SESSION TITLE: Hot Topic!
New Recommendations for Surgical Fire Prevention and Management

SPEAKER NAME: Mark E. Bruley, BS, EIT

SESSION NUMBER: 9039 & 9199R

DATE/TIME: Tuesday, March 5, 2013, 8:15-9:45am &
Wednesday, March 6, 2013, 8:15-9:45am

CONTACT HOURS: 1.5 CH

OVERVIEW:
Surgical fires, while relatively infrequent (~500 per year), can be disastrous or fatal, and vigilance by the surgical team is the best defense. This session will present the most-up-to-date information on surgical fire prevention and management for all settings where operative and invasive procedures occur, including ambulatory surgery centers, hospital surgical suites, procedural suites, and office settings. Practice advisories, clinical recommendations, and recent publications by the Joint Commission, ASA, AORN, PA Patient Safety Authority, NY Dept of Health, and ECRI Institute will be presented.

OBJECTIVES
1. Identify surgical devices, materials, and fluids that can burn and how they are ignited.
2. Discuss the hazards of oxidizer-enriched atmospheres.
3. Describe the new clinical recommendations on how to minimize the chance of a surgical fire.
4. Discuss the techniques used to extinguish a fire involving a patient.
5. Identify the appropriate OR locations and types of fire extinguishers.
6. Discuss why fire blankets are NOT appropriate for surgical fires or ORs.

BIOGRAPHY:
Mark E. Bruley, BS, is vice president for accident and forensic investigation at ECRI Institute in suburban Philadelphia. He is a Certified Clinical Engineer and biomedical engineer. In 1975, he began at the Institute as a Project Engineer responsible for comparative evaluations of medical devices and for investigating medical device problem reports. In 1982, he became responsible for the institute’s health technology accident and forensic investigation programs that provide consultation services worldwide. Mark has published more than 150 technical papers and book chapters and frequently lectures and consults on surgical fires and medical device accident investigation. Over the past 30 years, many agencies have relied on Mr. Bruley for his expertise on surgical fires, including professional medical societies, the Joint Commission, state departments of health, and the FDA. He is active in many professional societies, standards committees, and patient safety initiatives. Mr. Bruley earned a BS in biomedical engineering technology from Temple University in 1975, holds Fundamentals of Engineering Certification from the Pennsylvania State Board of Professional Engineers, and is a certified clinical engineer.
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**FACULTY DISCLOSURE:**

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Resources for Surgical Fire Prevention and Education*

ECRI Institute provides free surgical fire educational posters having the most current recommendations and large bibliography: www.ecri.org/surgical_fires.

Anesthesia Patient Safety Foundation (APSF) free educational video and Supplemental Information (released April 2010). The 18 minute video is viewable on the Web (and order a free copy of the DVD) at: www.apsf.org/resources_video.php.


Christiana Hospital Surgical Fire Risk Assessment Tools: www.christianacare.org/FireRiskAssessment

FDA’s Preventing Surgical Fires website (new in Oct 2011) aggregates links to and work of ECRI Institute, American society of Anesthesiologists, APSF, Association of periOperative Registered Nurses (AORN), and others: www.fda.gov/Drugs/DrugSafety/SafeUseInitiative/PreventingSurgicalFires.

AORN Fire Safety Tool Kit. Tools to promote fire prevention, plan effective response strategies, and develop department-specific evidence-based policies and protocols: http://www.aorn.org/FireSafety

SurgicalFire.org: An online resource for information on surgical fires from the family of an affected patient. www.surgicalfire.org

(Bibliography on next page)
Bibliography: Surgical Fire Education/Training References:


* For further information contact:

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ONLY YOU CAN PREVENT SURGICAL FIRES
Surgical Team Communication Is Essential

The applicability of these recommendations must be considered individually for each patient.

At the Start of Each Surgery:

- Enriched O₂ and N₂O atmospheres can vastly increase flammability of drapes, plastics, and hair. Be aware of possible O₂ enrichment under the drapes near the surgical site and in the fenestration, especially during head/face/neck/upper-chest surgery.
- Do not apply drapes until all flammable preps have fully dried; soak up spilled or pooled agent.
- Fiberoptic light sources can start fires: Complete all cable connections before activating the source. Place the source in standby mode when disconnecting cables.
- Moisten sponges to make them ignition resistant in oropharyngeal and pulmonary surgery.

