

Operating Room Desensitization as a Novel Treatment for Post-Traumatic Stress Disorder after Intraoperative Awareness

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THE incidence of intraoperative awareness with explicit recall is approximately 1–2 cases/1,000, with high-risk situations including cardiac surgery, trauma surgery, and emergency obstetric interventions.^{1,2} There can be severe and persistent psychiatric sequelae to awareness, which may recur years after the awareness event. The most severe consequence is post-traumatic stress disorder (PTSD), which can present with depression, anxiety attacks, or debilitating flashbacks.

Because the triggers of PTSD in this population are often healthcare settings and healthcare workers, many such patients will avoid further medical care. In patients who do return for surgical intervention, there is often a distrust of anesthesiologists, as well as fears related to PTSD flashbacks or a further awareness event.³ As such, a therapeutic modality that could attenuate the PTSD response to the surgical environment would be of great benefit in minimizing subsequent perioperative psychiatric sequelae. Here, we report the successful treatment of a patient with PTSD after intraoperative awareness by psychotherapy and desensitization to the operating room.

Case Report

Intraoperative Course

The patient was a 49-yr-old, 77-kg woman with a history of scoliosis, pseudoarthrosis, and other orthopedic problems who presented for a staged posterior–anterior lumbar spine fusion. Of note, the patient had a family history of malignant hyperthermia, and she had experienced cardiac arrest under ether during a hip surgery in 1968. It is unclear whether the arrest was due to malignant hyperthermia. Since that time, she had undergone more than 30 surgical procedures, with no adverse events. The posterior portion of the case proceeded uneventfully, and she presented 1 week later for the anterior intervention.

The patient had a 20-gauge intravenous catheter placed in her right hand preoperatively and was premedicated with 2 mg midazolam and 100 µg fentanyl. The patient was given 100 mg propofol and 7 mg

vecuronium for induction; tracheal intubation proceeded uneventfully. Anesthetic maintenance initially consisted of 80 µg · kg⁻¹ · min⁻¹ propofol, 0.05 µg · kg⁻¹ · min⁻¹ remifentanyl, and 50% nitrous oxide in oxygen. Because of the patient's history of nausea and vomiting, nitrous oxide was discontinued shortly after surgical incision, and infusion rates were increased. At this time, arterial catheter placement was attempted in the right radial artery. During the placement of the arterial line, the intravenous catheter on the right hand ceased functioning, which interrupted the delivery of anesthetic. There was an increase in heart rate, but this was also the period directly after incision. After discovery of the malfunctioning intravenous catheter, the propofol and remifentanyl infusions were transferred to a second peripheral intravenous catheter. No further benzodiazepine was administered.

Postoperative Course

Postoperatively, the patient reported that she had been aware, unable to move, and in pain for a portion of the case. She expressed relief when the anesthesiologist confirmed that there was a period during which she could have been aware, because it validated her experience. After supportive visits by the anesthesiology staff and resident, the patient was referred for psychological evaluation and treatment. Selected points of her outpatient psychological treatment are described below.

January 10. The patient experiences intraoperative awareness.

March 1. Upon her first outpatient psychiatric evaluation, the patient endorsed daily intrusive thoughts about the surgical event that were “very upsetting.” She reported fear of having surgery again and distress when exposed to reminders of her surgery (such as a “surgical blue” color or medical television shows). She also experienced an almost complete loss of interest in activities that were enjoyable to her before her surgery, as well as a feeling of distance and detachment. She stated that she had difficulty falling asleep and reported moderate to severe hypervigilance.

March 5. The patient reported continued symptoms of PTSD and avoidance behaviors. She was reassured that her symptoms were normal responses to a traumatic experience. The rationale and description of exposure-based therapy for the treatment of PTSD was given, and questions were answered. A list of avoided situations was constructed and ranked according to the level of anxiety each provoked. The patient was instructed to engage in one of the lower ranked items, lying on her back in a dark room, for 20 min each day.

March 26. The patient reported that she had engaged in behaviors at home that she had been previously avoiding, including watching television shows with medical themes. Prolonged exposure to the trauma memory was initiated during therapy. The patient completed a first exposure and was coached on remaining in the first person, including as many sensory details as possible.

March–April. Supportive counseling was provided. “*In vivo*” exposure was done in the magnetic resonance imaging simulator one time each month. “Homework” assignments were given to continue engaging in previously avoided activities.

