



LEGAL BRIEFS

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OPERATING ROOM FIRES: THE CRNA AND THE DEPOSITION

Although the reported incidence of surgical fires indicates they are rare occurrences, any Certified Registered Nurse Anesthetist (CRNA) who is involved in one will most likely end up in court defending a malpractice suit. This column discusses one such case with an emphasis on the CRNA's deposition testimony and its impact on the need to settle the

case. The column also will discuss how surgical fires can be prevented and provide sources of further information on this important risk management issue for CRNAs.

Key words: Certified registered nurse anesthetist, fire, malpractice, surgery.

A female in her mid-30s presented to a hospital for removal of several cysts on her neck that were growing larger and becoming painful. A Certified Registered Nurse Anesthetist (CRNA) was assigned to perform the anesthesia care during the case. After meeting with the patient, she felt it would be less risky to do the procedure under intravenous sedation anesthesia because of the patient's obesity and high blood pressure. She discussed this plan with the surgeon who was in agreement. The patient's anesthesia was difficult to manage because of her size and her claustrophobia, which the CRNA later stated the patient failed to report before the procedure. The CRNA and the surgeon decided that once the surgeon finished the first excision, they would switch to general anesthesia. This was because the CRNA was having a difficult time titrating the intravenous drip to maintain an appropriate amount of sedation. However, before the first excision was completed, a fire occurred.

As is often the case when an unexpected event occurs during surgery, there were various versions of exactly what happened around the time of the fire. According to the surgeon's operative

report, he was cauterizing bleeders when the patient became agitated and pulled off her oxygen line and the drapes from her nose and face, with a resulting flash fire on her face. The circulating nurse claimed that she saw the oxygen set at 10 liters and that the patient was becoming more agitated, so she left to scrub in to help the surgeon before the fire started. The anesthesia record showed that the oxygen was continually at 2 liters from the start of the procedure to the time of intubation after the fire, but the CRNA stated afterward that the oxygen "should have been at 4 liters" at the time the fire started. The CRNA did not see the patient's hand move to her face before the fire occurred. She recalled the patient suddenly sat up on the table. The CRNA asked what was wrong and the surgeon replied "fire." The CRNA then turned off the oxygen and tended to the patient. The fire was quickly extinguished by the surgeon.

The CRNA called for an anesthesiologist to come to the operating room and initiated general anesthesia. The patient was intubated and given systemic antibiotics and steroids. Drops were applied to the patient's eyes and

ointment to burns on the face, eyelids, shoulder, and finger. Multiple consultants were called while the patient was on the table. An otolaryngologist scoped the patient's upper airway and determined the patient had second and third degree burns in the distal portions of both nares. The otolaryngologist also noted there was no damage to the rest of the upper airway. She noted that the most severe burns were within the nasal vestibular areas where the nasal cannula would have been, which indicated to her that the fire originated while the nasal cannula was still in place in the nose. The prongs of the nasal cannula were vaporized in the fire.

A pulmonologist performed a bronchoscopy and ruled out any damage to the lower airway and lungs. An ophthalmologist ruled out any injury to the eyes. This patient was very lucky; she was sent home within a week, and had no visible scarring 6 months after the incident. Nevertheless, a claim was made in arbitration against the surgeon, the hospital, and the CRNA. The CRNA had been practicing only 4 months before the incident. At her deposition, the CRNA initially presented as a good witness, giving clear, concise

answers. As the deposition progressed and as the focus shifted to the events in the operating room at the time of the incident, she began to have difficulty not speculating, and avoiding arguing with plaintiff's counsel. She also had some difficulty with remembering not to volunteer information, and remembering to follow instructions regarding not answering questions. As a result of her poor performance, her attorney recommended that the case be resolved before arbitration by way of a confidential settlement. The matter was settled, with all defendants contributing.

Discussion

- *Incidence of surgical fires.* A total of 66 fires have been reported to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) as Sentinel Events¹ since January 1995. These fires occurred in various locations in the hospital setting. At least 2 of these were surgical fires. JCAHO² indicates that while exact numbers are not available, an estimated 100 surgical fires occur each year, resulting in up to 20 serious injuries and 1 or 2 patient deaths annually. So, while this is a very rare problem, the results can be potentially devastating not only for the patient but also for the providers involved in the patient's care at the time of the fire.

- *Basic principles of fire prevention.* Fires require heat, fuel and oxygen to start. All of these elements are present in the operating room and, specifically, on the sterile field. Common heat sources in the operating room include electro-surgery/electrocautery units, lasers, and fiberoptic light sources. Common fuel sources in the operating room are the surgical drapes, the patient's hair, the surgical prep agents, and other combustible supplies. Prevention of surgical fires,

therefore, involves minimizing these 3 elements and keeping them from coming together at the same time.

