Surgical Fires – Response  
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This article will highlight the actions to take when your best fire prevention efforts don’t work. Even a small fire can be very dangerous. Patient lives have been entrusted to us for their protection and safety. We can jeopardize those lives by the actions we take… or our failure to act. A small fire can grow exponentially and place the lives of our patients in immediate danger with disastrous results. In this circumstance, we don’t have the luxury of taking the time for normal decision-making; actions need to be taken immediately.

REMEMBER - PATIENT SAFETY IS THE PRIORITY IN YOUR SURGICAL SUITE!

RESPONSE TO A SURGICAL FIRE

Any time a staff member smells or sees smoke, a “Code Red” fire response should be initiated in the surgical suite. Every second counts in the surgical environment and staff can’t waste time trying to investigate a burning odor or try to determine what is smoking. Don’t wait for others to react - advise the other members of the surgical team that you smell smoke or see smoke. Begin the RACE process. Always transmit a fire alarm and call the switchboard to report the fire – even if it seems insignificant.

Airway Fires

Airway fires (occurring inside the patient's airway) need to be handled quickly and safely. Fires involving an endotracheal tube can act like a flamethrower, sending flames, smoke and hot gases into the patient’s airway.

When an airway fire occurs:
• The anesthesiologist should shut-off the oxygen flow immediately.
• He or she should disconnect the breathing circuit from the endotracheal tube. The pilot tube and ties that are used to anchor the tube to the patient must be cut. The endotracheal tube should be removed.
• The tube should be handed to another staff member and extinguished. Remove any cuff protection devices and any pieces of the tube that might still be burning in the patient's airway. Once the tube has been removed, examine it for burns which might help to determine where medical treatment is required inside the patient’s airway. Examine the airway for potential injury and treat the patient’s injury accordingly.

Note: Risk management should be contacted immediately and the endotracheal tube should be secured for an investigation. As with any fire investigation, the room should be left undisturbed following the fire until risk management and/or administration permits the room to be cleaned and once again used.

Small Fires

Small fires occurring on the patient can be smothered easily by placing a wet, sterile towel over the fire. This could also include pouring sterile water or saline over the burning area.

Other tips for putting out small fires are:
• Remove any burning material from the patient.
• Disconnect all non-life support electrical equipment; remember to alert the surgeon and anesthesiologist before making this move.
• If the fire happens to involve oxygen, the anesthesiologist needs to stop the flow and ventilate the patient with air.

Note: If the fire involves ALCOHOL or ALCOHOL-BASED solutions or involves electricity, DON’T USE WATER OR SALINE SOLUTIONS to extinguish the fire. This could place the patient and yourself in a more...
dangerous situation. The nearest portable fire extinguisher should be used to extinguish these types of fires. If a portable fire extinguisher is not located inside the operating room, consider using a dry towel. If the fire involves electricity, pull the power supply cord to the device and then use a wet towel.

Some hospital fire procedures suggest the use of a gloved hand being placed over the fire to smother it in an emergency. While the fire will probably go out, the glove is combustible and could actually melt and/or stick to the burned area. This could result in further injury to the patient as well as injuries to the staff member.

Large Fires

Large fires on or near the surgical field will most likely make it necessary for the anesthesiologist to stop the flow of oxygen to the patient. This should reduce the intensity of the fire, and may even cause the fire to go out. As with small fires, immediately remove any burning materials from the patient, drop it to the floor, and make sure the materials are completely extinguished.

Other tips for handling large fires:

- If you disturb the burned materials on the floor, it may re-ignite so have a fire extinguisher ready if you plan on removing this material from the room.
- Don’t forget normal patient care in the excitement.
- Breathing can be affected even in a small fire – it’s possible to restore breathing air to the patient but NOT OXYGEN FLOW.
- Finally, patient burns are very likely with a larger fire and will have to be addressed.
- If the fire can’t be extinguished immediately or the smoke condition within the room worsens, it may become necessary to evacuate the operating room. After leaving the room, do not forget to turn off the oxygen supply to the room, and close the door to the corridor. It may become necessary to place wet towels around the bottom of the door frame to limit smoke spread.

THE SURGICAL RESPONSE PLAN

Your surgical fire response plan should be reviewed and revised on an annual basis. Physical conditions related to the layout of the surgical suite may change (e.g., renovations to an adjoining smoke compartment may impact the secondary means of egress through that area). If the surgical suite is located in a free-standing medical office building individual occupancies can change (e.g., a new dental lab opens on the floor below surgical suite) that poses a higher risk of fire because of the process involved in making teeth. Staffing within the surgical suite might be reduced due to budget constraints, a new group of surgical interns has arrived on your campus, or your facility is now using contract nurse staffing services.

Education and training is the most important aspect of your surgical fire response plan. EVERY MEMBER OF THE SURGICAL TEAM NEEDS TO RECEIVE ANNUAL EDUCATION AND TRAINING – NO EXCEPTIONS. The facility could make this a part of the annual staff competency requirement. This annual education and training process needs to also involve a post-test that measures the effectiveness of the information presented.

