Fire Prevention in the Perioperative Suite

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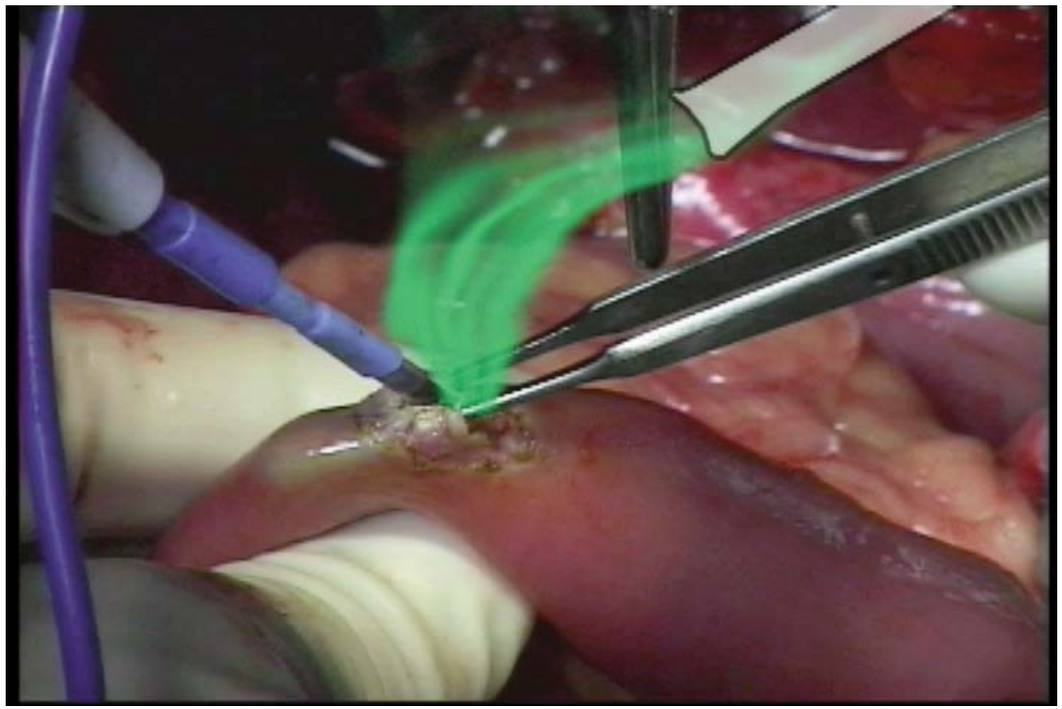
FIRE PREVENTION IN THE PERIOPERATIVE SUITE

AORN INDEPENDENT STUDY ACTIVITY
VIDEO WITH STUDY GUIDE



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The purpose/goal of this activity is to increase the perioperative nurse's awareness of how to prevent fires in the perioperative setting and how to respond if a fire should occur.

INTENDED AUDIENCE

This independent study activity is intended for perioperative nurses and other health care professionals who need to know how to prevent fires in the perioperative setting, as well as how to respond to a fire, should one occur.

OBJECTIVES

After completing the activity, the individual should be able to:

1. Discuss the three components of the fire triangle.
2. Describe appropriate steps to take in the event of an OR fire.
3. Identify measures that can be implemented in order to prevent OR fires.
4. Discuss the relevance of recommended practices when developing a fire prevention program for the OR suite.

GUIDE FOR STUDY

This study guide is intended to be used in conjunction with the accompanying video. We suggest that you take the following steps to complete this activity:

1. Read the overview and objectives for this educational activity, and compare them with your own learning objectives.
2. View the video.
3. Read the study guide, paying particular attention to those areas that reflect the objectives.
4. Consult the Glossary or a dictionary for definitions of unfamiliar words.
5. Consult the list of suggested readings for additional information.

