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Patient safety

Fire prevention: Avoid oxygen to face

New recommendations for preventing surgical fires seek to change a long-standing practice—open delivery of 100% oxygen to the face during head, face, neck, or upper-chest surgery.

The new advice from the Anesthesia Patient Safety Foundation (APSF) and ECRI Institute includes:

- Use only air for open delivery on the face for spontaneously breathing sedated patients who can maintain safe blood oxygen saturation without supplemental oxygen.
- If the patient does need extra oxygen, secure the airway with a laryngeal mask airway or tracheal tube.

Securing the airway prevents oxygen-enriched gases from accumulating under the surgical drapes. Oxygen-enriched atmospheres contri-bute to the majority of reported surgical fires, the recommendations note.

There are limited exceptions for open oxygen delivery, such as carotid artery surgery, neurosurgery, and some pacemaker implantations where patients need to be able to speak during the procedure.

"These are significant recommendations that are intended to change clinical practice that has been in effect for 30 or more years," says Mark Bruley, ECRI Institute's vice president of accident and forensic investigation, a national expert on surgical fires who is on the committee that developed the recommendations.

For surgery in locations not near an oxygen source, such as the abdomen, groin, legs, and hands, open delivery of oxygen can be used, but the risk of fire is always present, the recommendations note.

The new advice expands on a 2008 practice advisory on OR fires from the American Society of Anesthesiologists.

A fire prevention time-out

Preventing surgical fires is a team effort. A good way to assess the fire risk for each case is to do a fire-prevention time-out right before the procedure, Bruley advises.

"A surgical fire prevention time-out shouldn't take more than a few seconds," he says. "If there are risks, you can consider the appropriate means of prevention."

Christiana Care, a health system based in Newark, Delaware, has included a fire risk assessment with the Universal Protocol for surgical site verification for more than 4 years (sidebar, p 21). The assessment scores fire risk from 1 (low risk) to 3 (high risk), with 1 point each for:

- procedure site or incision above the xiphoid
- open oxygen source (face mask/ nasal cannula)
- ignition source (cautery, laser, fiberoptic light source).

A score of 3 means a high-risk fire protocol is initiated.

"The fire assessment just takes seconds—our staff is very used to doing it," says Judy Townsley, RN, CPAN, director of clinical operations/perioperative services.

"Because the fire-risk assessment is embedded in our process, this is really a confirmation," adds Mary Cay Curran, RN, MSN, CAPA, perioperative manager for clinical standards. OR teams generally know which procedures are high risk and plan ahead. The fire risk assessment is documented as part of the electronic record.

Surgical fire education

New and updated resources for fire safety education reflect the new recommendations. ❖

Anesthesia Patient Safety Foundation

- Fire prevention recommendations
- Free video: Prevention and Management of Surgical Fires (17 minutes). Scheduled for release in late 2009.
- Coming in spring 2010: Online course with continuing medical education credits.

—www.apsf.org

ECRI Institute

- Free posters for download:
  —Only You Can Prevent Surgical Fires.
  —Emergency Procedure: Extinguishing a Surgical Fire. Larger posters available for purchase.
- New clinical guide to surgical fire prevention. *Health Devices.* 2009: 38:314-332. Available by subscription; single copies may be purchased.

—www.ecri.org/surgical_fires

Christiana Care's fire safety tools are available at www.christianacare. org/homepage.cfm

References

American Society of Anesthesiologists. Practice advisory on prevention and management of operating room fires. *Anesthesiology.* 2008;108:786-801. www2.asahq.org/publications/pc-303-4-practice-advisory-for-the-prevention-and-management-of-operating-room-fires.aspx

Joint Commission. Sentinel event alert. Issue 29, June 24, 2003. www.jointcommission.org

Scoring fire risk for surgical patients. *OR Manager.* 2006(1):19-20.

