



SCORING FIRE RISK

FOR SURGICAL PATIENTS

Fires in the operating room are a risk that requires prevention, vigilance, and quick action to prevent patient injury. To heighten awareness, the Christiana Care Health System (CCHS) in Newark, Del., added a Surgical Fire Risk Assessment Score to its Patient Identification and Surgical Site documentation form.



“What brought this issue to our attention were two surgical fires. One occurred in the electrophysiology lab and the other in the OR with a patient having a carotid endarterectomy. Both cases involved a high concentration of oxygen, surgery above the xiphoid, and a heat source,” Judith Townsley, RN, MSN, CPAN, director of clinical operations for perioperative services, told *OR Manager*.

The chairman of the anesthesiology department, Kenneth Silverstein, MD, developed the fire risk assessment score after the fires were investigated by ECRI Institute (www.ecri.org), a not-for-profit organization that researches health services and technology, and Russell Phillips & Associates (www.phillipsllc.com), consultants in fire, code compliance and emergency management.

Assigning a fire risk score

The fire risk assessment is performed by the entire surgical team (anesthesia provider, surgeon and nurse) before the incision is made and is documented by the circulating nurse, noted Denise Dennison, RN, BSN, CNOR, staff development specialist.

The assessment requires the surgical team to identify the three key elements that are necessary for a fire to start – the fire triangle:

- Heat
- Fuel
- Oxygen

In the OR, three key risks are:

- Surgical site or incision above the xiphoid
- Open oxygen source (i.e., patient receiving supplemental oxygen via face mask or nasal cannula)
- Available ignition source (i.e., electrosurgery unit, laser or fiberoptic light source)



The surgical team at Christiana Care Health Services in Newark, Del., follows a surgical safety checklist as they perform a pre-incision team briefing. The checklist is mounted on the opposite wall and includes the components of the surgical time out and the fire risk assessment score. Pictured, left to right: scrub nurse Judy Saunders, CST; anesthesia provider Ron Castaldo, CRNA; surgeon Mike Conway, MD; assistant Paul Aquilon (medical student) and circulator Kelly Saunders, RN.

Score 3 = High risk.

All three components of the fire triangle are present.

Score 2 = Low risk with potential to convert to high risk.

This score is given when the procedure is in the thoracic cavity, the ignition source is remote from an open oxygen source, the ignition source is close to a closed oxygen source, or no supplemental oxygen is used.

Score 1 = Low risk.

Only supplemental oxygen is being used.

Each risk score has a fire protocol assigned to maximize patient safety. The documentation form allows the circulating nurse to indicate that the high-risk protocol was initiated. It also allows for documentation that sufficient time was allowed for fumes to dissipate when an alcohol-based prep solution is used.

Surgical site fire risk assessment guide

Alcohol-based prep solution had sufficient time for fumes to dissipate.		Verified by:	
<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA		(Circulating RN signature)	
(Circle appropriate option)		Y	N
*Surgical site or incision above the xiphoid		1	0
*Open oxygen source (patient receiving supplemental oxygen via any variety of face mask or nasal cannula)		1	0
*Available ignition source (ie, electrosurgery unit, laser, fiberoptic light source)		1	0
Total score			
Scoring:			
3 = High risk			
2 = Low risk w/potential to convert to high risk			
1 = Low risk			
Complete this section if risk score increases to 3 during procedure			
<input type="checkbox"/> High Risk Fire Protocol Initiated Signature/title _____ Print name _____ Time _____			

Note: This is a section of a form entitled Identification of Patient, Procedure and Surgical Side/Sites, and Fire Risk Assessment. Source: Christiana Care, Newark, Del.



The surgical site fire risk assessment guide (above) was developed by Kenneth Silverstein, MD, anesthesiologist and chair of the anesthesiology department at Christiana Care Health Services. He developed the guide to help prevent surgical fires at the hospital.

Communication heightens awareness

Since adding the fire risk assessment to the OR documentation, communication among the surgical team members as well as identification of the fire risk triangle have vastly improved, noted Dennison.

“The secret to success of this process is that this formal communication and documentation makes everyone involved aware of the potential risk of a fire,” Townsley said. “Enhancing communication between providers has strengthened our focus on providing clinical excellence for our patients.”

References

Bruley ME. Surgical fires: Perioperative communication is essential to prevent this rare but devastating complication. *Qual Saf Health Care*. December 2004;13:467-471.
Meltzer HS, Granville R, Aryan HE, et al. Gel-based surgical preparation resulting in an operating room fire during a neurosurgical procedure: Case report. *Neurosurg*. April 2005;102:347-349.
Paugh DH, White KW. Fire in the operating room during tracheostomy: A case report. *AANA J*. April 2005;73:97-100.

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Fire Risk Protocols

Score 3 = High risk

The circulating nurse and anesthesia provider take these precautions.

Circulating nurse

- Verifies fire triangle, including verbal confirmation of the oxygen percentage
- Ensures appropriate draping techniques to minimize oxygen concentration under the drapes
- Minimizes ESU setting
- Assesses that enough time has been allowed for fumes of alcohol-based prep solutions to dissipate (minimum of 3 minutes)
- Encourages use of wet sponges
- Ensures a basin of sterile saline and bulb syringe are available for fire suppression

Anesthesia provider

- Ensures that a syringe full of saline is in reach for procedures conducted within the oral cavity
- Documents oxygen concentrations and flows
- Uses the MAC circuit for oxygen administration initially at FiO₂ of .30 using fresh gas flows of at least 12 L/min.

Score 2 = Low risk with potential to convert to high risk

Standard fire safety precautions are followed with the potential to convert to high-risk precautions if necessary.

Standard precautions are to:

- Observe alcohol-based prep drying times (minimum of 3 minutes)
- Protect heat sources (e.g., using the ESU pencil holster)
- Use standard draping procedure

Score 1 = Low risk

Standard fire safety precautions are followed.

