Fire Safety in the Operating Room & Perioperative Areas

Samaritan Health Services

Updated: 2/2019

Welcome

WHAT YOU NEED TO KNOW TO COMPLETE THIS MODULE:

- There are two options to completing this module.

  Option 1: If you opt to take the pretest and pass, you will have met the requirement for this training and receive completion credit.
  - Please note that your transcript will show a Score of "0" even though you have passed the pretest. If you do not pass the pretest you will be routed directly to the learning module for completion.

  Option 2: If you opt to review the learning module your test questions will be within the module.
- There are 55 slides in this module
- To advance to the next slide, select the **NEXT** button.
- To review information on a previous slide, select the **BACK** button.
  - 2 attempts to answer correctly are allowed per quiz slide.
  - Once you have selected your answer(s), select the **SUBMIT** button.
  - If you want to change your answer before submitting, select the **CLEAR** button.
- To pass the training, you must answer 9 questions correctly.

Questions? Contact SHS Professional Development
at 80-5116 or 541-768-5116

Samaritan Health Services

Purpose for Training

Samaritan Health Services has created the following training to meet the OSHA and CMS requirements for education related to Fire Safety in the OR.

Assignment of this training has been requested/approved by SHS Periop Leadership and Professional Development.

Samaritan Health Services

Objectives

Staff are able to perform the following:

- Recall the three parts of the fire triangle
- Identify elements of a fire risk assessment
- Describe actions taken to prevent surgical fires
- Describe actions taken to manage fire in perioperative settings

Samaritan Health Services

The Fire Triangle

- All surgical fires are preventable
- For fire to occur, all three parts of the fire triangle must come together

It must have access to fuel, oxygen, and heat

Examples are:

HEAT/IGNITION: Laser, ESU active electrode, Fiber optic light cord

FUEL: Surgical drapes, Foam positioning devices, paper/gauze materials

OXYGEN: Nitrous Oxide, Methane, Alcohol vapor, oxidizer

Samaritan Health Services

Why Is This Important?

- How we prepare and act can make the difference between life and incapacitation, disfigurement & death

Samaritan Health Services

Patient Sources of Combustion

Typical Patient Sources include:

- Hair
- Tissue in the incision site
- Gas from the bowel
- Lip, palate, mouth and throat soft tissue

Spruce (2016)

Samaritan Health Services

The Role of O_2 as an Oxidizer

- Oxygen enrichment of the atmosphere is the most significant factor contributing to surgical fires
- Percentage of oxygen should be kept to 30% or less
- Room air is preferred

Spruce (2016)

Samaritan Health Services

Fire Risk Assessment

- Fire Risk Assessment is to be done **prior** to all surgical and other invasive procedures
- Assess flammability of all materials
  - Liquids e.g., alcohol-based skin prep solutions
  - Ointments e.g., petroleum or oil-based lubricants
  - Gases e.g., oxygen, methane, anesthetic agents, alcohol vapor
  - Plastics, bone cement
  - Paper or gauze materials
  - Surgical drapes
  - Foam positioning devices
  - Adhesive or plastic tapes
  - Endotracheal tubes

Samaritan Health Services

AORN vs EPIC

- AORN has established guidelines for fire risk assessments.
- Each facility/system has to implement this task in a manner supported by their EMR (SHS uses Epic).
- Epic's fire risk assessment uses slightly different language in their process but the method is consistent with the AORN guidelines.

Samaritan Health Services

Fire Risk Assessment, cont.

AORN Fire Risk Assessment

- RN Circulator may determine fire risk as A, B, C, D, or E, or any combination before the procedure begins.

The letters are assigned to the following questions:

- A. Is an alcohol-based/volatile prep being used preoperatively?
- B. Is the surgical procedure above the xiphoid process?
- C. Is open oxygen or nitrous oxide being administered?
- D. Is a laser, electrosurgical unit, or fiber-optic light cord being used?
- E. Are there other possible contributors? (e.g., moving drill, burr or saw blade)

Samaritan Health Services

"A" Question:

Actions to Prevent Fire for the "A" question

Is **an alcohol-based/volatile prep** being used preoperatively?

- Prevent pooling of skin prep solutions on/around patient
- Remove skin prep agent/allow vapors to dissipate before draping
- Validate prep agent is dry; perform prep "time out"
- Do not use ignition source until dry/vapors gone

Samaritan Health Services

"B" Question:

Actions to Prevent Fire for the "B" question

Is the surgical procedure being done **above the xiphoid process**?