OVERVIEW

Fire safety in the perioperative setting is an often overlooked issue due to modern technology and advances in the use of nonflammable anesthetic agents, as well as ignition-resistant materials. However, anesthetics are oxidizers and contribute to the fire danger in the perioperative setting. The perioperative suite is considered a high fire hazard area because almost anything used in this setting can burn. Many people who work in the perioperative setting may not be aware of the dangers that exist in this environment.

An environment that is composed of flammable materials, frequently used electrical equipment or high-energy sources, and high oxygen content needs to be carefully explored, potential fire hazards identified, and methods developed to eliminate those hazards. The ability to act in emergency situations needs to be outlined and the plan implemented before an emergency occurs. All staff members must be prepared to provide safe environments for patients as well as themselves.

INTRODUCTION

Of more than 27 million surgeries performed in the United States each year, the probability of a fire occurring is infinitesimal. Yet, the threat still exists. When a fire occurs in the perioperative setting, the results can be devastating, not only for the patient but for the hospital and the OR team.

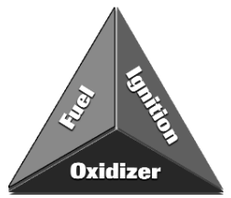
The perioperative setting is a tinderbox, full of all types of materials that encourage combustion. Add to that high-energy devices like electrosurgery units (ESUs), hot-wire cautery devices, fiberoptic light sources, and lasers. Put them in an oxygen-enriched environment and all the ingredients to create fire are present. The key to prevention is keeping them apart.

According to the National Commission of Fire Prevention and Control, there are five ways a fire can kill: asphyxiation, inhalation of superheated air or gases, inhalation of smoke, toxic fumes, and death by flames. Ninety to ninety-five percent of fire deaths are related to smoke and other toxic combustion byproducts, such as carbon monoxide and cyanide gas. This is especially important because of the amount of synthetic material found in the OR. The smoke created by plastics and other synthetics is considerably more toxic than that of natural fibers. Dense smoke can make it impossible to see, adding to the confusion and panic. There is little time to react, prepare the patient, and move to safety.

This study guide provides valuable information about the threat of fires in the perioperative setting. It explains the elements of a fire, conditions necessary for a fire to happen, and the various classifications of fire. It also includes fire prevention and reviews the steps to take when a fire occurs.

THE FIRE TRIANGLE

Fire is started by a reaction to the presence of three elements: fuel, ignition, and an oxidizing agent such as air, oxygen, or nitrous oxide. This fire triangle may be the most important concept you learn from this activity. When the three come together, combustion occurs. However, if one of the elements is removed, the fire hazard is greatly reduced. Understanding and remembering this fire triangle may save lives.



The difficulty in managing the fire triangle arises from the fact that each element is controlled by a different member of the surgical team. The surgeon is responsible for the ignition, the anesthesiologist for the oxidizers, and the entire perioperative team, including the registered nurse, is generally responsible for many of the fuels. Educating these diverse groups can be a challenge.

The perioperative nurse must be aware that all of these elements (fuel, ignition, and oxygen) are present in the perioperative setting during every procedure and must take every precaution to ensure that they are kept apart.

Fuel

Identifying fire hazards in a familiar environment can be difficult. Everything will burn when the conditions are right. Items made of natural fibers such as wood or cotton burn, whereas synthetics made of polymers and polyesters burn and melt. Hot, melting synthetics retain more heat and are more difficult to handle.

Some sources of fuel in the perioperative setting include the following:

- the patient's hair
- the patient's gastrointestinal tract gases
- gowns
- shoe covers
- sheets
- breathing circuits
- tissue fixatives
- gauze dressings
- sponges
- masks
- gloves
- adhesive tape
- drapes
- suction tubing

If alcohol is used for prepping, be aware that it is extremely flammable. Avoid forming pools of liquid on, under, or around the body. Any alcohol pools that do form should be blotted. Pools may occur in the umbilicus and/or cricoid notch. Replace linens that become soaked with alcohol solutions. Vapors from an alcohol prep may be ignited by an electrosurgical unit, laser, or other heat source. Combustion of these vapors can result in a fireball with enough force to knock down the surgical team. Always allow adequate time for the completed prep to be visibly dry before draping, because vapors accumulate under drapes and provide a potentially dangerous situation. Avoid open alcohol containers on the surgical field, on equipment, or anywhere in the perioperative setting.