May 14. Supportive counseling and cognitive behavioral therapy were provided. The patient and her psychologist went to a partially equipped operating room. The patient sat in a chair in the operating room and discussed her thoughts, emotions, and sensations elicited by

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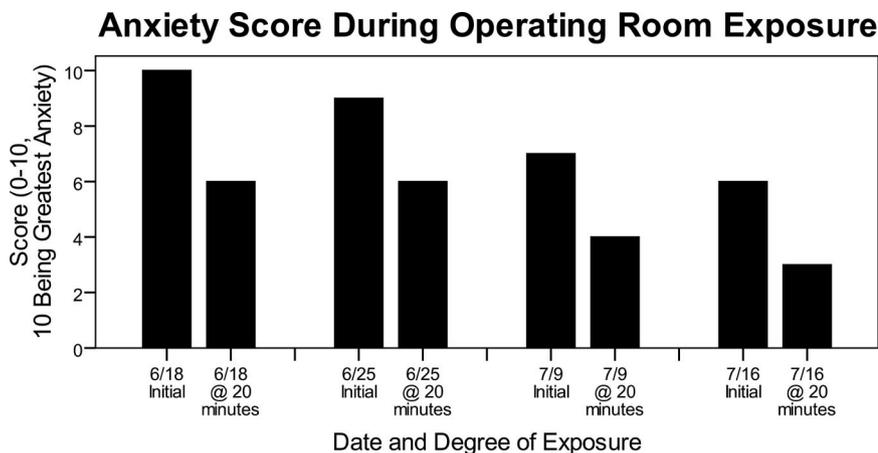


Fig. 1. Decreased patient-reported anxiety scores during repeated exposures to the operating room. Initial awareness event was the previous January, and diagnosis of post-traumatic stress disorder was the previous March. Note that the anxiety response is desensitized over time, both within and across treatments.

the operating room environment. The patient seemed to focus on the anesthesia cart for much of the time and was visibly distressed.

June–July. Supportive counseling and cognitive behavioral therapy was provided. Repeated *in vivo* exposure to surgery cues was performed in a fully equipped operating room that was not in use. Initial anxiety scores and anxiety scores at 20 min were reported by the patient and recorded by her psychologist (fig. 1).

September 10. The patient, her psychologist, and two anesthesiologists met in an operating room in preparation for a colonoscopy the patient would be undergoing later in the month. The anesthesiologists (G.A.M. and N.N.N.) were not involved in the original case but answered questions about awareness and general anesthesia. After the meeting, the patient reported being very satisfied with the exchange and said that she was grateful for the opportunity.

September 24. The patient reported that she underwent a colonoscopy procedure the previous week that was both “good and bad.” She stated that her interaction with the anesthesiologist before the procedure was unsatisfying in that he was insensitive regarding her awareness experience. The patient elected to have her colonoscopy at a hospital closer to her home, so the anesthesiologists involved in the therapeutic process were not present for the actual procedure. Despite the unsatisfying encounter with her anesthesiologist on that day, she had no physical or psychological complications during or after the procedure. The patient’s PTSD was deemed by her psychologist to be in remission.

Discussion

The incidence of PTSD after intraoperative awareness is still controversial. Prospective studies have found an incidence of 0–44%,^{4–6} whereas retrospective cases series suggest an incidence of 2–56%.^{7–10} The diagnosis of PTSD requires (1) exposure to a traumatic event; (2) reexperiencing of the traumatic event in recurrent thoughts, nightmares, or flashbacks; (3) avoidance of stimuli associated with the trauma; (4) hyperarousal states; (5) greater than 1 month duration of symptoms; and (6) functional impairment.¹¹ Particularly problematic in the case of awareness patients is that the cues associated with the trauma are usually related to healthcare settings and healthcare workers. There is thus the potential for avoidance of further medical care or surgical intervention. Risk factors for PTSD include severity of trauma, female sex, middle age, single status, psychiatric history, low education status, and bor-

derline personality disorder.¹¹ In patients experiencing awareness, a severe early emotional response was the only predictor found in one major study of PTSD and late psychological symptoms.¹⁰

Treatment modalities for PTSD include cognitive behavioral therapy, exposure or “flooding” therapy, eye-movement desensitization reprocessing, and antidepressant medication.^{11–13} Guiding the patient through the reexploration of traumatic memories is a key element of PTSD therapy, but *in vivo* exposure to traumatic cues has been found to be more effective.¹² Cognitive behavioral therapy attempts to restructure the intellectual framework within which the traumatic memory is processed.¹³ To our knowledge, there is only one case report of cognitive behavioral therapy and exposure in the treatment of PTSD in a patient experiencing awareness.¹³ In that case, however, the *in vivo* exposure was limited to visiting the hospital in which the surgery—a cesarean delivery—was performed.

The current case represents the first report of *in vivo* exposure to an operating room setting in a patient with PTSD after awareness during general anesthesia. It is important to note that the patient went through a graded exposure, starting with a reexploration of the memory of traumatic events and concluding with time in an actual operating room. This case is also unique because (1) anesthesiologists were involved in the therapeutic process and (2) the therapy and desensitization occurred before and in anticipation of another medical intervention. The patient was particularly grateful to be in the operating room with anesthesiologists who could address her questions. Although we cannot ascribe a strict causal relation, we believe that the graded exposure to the operating room setting and the participation of anesthesiologists in the therapy enabled the patient to undergo a further intervention in a hospital setting without psychological sequelae such as flashbacks, panic attacks, or anxiety. This case suggests that psychotherapy in conjunction with exposure and desensitization to the operating room may be an effective treatment for

PTSD in patients who have experienced intraoperative awareness. Further investigation, such as case series analysis and randomized study, is warranted to validate this therapeutic technique.

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