The surgical fire response plan should address each element of the fire triangle (fuel, oxygen, and heat). The surgical fire plan should establish at the beginning of each surgery which staff member will be in command if a fire occurs during surgery. The role of each member should be designated and identified on a pre-fire safety check sheet. Any fire safety questions related to the procedure should be discussed prior to commencing any surgical procedure.

Surgeons have primary responsibility for minimizing the hazards associated with heat sources. However, the nursing staff should act as a back-up in this capacity to ensure that:

- Each piece of medical equipment that is going to be used in the surgical suite has a current preventative maintenance sticker. Electrical cords and cables are free of visible defects. If a vendor owned piece of medical equipment is to be trialed in the surgical suite it should be inspected by the biomedical engineering department prior to use.
- Heat sources are used as per the manufacturer’s operating guidelines and methods/techniques. That safety protocols are followed in their entirety.
- Any piece of medical equipment that emits a burning odor or shows other physical signs of malfunctioning is turned off and replaced. The device should be removed from the surgical suite, tagged out of service and biomedical engineering department called for corrective action.

Nursing staff have primary responsibility for minimizing the hazards associated with fuel sources. However, the surgeon should also act as a back-up in this capacity to ensure that:

- Any flammable liquids or glues used for skin preparations are given a significant drying period prior to the activation of a heat source. Pooling of flammable liquids under the patient is anticipated and addressed.
- Draping materials is fire resistant and appropriate for the case.

Anesthesiologists and their staff have primary responsibility for minimizing the hazards associated with oxidizing sources. However, the surgeon should also act as a back-up in this capacity to ensure that oxygen concentrations above 21% are minimized. Stop the flow of oxygen to the surgical site at least one minute prior to the use of a heat source.

Specific fire response roles are described below but your facility’s surgical fire response may differ and each facility should develop their own individual surgical fire response plan. You need to keep in mind that while the following response procedures appear to be a sequential step by step action plan, in reality these actions occur almost simultaneously using the “RACE” acronym as a guide.

The circulating nurse or their designee should initiate the surgical fire response plan by either pulling the nearest fire alarm pull station or calling the switchboard to report the fire. Remember seconds count; call the facility’s fire emergency number. Valuable time can be wasted if you dial “O” for...
the operator and get a busy signal. Have someone alert the nurse’s station inside the surgical suite.

If the patient is on fire the surgeon should assist with extinguishing the fire if possible. He or she should evaluate bleeding, prepare the patient for evacuation and place sterile towels or covers over the surgical site. If there is immediate danger to the patient, he or she should assist with moving the patient to a safe area. If there is no immediate danger to the patient, he or she should conclude the procedure as soon as is safely practical.

The anesthesiologist or their designate should shut off the oxygen or nitrous oxide flow to the patient. He or she should maintain patient breathing during this process. Note: an ambu-bag should be located on each anesthesia machine. Monitor the patient’s anesthetic state and assemble those medications needed to move the patient. This may involve the use of IV agents.

If the room needs to be evacuated, the anesthesiologist or the circulating nurse should disconnect the medical gas lines to the anesthesia machine and should disconnect all power supply cords to the machine. He or she can assist the anesthesiologist in moving the machine out of the room.

The circulating nurse or their designee should disconnect all other power supply cords, lines, leads or anything else that would not permit the patient to be moved from the area. Take any IV solution bags off of IV poles and place them on the bed.

The scrub nurse or their designee should gather the minimum number of medical instruments necessary and prepare them to be moved with the patient. The scrub nurse or their designee should also assist with the evacuation if the patient is to be evacuated out of the suite.

Other surgical staff members not working in the room of fire origin or on a case should report to a nearby location, so they can assist where directed. Any medical equipment needed to transport patients and to maintain life support should be assembled at a staging area where it can be moved rapidly to assist with patient evacuation.

Summary

Each member of the surgical fire response team plays an important role in the surgical fire response plan. When confronted by a fire in the surgical setting each second counts. Quick and effective action needs to be taken. Before surgery begins, review the roles and responsibilities of each team member. Remember the patient lying on the surgical table has put their wellbeing and safety in your hands. We hope that you never have to initiate the Code Red and RACE procedures, but should your fire prevention efforts fail, you can feel confident that your surgical fire training and experience will help you to make the correct decisions and save lives.

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1 The designation Code Red is a standardized term used by healthcare facilities to alert staff members to a potential or actual fire emergency. The New Jersey Hospital Association on or about November 10, 2004 formally adopted the designation Code Red as their official statewide designation for fire.

2 The term RACE is an acronym used throughout the country by healthcare facilities that can be used by staff as a quick reference with regards to emergency fire plan procedures. “R” refers to Rescue (anyone in immediate danger), “A” refers to Alert (by verbally alerting staff, by activating the fire alarm system and by dialing the emergency number), “C” refers to Confine (shut doors and windows to limit smoke travel) and “E” refers to Extinguishment (use an extinguisher on small fires). Note: some facilities may also use “E” to reference Evacuation.