Ignition

Most fires in the perioperative setting start because a heat source was not used safely or properly. Equipment such as electrosurgical units, lasers, and fiberoptic cables are common sources of problems.

To help prevent electrical fires, it is important that all equipment be checked by a biomedical engineer before being put into service and that a scheduled maintenance program be in effect for all electrical equipment. Any equipment that malfunctions should be removed immediately and repaired or replaced.

Electrosurgical Units (ESUs)

The Emergency Care Research Institute (ECRI) has stated that most OR fires can be traced to the use of electrosurgery. It is important to remember that typically, there is arcing between the electrosurgical unit and tissue during surgery. This arcing is more likely to be the cause of fire than the electrode tip becoming hot. Also, burning embers or sparks created during the use of electrosurgery can fall on flammable material and ignite a fire. Another way the electrosurgical unit can contribute to a fire is if the electrosurgical pencil is not holstered when not in use. It can be activated inadvertently by pressure on the pencil or activation of the footswitch.

AORN's "Recommended Practice IV for Electrosurgery" states that "the ESU should be used in a manner that minimizes the potential for injuries."[1] "Recommended Practice VI for Electrosurgery" further states that "the ESU active electrode should not be used in the presence of flammable agents"[1] (eg, alcohol, tinctures defatting agents). Ignition of these flammable agents has resulted in patient and personnel injuries.

Other AORN Recommended Practices include:

- inspecting the active electrode for damage before use,
- placing the active electrode in a clean, dry, well-insulated safety holster when not in use, and
- ensuring that the tip of the active electrode is secure and easy to clean.[1]

Electrosurgical units should have built-in safety features such as lights and activation sound, as well as audible alarms. All cords should be inspected for wire breakage or fraying and be long enough to prevent undue stress on the cord.

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Lasers

Accidental fires are among the most significant hazards of laser use. The intense heat of the laser beam can ignite or vaporize almost anything. Deadly fires may begin by ignition of drapes, sponges, endotracheal tubes, clothing, or hair; or the combustion of ointments, prep solutions, anesthetic gases, or flatus.

Fires associated with lasers frequently involve surgical drapes and endotracheal tubes. All drapes will ignite and burn in oxygen and even in room air; no drape offers protection against a laser-ignited fire. Polypropylene will not sustain combustion, but it will melt away from the heat source. Whenever a laser is used, it is imperative to follow laser safety precautions. The American National Standards Institute (ANSI) leaves the choice of drape material to laser safety officers and physicians. Wet towels and sponges surrounding the laser interaction site decrease the potential for fire. Water or normal saline should always be available during laser procedures.

It is important to remain alert to the fact that many fires have started away from the surgical site and that the continuous safe use of the laser is critical. For this reason, it is extremely important that the laser be placed in "standby" position whenever it is not in use during surgery.

Only the operating surgeon should operate the laser foot pedal. Laser surgery must not be performed with one surgeon activating the foot pedal while another guides the fiber or handpiece. Accidental firing of a laser has occurred because of confusion created by multiple foot switches positioned below the procedure bed.