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 O_2 and N_2O atmospheres can vastly increase flammability of drapes, plastics, and hair. Be aware of possible O_2 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 O_2 saturation without supplemental O_2.
- If the patient cannot maintain a safe blood O_2 saturation without extra O_2, 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 O_2 delivery is required to keep the patient safe:

  - At all times, deliver the minimum O_2 concentration necessary for adequate oxygenation.
  - Begin with a 30% delivered O_2 concentration and increase as necessary.
  - For unavoidable open O_2 delivery above 30%, deliver 5 to 10 L/min of air under drapes to wash out excess O_2.
  - Stop supplemental O_2 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 O_2-enriched atmospheres beneath the drapes.
  - Keep fenestration towel edges as far from the incision as possible.
  - Arrange drapes to minimize O_2 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 O_2 and N_2O.
- 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:

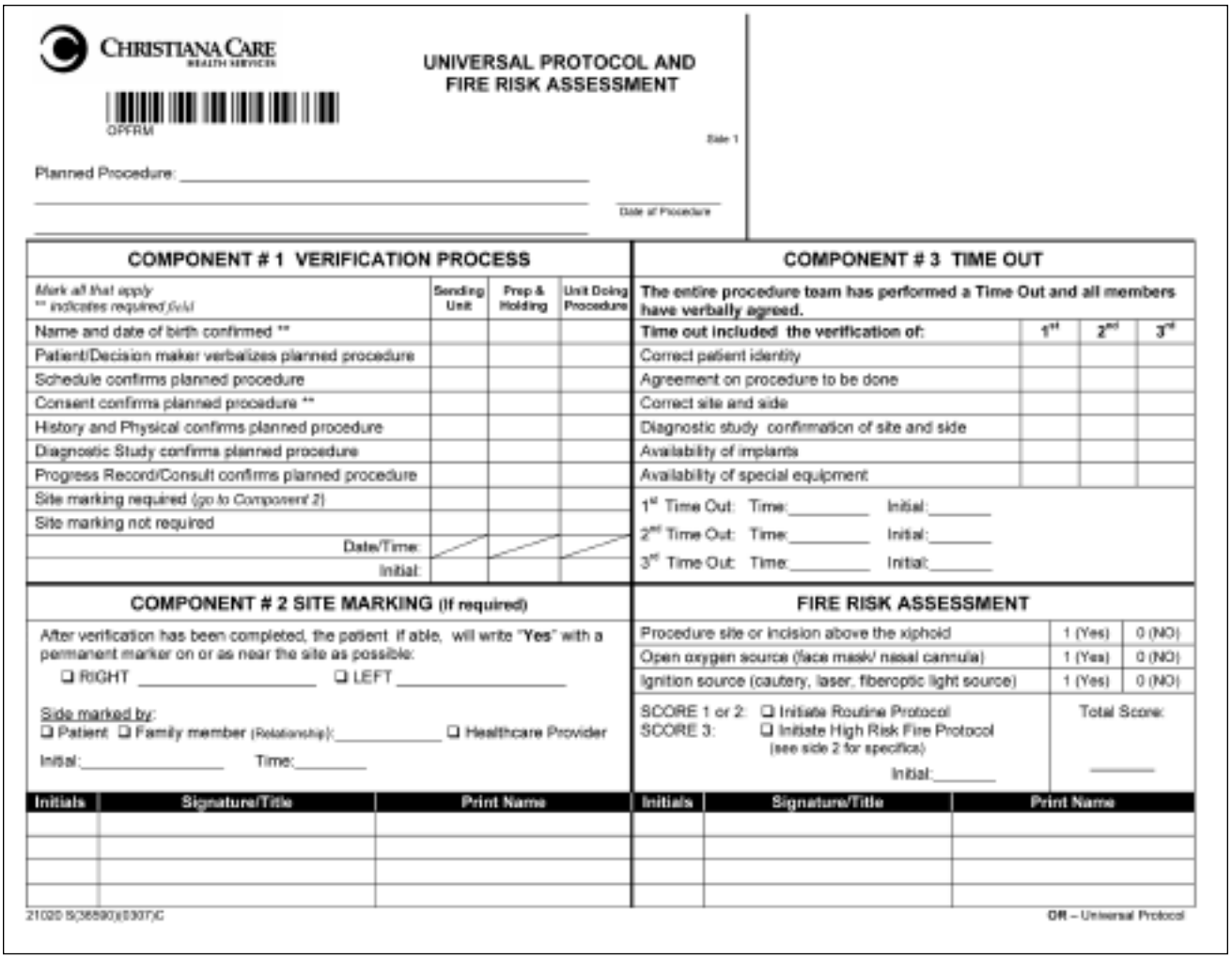
- If the patient requires supplemental O_2, keep the delivered O_2 below 30%. Use inhalation/exhalation gas monitoring (e.g., with an O_2 analyzer) to confirm the proper concentration.

