

SPINE SAFETY WARNING:

Information for Healthcare Professionals:

FDA Safety Communication:

Preventing Surgical Fires

Audience

All health care professionals (surgeons, surgical technicians, anesthesiologists, CRNAs, nurses, etc.) involved in surgical procedures and health care facility executives and staff responsible for patient safety and risk management.

Products

Medical products used in surgical procedures, including medical gases, alcohol-based skin preparation agents, electrosurgical units (ESUs), lasers, and fiber optic light sources.

Purpose

The FDA is advising health care professionals and health care facility executives and staff on factors that increase the risk of surgical fires, particularly the delivery of supplemental oxygen to patients. The FDA is recommending practices to help prevent these fires including the safe use of medical products used during surgical procedures. With support from partners in the health care community, the FDA is launching a [surgical fire prevention initiative](#)¹ to promote safer practices and to share fire prevention resources.

Summary of Problem and Scope

Surgical fires are rare events that can result in serious injury, disfigurement and death. According to ECRI Institute, an estimated 550 to 650 surgical fires occur in the United States per year¹. Surgical fires are preventable. However, the FDA continues to receive reports of surgical fires some resulting in second and third-degree degree patient burns. Deaths are less common and are typically associated with fires occurring in the patient's airway.

Surgical fires can occur at any time all three elements of the fire triangle are present:

1. **Ignition source** (e.g., ESUs, lasers, and fiber optic light sources)
2. **Fuel source** (e.g., surgical drapes, alcohol-based skin preparation agents, the patient)
3. **Oxidizer** (e.g., oxygen, nitrous oxide, room air)

Most surgical fires occur in oxygen-enriched environments, when the concentration of oxygen is greater than in ordinary room air. When supplemental oxygen is delivered to the patient, an oxygen-enriched environment can be created. An open oxygen delivery system, such as nasal cannula or mask, presents a greater risk of fire than a closed delivery system, such as a laryngeal mask. In an oxygen-enriched environment, materials that may not normally burn in room air can ignite and burn.

Recommendations to Reduce the Risk of Surgical Fires

- Conduct a fire risk assessment at the beginning of each procedure. The highest risk procedures involve an ignition source, delivery of supplemental oxygen, and the operation of the ignition source near the oxygen (e.g., head, neck, or upper chest surgery).
- Use supplemental oxygen safely.
 - Evaluate if supplemental oxygen is needed for each patient. Any increase in oxygen concentration in the surgical field increases the chance of fire.
 - If supplemental oxygen is necessary, particularly for surgery in the head, neck, or upper chest area:
 - Deliver the minimum concentration of oxygen needed to maintain adequate oxygen saturation for your patient.
 - Use a closed oxygen delivery system such as an endotracheal tube or laryngeal mask whenever possible, especially if high concentrations of supplemental oxygen (greater than 30 percent) are being delivered.
 - Take additional precautions to exclude oxygen from the field if using an open delivery system. These precautions include draping techniques that avoid accumulation of oxygen in the surgical field, the use of incise or fenestrated drapes which may help isolate oxygen from the surgical site, blowing air to wash out excess oxygen, or alternatively, scavenging oxygen from the field.
- Use alcohol-based (flammable) skin preparation agents safely.
 - Prevent alcohol-based antiseptics from pooling during skin preparation. For example use the appropriate size applicator for the surgical site.
 - Remove alcohol-soaked materials from the prep area.
 - Allow adequate drying time, as prescribed in the labeling, for the specific product. If the product is used on hairy areas or in skin folds, extend the drying time.
 - Ensure the skin is dry before draping the patient and beginning surgery.
- Use devices and other surgical equipment safely.
 - Consider alternatives to using an ignition source for surgery of the head, neck, and upper chest if high concentrations of supplemental oxygen (greater than 30 percent) are being delivered. If an ignition source must be used, know that it is safer to do so after allowing time for the oxygen concentration to decrease. It may take several minutes for a reduction of oxygen concentration in the area even after stopping the gas or lowering its concentration.
 - When not in use, place ignition sources, such as ESUs and electrocautery devices, in a holster and **not** on the patient or drapes.
 - Understand that surgical drapes and other fuel sources can ignite easily and burn in an oxygen-enriched environment, even if the products are described as “flame-resistant.”
- Encourage communication among members of your surgical team.
 - Ensure the anesthesia professional delivering the gases is communicating with the surgeon controlling the ignition source and the clinician applying the skin preparation agent.

- Plan how to manage a surgical fire. For example, understand how to extinguish a fire burning on a patient, develop evacuation procedures, conduct fire drills, and keep saline handy to put out a fire.

Additional information and resources are available at:

<http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm275189.htm>

The North American Spine Society is committed to quality patient care through promotion of patient safety and prevention of medical errors. NASS monitors a variety of government and other resources for patient safety related notices that may be useful to our members.

Information from these notices is also archived on the NASS website at

<http://www.spine.org/Pages/PracticePolicy/ClinicalCare/SpineSafetyAlerts/Default.aspx>. This information is provided as a service for information and education only.