ANSI specifies that a laser safety officer is to be responsible for the evaluation of laser hazards. This safety officer should have the authority to monitor and control hazards. ANSI states, "There should be a designated laser safety officer for all circumstances of operation, maintenance, and service of a laser."[2]

Patient safety is a particular concern when lasers are used near the trachea. Endotracheal tubes can ignite and support combustion if they are not laser-safe. To avoid this problem, always take the following precautions during laser surgery in the aerodigestive tract:

- Use only endotracheal tubes known and demonstrated to be laser-resistant to the particular laser wavelength that is to be used. Do not use standard endotracheal tubes for laser procedures.
- Inflate endotracheal tube cuffs with sterile saline. If a small amount of methylene blue dye is added to the saline, and the cuff is damaged subsequently by the laser beam, the saline will dissipate the heat, and leaking of the methylene blue dye will immediately alert the physician.
- Externally protect endotracheal tube cuffs with wet cottonoids or products specifically designed for this purpose. Remember to count cottonoids at the end of the case.
- Use the lowest possible concentration of oxygen in laryngotracheal procedures.

At the first sign of an endotracheal tube fire, stop ventilating the patient's lungs and stop the flow of all anesthetic gases, including oxygen. Extinguish the flames with saline, and quickly remove the endotracheal tube. Reintubate immediately to prevent laryngospasm. Conduct a complete bronchoscopic examination of the mouth, oral cavity, and bronchial tree. If airway burns are extensive, mechanical ventilation of the lungs and the administration of antibiotics and steroids may be necessary.

Fiberoptic Cables

Another potential problem area that can occur is with the use of fiberoptic illumination cables. The fiberoptic illumination cable transmits both visible light and infrared radiation. Fiberoptic light is thought to be "cold." When the illumination cable is connected to the scope, the heat is absorbed by the optical system of the scope. However, if the cable is not attached to the scope and the lamps of the light source are turned on, the cable can transmit

enough heat to char or ignite surgical drapes, sponges, or towels. To minimize the risk of fire caused by fiberoptic cables, complete all cable connections before activating the light source.

Oxygen

The perioperative setting is an oxygen-enriched environment. Oxygen-enriched atmospheres exist routinely wherever inhalation anesthesia is used. In many instances of regional or local anesthesia, the patient receives supplemental oxygen to counteract the respiratory depressant effects of sedation. The surgical team also needs to be aware of the risk of fire in the presence of nitrous oxide, even though it is a nonflammable gas. Nitrous oxide, like oxygen, will support combustion, although neither gas itself will burn. Both are oxidizers, and when the two (oxygen and nitrous oxide) are combined, they are essentially equivalent to 100% oxygen in the ability to support a fire.

The use of sevoflurane presents another fire hazard. When sevoflurane degenerates by the use of dessicated absorbents (soda-lime), temperatures greater than 200° F (99.33° C) may result. This high temperature is enough to cause a fire in the anesthetic circuit. Oxygen left running at the end of the procedure speeds up the drying out of the absorbent. Facilities should develop a system for regularly scheduled replacement of the absorbent.

Modifying draping techniques can reduce the building up of gases beneath the surgical drapes. Placing expiratory hoses appropriately also will reduce the buildup of gases beneath the surgical drapes. Pneumatic tourniquets should never be inflated with oxygen or nitrous oxide. Oxygen and nitrous oxide tanks should not be draped during a procedure due to the possibility of the buildup of those gases beneath the drape.

CLASSIFICATION OF FIRES AND USE OF FIRE EXTINGUISHERS

Fires generally are classified according to the type of material that is burning and are classified as Class A, Class B, or Class C fires.

Class A fires are the most common. Class A fires occur with materials such as paper, cloth, wood, rubber, and some plastics. These fires can be extinguished with water.

Class B fires occur in the vapor that is present over flammable liquids, petroleum products, many oils, alcohol, and other combustible liquids or solvents. They can be extinguished with foam or carbon dioxide.

Class C fires involve energized electrical equipment. It is important that the extinguishing agent be non-conductive due to the risk of electrocution. These fires can be extinguished with carbon dioxide. Never use water on an electrical fire. It is also important to remember that with Class C fires, once the energized source is removed, these fires can become a Class A or Class B fire.

Most fire extinguishers are marked with an A, B, or C to indicate what type of fire they are to be used for. Some extinguishers include all three letters to indicate they are suitable for extinguishing any classification of fire. You must be knowledgeable of the type of extinguishers used in your facility.

