A surgical fire, like any fire, requires the presence of three elements: a heat (or ignition) source, fuel, and an oxidizing agent. Oxygen is necessarily present for breathing, however, additional oxygen supplied to the patient increases the risk of a fire. Additionally, nitrous oxide produces oxygen from thermal decomposition. An increased level of oxygen increases the risk of a surgical fire. Like oxygen, fuel will always be present in a surgical room. Prep agents, drapes, and even a patient’s hair are fuel sources. Vapors from insufficiently dry prep agents are extremely flammable. Although some drapes are advertised as flame-resistant, the ECRI has determined that all types of drapes burn in oxygen.

Surgical equipment, such as electro-cautery devices and lasers, are believed to provide the ignition source for many surgical fires. The increased use of such devices is believed to contribute to the increase in surgical fires. Although these devices can provide benefits during surgery, a non-ignition source tool should be considered for surgery performed near the oxygen supply of a patient requiring oxygen.

The best way to protect patients from surgical fires is to prevent them by reducing the use of oxygen, decreasing the flammability of potential fuel sources in the operating room (by allowing prep agents to dry and coating hair or other flammable objects with water-based lubricant) and ensuring that heat sources are monitored carefully to reduce the risk of ignition. In addition, operating teams should be prepared in the case of fire to minimize effects on patient and staff safety by taking steps to extinguish the fire and evacuate if necessary.

**Solutions**

**Prior to procedure:**
- Evaluate the risk of fire and implement safeguards
- Coat hair with water based lubricant
- Allow flammable skin preps to dry fully
- Consider alternatives to ignition source tools for surgery near O₂ supply

**During procedure:**
- Ensure all cables are connected before activating equipment
- Deactivate any surgical equipment before tip leaves surgery site
- Holster and/or place on standby equipment not in active use
- Deliver the minimum O₂ needed to maintain adequate blood saturation if patient requires O₂ secure airway
- Moisten any sponges used

**In case of fire:**
- Stop flow of airway gases
- Remove burning materials

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**In case of fire, remove burning materials**

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