The CRNA's role in fire prevention

What is expected of the CRNA to prevent surgical fires? AANA's Scope and Standards for Nurse Anesthesia Practice³ indicates that the CRNA is expected to follow safety precautions as established by the facility to minimize the risk of fire and other hazards. All facilities need to have policies and procedures addressing prevention of operating room fires. JCAHO's 2007 National Patient Safety Goals include reducing the risk of surgical fires by educating staff, including anesthesia providers, on how to control heat sources and manage fuels with enough time for patient preparation, and establish guidelines to minimize oxygen concentration under drapes.⁴ Association of Operating Room Nurses⁵ notes that ambient air contains 21% oxygen and that fires can occur when the oxygen level in the atmosphere rises above 21%, thus, if oxygen is in use in the operating room, it should be treated as an oxygen enriched environment. Oxygen is known to leak into the air when patients are given mask or nasal oxygen. A recent study by Goldberg⁶ showed that regardless of the oxygen concentration, surgical drapes are flammable when exposed to close contact with an electro-surgical unit, although time to ignition is decreased at higher concentrations of oxygen.

The Joint Commission International⁷ indicates that among the 3 elements required for a fire to start, the anesthesia provider is in control of the oxidizers, such as compressed air, oxygen and nitrous oxide. Regulation of oxygen is therefore the most important thing

the CRNA can do to minimize fire risk. The Emergency Care Research Institute (ECRI)⁸ recommends that, as a general policy, only air or F_{iO_2} less than or equal to 30% should be used for open delivery and that drapes should be arranged to minimize oxygen and nitrous oxide buildup. ECRI also recommends that if the oxygen concentration is more than 30%, supplemental oxygen should be stopped at least 1 minute before and during use of an electro-surgery, electrocautery, or laser device, if possible. This dictates that as part of the CRNA's pre-operative patient evaluation, a determination should be made as to whether the patient will be able to tolerate brief periods without supplemental oxygen. Additionally, the CRNA should consider eliminating the use of nitrous oxide in any case in which oxygen is used since nitrous oxide is flammable when in the presence of oxygen.⁹ An excellent discussion of this subject, including steps to take if a fire occurs, is available at the national guideline clearinghouse at www.guideline.gov.

If a fire occurs

Healthcare providers can expect some type of legal action in the aftermath of a surgical fire. JCAHO International Center for Patient Safety states that the risk of a surgical fire is exceedingly low and therefore could potentially be eliminated with proper interventions.⁷ Other publications echo this sentiment that virtually all surgical fires can be prevented.¹⁰ Thus, if a patient is injured in a surgical fire, his or her attorney will likely use the legal theory of *res ipsa loquitur*, which means "the thing speaks for itself." This legal theory is used rarely in medical negligence cases, and most often applies in the case of retained surgical instruments,

surgical fires, and other incidents whose occurrence suggests negligence. In other words, when a surgical fire occurs, the presumption is that it occurred because of negligence. This is because surgical fires are rare and are felt within the safety community to be nearly entirely preventable. The patient is at a great advantage when *res ipsa loquitur* applies because it means that the burden of proof shifts to the defendants to prove that the incident occurred absent negligence. This can often be hard if not impossible to do.

The case discussed above involved several standard of care issues. First, the patient's experts were prepared to testify that this patient was too complicated for anesthesia to be administered by a CRNA because of her obesity, her hypertension, and her claustrophobia. Second, the experts criticized the CRNA for not calling for the assistance of an anesthesiologist when she had trouble titrating the sedation. Next, they asserted that the patient was not sedated enough because she kept moving around during the case. They also criticized the CRNA for failing to titrate the oxygen level appropriately, thus leading to oxygen buildup under the drapes; and for not turning down the oxygen when the surgeon was using the cautery device.

Although the CRNA had a supportive expert, she performed poorly at her deposition despite extensive preparation. In testifying, she fell into several pitfalls for defendants in the deposition

process by not listening carefully to the questions posed, by volunteering information, by speculating, and by arguing with the patient's attorney. Why did this have an impact on her case? Because in this case (as with nearly all healthcare negligence cases) there were important factual questions that would only be able to be answered based on credibility: Did the patient fail to tell the CRNA about her claustrophobia before the procedure? Was the oxygen set at 10 liters as the circulating nurse said, or at 4 liters as the CRNA said, or at 2 liters as the CRNA documented? Did the patient reach up and pull off her nasal cannula thus starting the fire as the surgeon asserted, or did she sit up because she was on fire as the CRNA asserted? By her conduct at deposition, this CRNA lost any credibility she may have had regarding her version of the events. Without that credibility, she had little hope of proving that her version was the true one, little hope of proving that the fire occurred absent negligence, and thus little hope of prevailing at the arbitration. She thus accepted counsel's recommendation that the matter be settled.

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