If a fire extinguisher is required, a Halon (bromotrifluoromethane) unit is preferred because of its low toxicity and absence of residue. Unfortunately, Halon is extremely difficult to purchase due to worldwide bans of this ozone-depleting chemical. Carbon dioxide extinguishers are the next best option for the perioperative setting.

Note that the contents of all such liquefied-gas fire extinguishers are extremely cold when discharged and may cause minor frostbite if discharged directly on the patient at very close range. It is important to emphasize that fire extinguishers are designed to minimize the spread of a fire (or to extinguish small fires) and to hold it in check until other actions can be taken; they cannot be used to extinguish a major fire. However, the use of fire extinguishers on a small incipient fire can buy additional time so that the patient can be evacuated safely. Dry chemical extinguishers should NOT be used in the perioperative setting.

Portable fire extinguishers are not designed to fight a large or spreading fire. Even when used for small fires, they are useful only under the right conditions. These conditions include the following.

- An extinguisher must be large enough for the fire that is present. It must be fully charged and in working order.
- The operator must be strong enough to lift and operate the fire extinguisher.
- The operator must know how to use the extinguisher quickly without taking the time to read the instructions during an emergency.

Using a fire extinguisher directly on a patient is acceptable in extreme cases of large fires but should be avoided if possible because tissue damage may occur. In a surgical fire, use of an extinguisher is not the first, best course of action–physically removing the burning material is best.

How to Use a Fire Extinguisher

If the situation requires you to use a fire extinguisher, remember the acronym PASS (Pull, Aim, Squeeze, Sweep). First, **pull** the safety pin at the top of the extinguisher. Second, **aim** the nozzle or hose at the base of the flames, staying 6 to 8 feet away from the flames. Third, **squeeze** or press the handle, and fourth, **sweep** from side to side at the base of the fire until the fire is extinguished.

IF A SURGICAL FIRE OCCURS

These recommendations are intended to complement general fire prevention and fire fighting policies and procedures that already may exist at your facility.

If a surgical fire or signs of a fire are noticed, health care personnel should take the following steps (the sequence may vary depending on type, location, and patient involvement in the fire):

- Remove any burning materials from the patient to protect against direct burns and inhalation of hot or toxic gases. If fire is present in and under the drapes, it is especially important to rip the burning materials away from the patient and extinguish them. If the fire is under the drape (eg, if the OR bed pads or linens are burning under a laparotomy drape), pull the drape from the patient. Water poured on water-resistant drapes will not reach the underlying burning items.
- If, after removing burning materials, the fire continues to burn directly on the patient, extinguish the flames by smothering them with any materials within reach. (Sterility is not of primary importance in this instance.) Remove any smoldering, charred materials from the patient immediately after smothering the flames.
- If the fire involves an endotracheal tube, shut off oxygen and gas sources, and then disconnect the endotracheal tube and remove it.
- Shut off any oxygen and nitrous oxide valves. Disconnect the patient from the anesthesia machine; if spontaneous breathing is absent or insufficient, ventilate the patient by using a manual resuscitator without supplemental oxygen. If supplemental oxygen is absolutely necessary, move the patient to the nearest area where oxygen can be used safely.
- If electrical equipment is not involved and the fire involves ordinary combustibles such as rubber, plastics, linen, or paper, a basin of water may be used.
- Fires involving electrical sources should never be extinguished with water because of the added danger of electrocution. In such cases, the equipment should be disconnected from its power source, and an appropriate extinguisher should be used.
- Inform personnel of the situation.
- Activate the nearest fire alarm, if deemed necessary.

