment may have been considered a potential trigger if the patient required that level of diagnostic testing in the future.) In addition, supportive counseling was provided. After 2 months, the patient was accompanied to a partially equipped operating room. Although the patient appeared distressed, she was able to discuss her thoughts, emotions, and sensations. Subsequent in vivo exposure was provided in a fully equipped operating room. Her symptoms remitted, and the patient was able to have a colonoscopy initially. At the appropriate time, the patient required that level of diagnostic testing in the future.) In addition, supportive counseling was provided. After 2 months, the patient was accompanied to a partially equipped operating room. Although the patient appeared distressed, she was able to discuss her thoughts, emotions, and sensations. Subsequent in vivo exposure was provided in a fully equipped operating room. Her symptoms remitted, and the patient was able to have a colonoscopy completed 8 months following the initial event of anesthesia awareness.

As reported cases of treatment for anesthesia awareness-induced PTSD are rare, greater knowledge of specific sequelae of identified patients and their response to treatment is needed to guide future research. Therefore, the following individual example of a woman diagnosed and treated for anesthesia awareness-induced PTSD is presented.

**INDIVIDUAL EXAMPLE**

Mrs. Nelson (pseudonym) is a 50-year-old White, divorced woman who came to see the first author (K.M.P.) for a psychiatric consultation and medication evaluation. Although the patient identified anxiety and panic symptoms related to the recent loss of her job as the primary problem, she also reported fatigue and chronic insomnia. Her sleep disturbance had originated with an anesthesia awareness event 10 years ago. A miscarriage and subsequent dilation and curettage had resulted in her “not being completely under” the general anesthesia, according to Mrs. Nelson. During the episode, she experienced the sensation of being “covered with dirt” and felt that way when she awakened.

Since the anesthesia awareness event, Mrs. Nelson re-experienced the same sensation of being buried alive on numerous occasions. This sensation led to a fear of lying down in bed to go to sleep. Consequently, she slept on the sofa in her living room with the lights on, and only brief periods of sleep occurred. The sleep deprivation resulted in chronic fatigue.

During the initial interview, Mrs. Nelson cried profusely, and her mood was depressed. Following a complete psychiatric evaluation, findings included symptoms of sleep disruption, depressed mood, anxiety, and flashbacks associated with feelings of being buried alive. She was diagnosed with major depressive disorder and PTSD.

During the treatment with K.M.P., guanfacine (Tenex®) was prescribed to reduce the hyperarousal that was interfering with her sleep, but this was rejected by the patient. Due to a previous unsuccessful trial of escitalopram (Lexapro®), the patient refused to take another antidepressant agent. She agreed to continue to take clonazepam (Klonopin®) 0.5 mg, prescribed previously by her primary care provider, on an as-needed basis for sleep. Although the clonazepam worked for sleep initiation, she continued to awaken during the night.

Subsequent visits revealed that Mrs. Nelson was experiencing frequent panic symptoms. Psychoeducation was
provided, describing common experiences and treatments related to panic symptoms. Gradual desensitization techniques were applied to help her focus on addressing the anxiety associated with sleep. Mrs. Nelson was encouraged to take the clonazepam along with positive self-talk techniques to move her sleep location gradually closer to her bed. She attended a support group led by K.M.P., which was limited to women who experienced anxiety and panic attacks and had a diagnosis of PTSD (none related to anesthesia awareness). The focus of the group sessions was education regarding panic symptoms, support for dealing with the panic symptoms, and the discussion of techniques to reduce anxiety and panic symptoms. Mrs. Nelson was very vocal in these groups and shared her techniques for dealing with her panic attacks, which included deep breathing and positive self-talk. In addition, she processed her anesthesia awareness experience in the supportive environment of the group. She continued to see her individual therapist for supportive psychotherapy to discuss her feelings about the job loss and to learn how to manage her symptoms of anxiety and depression. The treatment between the therapist and K.M.P. was coordinated via telephone conversations with the consent of the patient.

At the onset of treatment, Mrs. Nelson had experienced frequent panic attacks, but within 9 months her panic symptoms had subsided, her anxiety was minimal, and she no longer had a fear of sleeping. CBT techniques, social support, psychoeducation about PTSD and panic symptoms, and the use of clonazepam 0.5 mg on an as-needed basis were the main interventions. While still sensitive to stress, she was no longer experiencing the symptoms of chronic PTSD resulting from anesthesia awareness, was coping with her job loss, and did not identify it as an ongoing stressor.

Subsequently, Mrs. Nelson required two additional surgical procedures that involved general anesthesia and, understandably, was quite anxious about a recurrence of anesthesia awareness. She communicated her concern effectively to the anesthesiologist and was provided reassurance, which helped reduce her anxiety. Mrs. Nelson was able to proceed with the surgery and did not re-experience anesthesia awareness.

NURSING IMPLICATIONS

Nurses are an integral part of the treatment team in the pre-operative, intraoperative, and postoperative settings and therefore can have an impact on the identification, assessment, and treatment of anesthesia awareness. Pre-operatively, nurses can screen for previous occurrences of anesthesia awareness and alert the surgical team. Although one of the main identifiable risk factors for anesthesia awareness is prior occurrences (Ghoneim et al., 2009), many patients may not have the knowledge or communication skills to effectively alert anesthesia practitioners about their previous experiences. Information regarding a prior history of anesthesia awareness should be identified so that measures to minimize the risk of recurrence are instituted.

Intraoperatively, surgical nurses should be cautious about communications in the surgical area. In addition, they should educate other members of the surgical team about appropriate communication during surgery and the risk of anesthesia awareness. Auditory perceptions are one of the most frequent experiences reported by patients who have experienced anesthesia awareness (Moerman et al., 1993). Postoperatively, nurses have a significant role in detecting anesthesia awareness and responding in the most therapeutic manner. JCAHO (2004) recommends that a health care practitioner involved in the patient’s care should provide an apology if anesthesia awareness occurs, and the credibility of the patient’s account should be assured along with sympathizing with his or her suffering. Psychological support should be offered along with referrals to a psychiatric provider. Long-term follow up should constitute standard practice for all patients who

KEYPOINTS


1. Anesthesia awareness occurs in approximately 1 to 2 cases per 1,000.

2. Approximately one third of patients who experience anesthesia awareness develop severe psychiatric symptoms.

3. The occurrence of perioperative dissociative experiences is the most predictive factor for developing anesthesia awareness-induced posttraumatic stress disorder.

4. It is critical to identify patients who have experienced anesthesia awareness so that appropriate interventions and referrals can be provided.

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have experienced anesthesia awareness (Lennmarken et al., 2002).

Nurse educators in undergraduate and graduate programs need to provide content that addresses anesthesia awareness. Nurses, as psychiatric care providers, along with their psychiatric colleagues, need to be knowledgeable about the identification and treatment of psychological complications related to anesthesia awareness-induced PTSD. It is recommended that patients seeking psychiatric treatment following surgical treatments automatically be evaluated for anesthesia awareness (Osterman & van der Kolk, 1998).

CONCLUSION

The long-term debilitating effect that the experience of anesthesia awareness-induced PTSD had on the patient described in this article cannot be overstated. The chronic fear of death associated with sleep and flashbacks of being buried alive were extremely distressful. The resultant sleep deprivation, anxiety, and panic interfered with Mrs. Nelson’s vocational and social functioning and general well-being. Fortunately, this patient sought help, and positive outcomes were achieved. Specific treatments included supportive psychotherapy, psychosocial evaluation, psychopharmacology, and group therapy. Further investigations using case studies are needed to identify effective treatments for patients experiencing anesthesia awareness-induced PTSD.

REFERENCES

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