When Using Electrosurgery, Electrocautery, or Laser:

- The surgeon should be made aware of open O_2 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.

ECRI Institute
The Discipline of Science. The Integrity of Independence.

Developed in collaboration with the Anesthesia Patient Safety Foundation. apsf



CHRISTIANA CARE HEALTH SERVICES

OPFRM

UNIVERSAL PROTOCOL AND FIRE RISK ASSESSMENT

Side 1

Planned Procedure: _____

_____ Date of Procedure

_____

COMPONENT # 1 VERIFICATION PROCESS

Mark all that apply *** indicates required field*	Sending Unit	Prep & Holding	Unit Doing Procedure
Name and date of birth confirmed **			
Patient/Decision maker verbalizes planned procedure			
Schedule confirms planned procedure			
Consent confirms planned procedure **			
History and Physical confirms planned procedure			
Diagnostic Study confirms planned procedure			
Progress Record/Consult confirms planned procedure			
Site marking required *(go to Component 2)*			
Site marking not required			
Date/Time:			
Initial:			

COMPONENT # 3 TIME OUT

The entire procedure team has performed a Time Out and all members have verbally agreed.

Time out included the verification of:	1st	2nd	3rd
Correct patient identity			
Agreement on procedure to be done			
Correct site and side			
Diagnostic study confirmation of site and side			
Availability of implants			
Availability of special equipment			

1st Time Out: Time:_____ Initial:_____

2nd Time Out: Time:_____ Initial:_____

3rd Time Out: Time:_____ Initial:_____

COMPONENT # 2 SITE MARKING (If required)

After verification has been completed, the patient if able, will write "**Yes**" with a permanent marker on or as near the site as possible:

❑ RIGHT _____ ❑ LEFT _____

Side marked by:

❑ Patient ❑ Family member (Relationship):_____ ❑ Healthcare Provider

Initial:_____ Time:_____

FIRE RISK ASSESSMENT

Procedure site or incision above the xiphoid	1 (Yes)	0 (NO)
Open oxygen source (face mask/ nasal cannula)	1 (Yes)	0 (NO)
Ignition source (cautery, laser, fiberoptic light source)	1 (Yes)	0 (NO)

SCORE 1 or 2: ❑ Initiate Routine Protocol

SCORE 3: ❑ Initiate High Risk Fire Protocol (see side 2 for specifics)

Initial:_____

Total Score: _____

Initials	Signature/Title	Print Name

Initials	Signature/Title	Print Name

21020 S(36590)(0307)C

OR – Universal Protocol

Fire risk assessment

Routine protocol

1. Fuel

A. When an alcohol-based solution is used, use minimal amount of solution and allow sufficient time for fumes to dissipate before draping. Observe drying time (minimum 3 minutes). Do not drape patient until flammable prep is fully dry.
B. Do not allow pooling of any prep solution (including under the patient).
C. Remove bowls of volatile solution from sterile field as soon as possible after use.
D. Utilize standard draping procedure.

2. Ignition source

A. Protect all heat sources when not in use (cautery pencil holder, laser in stand-by mode, etc).
B. Activate heat source only when active tip is in line of sight.
C. Deactivate heat sources before tip leaves surgical site.
D. Check all electrical equipment before use.

High-risk protocol (includes all of the routine protocol)

A. Use appropriate draping techniques to minimize oxygen concentration (ie, tenting, incise drape).
B. Electrical surgical unit (ESU) setting should be minimized.
C. Encourage use of wet sponges.
D. Basin of sterile saline and bulb syringe available for suppression purposes only.
E. Anesthesia care provider considerations:
   - A syringe full of saline will be available in reach of anesthesia provider for procedures within the oral cavity.
   - Documentation of oxygen concentration/flows. Use of "MAC circuit" oxygen administration.

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