- You and your OR team members may have to make the decision to take evacuation steps if the fire or smoke causes immediate danger. Get to a safe place as rapidly as possible. Initially, this will be a horizontal move away from the fire but on the same floor as the OR.
- Close all doors to confine smoke and flames.
- Limit/control traffic and telephone usage in the area.
- Turn on all lights.
- When ordered by the supervisor or a firefighter, take appropriate action to evacuate patients and personnel from the immediate area, following predetermined evacuation plans. This will most likely occur if a fire is in your perioperative suites and endangering your immediate area.
- Be prepared to direct firefighters to the location of the fire.
- Once the fire has been extinguished, save all burned material and equipment so that the cause of the fire can be investigated.
- Fires should be reported to the local fire authorities, consistent with hospital policy.

Individual staff members should have preassigned responsibilities in case of a fire. Personnel working in associated areas also should be instructed and assigned specific duties in a fire emergency. Anyone involved in the surgical procedure should be knowledgeable and ready to lead team activities, including ensuring that the evacuation process, if needed, takes place logically and reasonably.

If a fire alarm originates outside the perioperative suite, even if there is reason to believe that it is only a drill, it is important to remain calm, close all doors, limit traffic and telephone calls, turn on the lights, and stand by to evacuate or help where directed.

When to Fight A Fire

Knowing when to fight a fire and when not to fight a fire is one of the most important concepts for you to apply. This knowledge is important for your own safety as well as that of the patient. Fight a fire if it is small and confined to the immediate area where the fire started. Do not put yourself in danger. Be sure you can fight the fire with your back to a safe escape route. Fight a fire only if you are trained to use the extinguisher and are certain that you are able to operate it effectively. Know that the extinguisher you are using is rated for the type of fire you are fighting and that it is in good working condition.

Protect yourself at all times, because this may be the only way to save your own life. Stay low and avoid breathing the heated smoke and fumes or the extinguishing agent, because these will cause personal injury. If the fire starts to spread or threatens your escape route, leave the area immediately.

PREVENTION OF SURGICAL FIRES

The most obvious way of fighting fires is to prevent them from starting. Prevention is the key.

Lack of knowledge of hospital policy and procedure is the number one problem encountered with fire safety. It is imperative that fire safety be an integral part of hospital orientation. Even more important is that fire safety be a part of the department orientation for all employees working in the perioperative setting. As with any learning process, if we know ahead of time what to do in a situation, our response is better controlled and implemented.

Sometimes it is necessary to change established policies or create new hospital policies and procedures to provide fire prevention and control measures that will maximize patient and personnel safety.

This also may be necessary to minimize liability to the facility. It is important that these policies and procedures be established and that facilities be able to demonstrate that all reasonable precautions have been taken to manage the risk of fire.

One example of demonstrating fire safety precautions may be a fire safety checklist.

FIRE SAFETY CHECKLIST (sample)

	YES	NO	LOCATION (if yes)
Outlet covers:			
Cracked	❑	❑	_____
Taped	❑	❑	_____
Fire extinguishers:			
Date last checked			_____
Blocked by equipment	❑	❑	_____
Coffee Pots:			
Empty	❑	❑	_____
Left on	❑	❑	_____
Microwaves	❑	❑	_____
Ungrounded plugs	❑	❑	_____
Extension cords	❑	❑	_____
Flammable solutions	❑	❑	_____
Doors:			
Propped open	❑	❑	_____
Blocked	❑	❑	_____
Hallways:			
Crowded, unable to get bed through	❑	❑	_____
Lasers:			
Key left in laser	❑	❑	_____
Warmers:			
Temperatures +100°F	❑	❑	_____
Plastic in warmers	❑	❑	_____
Blankets overstocked	❑	❑	_____

Date of inspection: _____

Name(s): _____

Action taken: _____

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Specific fire-prevention measures for the perioperative setting include the following.