- Cover/coat patient's head and facial hair near the surgical site with water-soluble surgical lubricant (to ↓ flammability)
- Use an adhesive incise drape

Samaritan Health Services

"C" Question:

Actions to Prevent Fire for the "C" question

Is **open oxygen or nitrous oxide** being administered?

- Allow for venting of oxygen delivered by mask or nasal cannula (NC)
- Deliver 5-10 Liter/min air under surgical drapes if O_2 by mask/NC
- Titrate O_2 at lowest percentage needed for pt
- Stop O_2 for one minute before electrosurgery or electrocautery, or laser for head, neck, or upper chest procedures

Samaritan Health Services

Actions to Prevent Fire for the "C" question, Cont.

- Use cuffed endotracheal (ET) tubes if possible
- Use tinted saline e.g. methylene blue, to inflate ET tubes
- Prevent accumulation of smoke in small spaces (e.g., back of throat)
- Check anesthesia circuits for leaks
- Pack wet sponges around back of throat to help slow O_2 leaks
- Deep suction oropharynx (with metal suction cannula) before using ignition source if O_2 used
- Turn off O_2 at end of procedure

Samaritan Health Services

Actions to Prevent Fire, cont.

- If a patient requires supplementary oxygen greater than 30%, a laryngeal mask airway or endotracheal tube should be used, unless contraindicated by the procedure e.g., patient must respond verbally

Samaritan Health Services

"D" Question:

Actions to Prevent Fire for the "D" question

Fire Source-ESU safety

<u>For electrosurgical unit:</u>

- Place return electrode on large muscle close to surgical site
- Keep active electrode cords from coiling
- Store ESU pencil in holster
- Keep surgical drapes or linens away
- Moisten drapes, towels, and sponges that are in contact with ESU active electrode

Samaritan Health Services

Actions to Prevent Fire for the "D" question, cont.

- Do not use ignition source to enter bowel when distended with gas
- Keep ESU active electrode (AE) away from O_2/nitrous oxide
- Keep AE tip clean
- Use electrodes intended for equipment
- Only the person controlling the AE activates the ESU
- Use approved protective covers as insulators for AE tip
- Activate AE only when near target tissue/away from metal
- Inspect for impaired insulation/intactness
- Use lowest setting, & cut or blend settings (instead of coagulation) when possible

Samaritan Health Services

"D" Question:

Actions to Prevent Fire for the "D" question

Fire Source-Laser Safety

For laser use:

- Use a laser-resistant ET tube during upper airway procedures
- Place wet sponges around the surgical site and the tube cuff if the laser is used close to ET tube
- Only the person controlling the laser is to activate it
- Verify water and appropriate fire extinguisher are available

Samaritan Health Services

Appropriate Fire Extinguishers

- A, B, C rated Extinguishers may be used in rooms outside the OR; intended use is on things, not people
- Water mist or CO_2 extinguishers are provided in the OR suite
  - If the patient is the fuel source, CO_2 and water mist extinguishers reduce contamination and tissue damage
- Whenever possible, remove burning material from person & extinguish
- Remember acronym "PASS" when using an extinguisher:

P = Pull the pin
A = Aim at base of fire
S = Squeeze the trigger
S = Sweep

Samaritan Health Services

"D" Question:

Actions to Prevent Fire for the "D" question

Fire Source-Fiber-optic light cord safety

<u>For fiber-optic light cord use:</u>

- Place light source on standby or turn off when cable is not in active use (e.g., within 5-10 seconds)
- Inspect light cables before use/remove from use if light bundles are visibly broken
- Secure the end, that is inserted into the body of the telescope or cord, is on a moist towel/away from drapes and flammable materials

Samaritan Health Services

"E" Question:

Actions to Prevent Fire for the "E" question

Are there **other possible contributors** for fire?

- Pediatrics: select defibrillator pads that are the correct size for the patient
- Pads need skin contact (e.g., remove hair)
- Drip saline on a moving drill, burr, or saw blade
- Place equipment on mayo stand or back table when not in use

Samaritan Health Services

What if there are small flames or a small area is on fire?

- Do not panic
- Communicate presence of fire to team
- Pour saline or water slowly on the fire
- Place your arm between the patient's head and fire & lay a wet towel/sponge over the flame, sweeping towards feet
- Lift the material used to smother the flame to vent heat

Samaritan Health Services

Small Area/Small Fire (Cont.)