During Head, Face, Neck, and Upper-Chest Surgery:

- Use only air for open delivery to the face if the patient can maintain a safe blood O₂ saturation without supplemental O₂.
- If the patient cannot maintain a safe blood O₂ saturation without extra O₂, secure the airway with a laryngeal mask airway or tracheal tube.
  - Exceptions: Where patient verbal responses may be required during surgery (e.g., carotid artery surgery, neurosurgery, pacemaker insertion) and where open O₂ delivery is required to keep the patient safe:
    - At all times, deliver the minimum O₂ concentration necessary for adequate oxygenation.
    - Begin with a 30% delivered O₂ concentration and increase as necessary.
    - For unavoidable open O₂ delivery above 30%, deliver 5 to 10 L/min of air under drapes to wash out excess O₂.
    - Stop supplemental O₂ at least one minute before and during use of electrosurgery, electrocautery, or laser, if possible. Surgical team communication is essential for this recommendation.
    - Use an adherent incise drape, if possible, to help isolate the incision from possible O₂-enriched atmospheres beneath the drapes.
    - Keep fenestration towel edges as far from the incision as possible.
    - Arrange drapes to minimize O₂ buildup underneath.
    - Coat head hair and facial hair (e.g., eyebrows, beard, moustache) within the fenestration with water-soluble surgical lubricating jelly to make it nonflammable.
    - For coagulation, use bipolar electrosurgery, not monopolar electrosurgery.

During Oropharyngeal Surgery (e.g., tonsillectomy):

- Scavenge deep within the oropharynx with a metal suction cannula to catch leaking O₂ and N₂O.
- Moisten gauze or sponges and keep them moist, including those used with uncuffed tracheal tubes.

During Tracheostomy:

- Do not use electrosurgery to cut into the trachea.

During Bronchoscopic Surgery:

- If the patient requires supplemental O₂, keep the delivered O₂ below 30%. Use inhalation/exhalation gas monitoring (e.g., with an O₂ analyzer) to confirm the proper concentration.

When Using Electrosurgery, Electrocautery, or Laser:

- The surgeon should be made aware of open O₂ use. Surgical team discussion about preventive measures before use of electrosurgery, electrocautery, and laser is indicated.
- Activate the unit only when the active tip is in view (especially if looking through a microscope or endoscope).
- Deactivate the unit before the tip leaves the surgical site.
- Place electrosurgical electrodes in a holster or another location off the patient when not in active use (i.e., when not needed within the next few moments).
- Place lasers in standby mode when not in active use.
- Do not place rubber catheter sleeves over electrosurgical electrodes.
EMERGENCY PROCEDURE
EXTINGUISHING A SURGICAL FIRE

Fighting Fires ON the Surgical Patient
Review before every surgical procedure.

In the Event of Fire on the Patient:
1. Stop the flow of all airway gases to the patient.
2. Immediately remove the burning materials and have another team member extinguish them. If needed, use a CO2 fire extinguisher to put out a fire on the patient.
3. Care for the patient:
   — Resume patient ventilation.
   — Control bleeding.
   — Evacuate the patient if the room is dangerous from smoke or fire.
   — Examine the patient for injuries and treat accordingly.
4. If the fire is not quickly controlled:
   — Notify other operating room staff and the fire department that a fire has occurred.
   — Isolate the room to contain smoke and fire.

Save involved materials and devices for later investigation.

Extinguishing Airway Fires
Review before every surgical intubation.

At the First Sign of an Airway or Breathing Circuit Fire, Immediately and Rapidly:
1. Remove the tracheal tube, and have another team member extinguish it. Remove cuff-protective devices and any segments of burned tube that may remain smoldering in the airway.
2. Stop the flow of all gases to the airway.
3. Pour saline or water into the airway.
4. Care for the patient:
   — Reestablish the airway, and resume ventilating with air until you are certain that nothing is left burning in the airway, then switch to 100% oxygen.
   — Examine the airway to determine the extent of damage, and treat the patient accordingly.

Save involved materials and devices for later investigation.

More information on surgical fire prevention, including a downloadable copy of this poster, is available at www.ecri.org/surgical_fires

Developed in collaboration with the Anesthesia Patient Safety Foundation.