- Limit use of alcohol-based or other flammable topical anesthetic agents; instead, use injectable local anesthetic agents.
- Use only noncombustible anesthetic gases and localized exhaust techniques.
- Do not use flammable or combustible drying agents, ointments, plastic resins, or plastics near the operative site during use of electrosurgery, electrocautery, or laser.
- Do not allow prep solutions to pool under the patient.
- Use dampened sponges or towels within the operative field if open oxygen is present. Ignition of drapes can be particularly hazardous to anesthetized patients, who are unable to warn OR staff of the sensation of heat. No standard surgical drapes will resist direct laser beam impact. Anecdotal reports indicate that misfiring of a laser when not in use or undetected breakage of optical fibers has led to drape fires and serious patient injuries.
- To avoid exploding methane gas when procedures are performed in the vaginal vault, cervix, uterus, or anus, insert saline-moistened, counted sponges or gauze rectal packs with water-based (not petroleum-based) lubricants into the rectum. Provide adequate exhaust ventilation in colonic procedures.
- Apply water-based gels to patient's beard, eyebrows, mustache, head, and pubic hair if an ESU is used near these areas. Also, remove waxes and hair-stiffeners from mustache and beard.
- To avoid igniting the fumes given off during the methylmethacrylate chemical bonding process, use effective scavenging systems, and prevent the use of ignition sources or any action that may cause sparks until the chemical reaction has stopped.
- Dispose of aerosol cans separately from other trash. Use nonflammable skin-degreasing substances if possible.

Fire Drills

It is not enough to read fire safety policies or to hear about them. If personnel do not practice using fire-safety equipment, they will not know how to use it in an emergency.

Regular fire drills are an essential part of fire safety education. Fire drills help ensure that the actions and reactions that take place in the event of a fire are done properly and in the right sequence.

Practice drills might include

- removing drapes from the patient,
- deactivating an ignition source,
- smothering fires,
- disconnecting oxygen tubing from patients and utilizing the Ambu bag,
- reporting fires,
- using fire extinguishers, and
- evacuating patients from the OR.

There should be a policy for monitoring and recording attendance of personnel at fire drills, including institutional fire drills and fire drills in the OR.

SUMMARY

In far less than a minute, a small fire can progress to a life-threatening large fire in the perioperative suite. Protecting the patient is the primary responsibility of the staff. Not only do fires in the perioperative setting present risks of serious or fatal injury to patients, but they also present the risks of serious or fatal injury to the surgical team. Learn what to do in an emergency, learn how to do it, and be prepared to use this knowledge whenever there is a fire alarm.

GLOSSARY

Combustion–A chemical process, such as oxidation, accompanied by the rapid evolution of heat and light.

Fire–A rapid, self-sustaining oxidation, accompanied by varying intensities of heat and light.

Flammable–Capable, when ignited, of maintaining combustion under the specified environmental conditions. Many substances that are nonflammable in air become flammable if the oxygen content of the gaseous medium is increased.

Flammability–The tendency of a material to burn with a flame.

Fuel–Any material that will maintain combustion under specified environmental conditions.

Halon–Bromotrifluoromethane. A commercial product used in fire extinguishers that is safe for OR use; however, it is no longer easily available.

Ignition–Setting or catching on fire.

Methylmethacrylate–A flammable liquid mixed in the OR to form a bone cement for artificial joint replacement.

Nitrous Oxide–An inorganic compound that exists as a gas at atmospheric pressure and temperature, possesses a sweetish smell, and is capable of inducing the first and second stages of anesthesia when inhaled. The oxygen in nitrous oxide is released under conditions of combustion, creating an oxygen-enriched atmosphere.

Oxygen-Enriched Atmosphere–An atmosphere in which the concentration of oxygen exceeds 21% by volume or the partial pressure of oxygen exceeds 160 mmHg, or both.

Sevoflurane–A liquid halogenated general inhalation anesthetic. It is a nonflammable and nonexplosive liquid administered by vaporization.

Synthetics–Compounds formed through a chemical process by human agency as opposed to those of natural origin (ie, synthetic fibers, polymers).

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POSTTEST

Multiple choice. Please choose the word or phrase that best completes the following statements.

1. The components of the fire triangle are
   A. surgical drapes, an ESU, and any anesthetic gas.
   B. the patient's gown, the patient's hair, and drapes covering the patient.
   C. fuel, ignition, and an oxidizing agent.
   D. prep solutions, a laser, and nitrous oxide.