- Remove burning material from the patient
- Assess the surgical field for secondary fire/under drapes or towels
- Assess patient for injuries/report to a physician
- Activate alarms if necessary
- Notify manager/supervisor and complete unusual occurrence report

Samaritan Health Services

What if there are large flames or a large area is on fire?

- Do not panic
- Communicate presence of fire to team
- Communicate with anesthesia provider to stop flow of breathing gases to patient
- If drapes involved, remove drape to ground, rolling it on itself to smother fire-avoid moving drape where it may block exit route
- Assess the surgical field for secondary fire/under drapes or towels

Samaritan Health Services

Large Area/Large Fire (Cont.)

- Assess patient for injuries/report to a physician
- Verify flames are extinguished and use a fire extinguisher if necessary (use PASS)
- Activate alarms if necessary
- Notify manager/supervisor and complete unusual occurrence report

Samaritan Health Services

Handling a Fire IN a Patient

- Do not panic
- Communicate presence of fire to team
- Consult with anesthesia provider to determine actions needed to extinguish an airway fire
- Assist anesthesia provider with:
  - Disconnecting and removing the breathing circuit
  - Turning off the flow of oxygen
  - Removing the ET tube and segments of burned tube remaining in airway
  - Pouring saline or water into the airway if instructed
  - Re-establish and examine the airway

Samaritan Health Services

Handling a Fire IN a Patient (Cont.)

- Assess the surgical field for secondary fire/under drapes or towels
- Assess patient for injuries/report to a physician
- Verify flames are extinguished and use a fire extinguisher if necessary (use PASS)
- Activate alarms if necessary
- Notify manager/supervisor and complete unusual occurrence report

Samaritan Health Services

Handling a Fire on a Piece of Equipment

- Do not panic
- Communicate presence of fire to team
- Disconnect equipment from its electrical source
- Shut off the electricity to the equipment at the electrical panel if unable to remove plug from outlet
- Shut off gases to equipment as soon as possible

Samaritan Health Services

Handling a fire on a Piece of Equipment (Cont.)

- Assess the size of the fire
  - Can equipment be safely removed?
  - Evacuate the room
- Extinguish the fire using a fire extinguisher if appropriate
- Activate alarms if necessary
- Notify manager/supervisor and complete unusual occurrence report

Samaritan Health Services

Handling a Fire in Another Area of Building

- Do not panic
- Person in charge notifies all operating/procedure rooms of presence of fire in another area of the building
- No elective cases are to be started
- Follow fire plan—e.g., respond to needs if fire is in an adjacent department, or shelter in place if protected by smoke compartment

Samaritan Health Services

Handling a Fire in Another Area of Building (Cont.)

- Prepare for evacuation to nearest smoke compartment away from the fire
- Use RACE/R:
  - Rescue
  - Alarm
  - Contain the fire-closing doors/shutting off gases and electricity
  - Evacuate
  - Relocate-removing patients beyond first set of smoke barriers

Samaritan Health Services

Roles/Resources

- Refer to your departmental fire plan, which determines team member's responsibilities and evacuation plan
- Click HERE to review the policy/procedure in Lippincott "Fire Prevention and management, OR"

Samaritan Health Services

References

Butterworth IV J.F., Mackey D.C., Wasnick J.D. (2013). Chapter 2. The Operating Room Environment. In J.F. Butterworth IV, D.C. Mackey, J.D. Wasnick (Eds), *Morgan & Mikhail's Clinical Anesthesiology*, 5e. Retrieved August, 2013 from http://www.accessmedicine.com/content.aspx?aID=57230046

Fire prevention and management, OR (2018). Lippincott Procedures and Skills, Wolters Kluwer/Lippincott Williams & Wilkins Health.

Fire Safety. (2018). Retrieved February 19, 2019, from https://www.aorn.org/guidelines/clinical-resources/tool-kits/non-member-tool-kits/fire-safety-tool-kit-nonmembers

Hughes, A. B. (2015). *Implementing AORN recommended practices for safe a environment of care. AORN, 98(2)*, 153-166. Retrieved from http://www.sciencedirect.com/science/article/pii/S0001209213006819

RP Summary: Recommended practices for a safe environment of care (2016). *AORN*, *98*(2), 167-171. Retrieved from http://dx.doi.org/10.1016/j.aorn.2013.04.013

Spruce, L. (2016). Back to Basics: Preventing Surgical Fires. AORN, 104(3). 218-222. Retrieved from http://dx.doi.org/10.1016/j.aorn.2016.07.002

Samaritan Health Services