2. Which of the following are examples of fuel in the perioperative setting?
   A. Lasers and fiberoptic cables
   B. Gowns, drapes, sponges, and suction tubing
   C. Nitrous oxide, oxygen, and room air
   D. Gowns, lasers, and room air

3. Which of the following is a source of ignition?
   A. Laser
   B. Electrosurgical unit (ESU)
   C. Fiberoptic cable
   D. All of the above

4. Class B fires occur
   A. in vapors of flammable liquids.
   B. with plastics.
   C. with wood.
   D. with malfunctioning electrical equipment.

5. When using alcohol as a prepping solution, which of the following precautions should be taken?
   A. Avoid pooling on or around the body.
   B. Replace linens that become soaked with the solution.
   C. Allow adequate time for the prep to be visibly dry before draping.
   D. All of the above.

6. All cable connections should be completed before activating the light source to minimize the risk of fire.
   A. True
   B. False

7. Electrical equipment that malfunctions should be replaced
   A. after the procedure is completed.
   B. or repaired on site.
   C. immediately.
   D. when a replacement is available.

8. The first thing to do when you use a fire extinguisher is
   A. squeeze the handle.
   B. pull the safety pin.
   C. aim the nozzle.
   D. sweep from side to side.

9. Of the following drapes, which will burn or melt when in contact with a heat source?
   A. Polypropylene drapes
   B. Paper drapes
   C. Cloth drapes treated with fire-retardant
   D. All of the above

10. In the perioperative setting, oxygen and nitrous oxide tanks
    A. should be draped for sterility purposes.
    B. should be cleaned with a germicide.
    C. should not be draped to avoid gases building up underneath.
    D. B and C.

11. Which of the following should not be included in best practices when using a laser?
    A. Place wet towels and sponges around the surgical site.
    B. Allow the entire surgical team access to the foot control pedal.
    C. Keep a basin of saline or water close by.
    D. Place the laser in "standby" mode when not in use.

AORN

12. The most effective substance to use on a Class C fire is
    A. foam or carbon dioxide.
    B. water.
    C. saline.
    D. fire blanket.

13. If a fire occurs on your patient, the first step you take is to
    A. call the fire department.
    B. notify your supervisor.
    C. remove the burning material.
    D. get the fire extinguisher and spray your patient.

14. When using an ESU, always remember to
    A. clean the tip frequently during the procedure.
    B. lay it down when not in use.
    C. place it in clean, dry safety holster when not in use.
    D. A and C.

15. Nitrous oxide and oxygen are considered nonflammable gases; therefore, they are not a fire hazard.
    A. True
    B. False

16. Fiberoptic cables do not get hot enough to start a fire; therefore, they are not a fire hazard.
    A. True
    B. False

17. Under what conditions is it acceptable for you to fight a fire?
    A. The fire is small and confined to the immediate area.
    B. The fire department is located more than five miles from the hospital.
    C. You are not sure what the evacuation policy is.
    D. You are the closest one to the fire extinguisher.

18. According to ANSI, who is responsible for the evaluation of laser hazards and precautions?
    A. The circulator
    B. The surgeon
    C. The OR supervisor
    D. The laser safety officer

19. Which of the following should not be included as part of your fire drill practice?
    A. Peeling drapes off the patient
    B. Learning how to use a fire extinguisher
    C. Yelling "FIRE!" down the hall to the other surgical suites
    D. Evacuating patients from the OR

20. Because the use of flammable anesthetics has been discontinued, ORs are now one of the safest areas of the hospital, as far as fire hazards are concerned.
    A. True
    B. False

Answer sheet for Fire Prevention in the Perioperative Suite

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1. C
2. B
3. D
4. A
5. D
6. A
7. C
8. B
9. A
10. C
11. B
12. A
13. C
14. D
15. B
16. B
17. A
18. D
19. C
20. B