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Original Research Paper

Anaesthesiology

FIRE SAFETY IN OT

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ABSTRACT Operatin	g room fires are devastating events, which are rare but preventable. Favorable outcomes

depend on all operating room personnel being aware with their roles in fire prevention and fire management. The three components of any operating room fire, known as "fire triad"- an oxidizer (oxygen, nitrous oxide), an ignition source (laser), and a fuel. These components present in every surgical OT in modern healthcare system. But modern-day OT staff is not familiar with fire management due to very few fire drills and simulations.

KEYWORDS : Fire, Fire Prevention, Fire Triad

INTRODUCTION:

Operating room fire is rare but dangerous event. Three components essential for operating room fire: an oxidizer, an ignition source, and a fuel. This creates the "fire triad".¹ In modern day operating roomelectrosurgical cautery in presence of fuel rich sources and oxidizers (air, oxygen and nitrous oxide) is main reason for fire. Laser surgeries are also increasing, and risk of fire hazard is more in these type of surgeries.

Fire Triad:



Oxidizer:

Studies have revealed that nearly all objects can become fuel for a fire once the oxygen content increases to greater than 30%.²14 A review of operating room fire claims found that 85% of fires occurred in the head, neck, or upper chest, and 81% of cases occurred with monitored anesthesia care.³ These fires are mostly due to increases in oxygen content at the surgical site.

Ignition source:

Surgical energy is the ignition source in 90% of operating room claims.⁴ The most common form of surgical energy is monopolar radiofrequency energy. The second most common ignition source is the laser.⁵ Lasers are used in cosmetic, eye, and oral surgeries—all areas above the xiphoid that are considered high-risk. The high risk of fire with lasers in these locations is known to physicians who indicated on a recent survey that the most common major complication of endoscopic laser surgery was a fire.⁶ Even with an ETT in place, a surgical laser can penetrate an unprotected tube and cause a fire in less than 2 s when 100% Fio2 is being used.^{78.9}

Fuel:

Potential fuel sources for a surgical fire (table 1).¹⁰

Table 1. Fuel Sources in the Operating Room Fires Patient-dependent

Hair Tissue

Gastrointestinal content (methane, hydrogen)

Patient-independent

Solutions Alcohol-based sterile skin preparations Wound closure (benzoin, mastazol) Degreasers (acetone, ether) Petrolatum-based dressings/ointments Paraffin, wax

Materials Drapes (paper, cloth, plastic) Protective equipment (gowns, gloves, caps, and others) Dressings (gauze, bandages, tape) Gauze, sponges Airway devices (endotracheal tubes)

Equipment Anesthesia (endotracheal tubes, masks, tubing, and others)

Surgical (fiberoptic cables/wires, cuffs, tubing, drains, endoscopes, and others)

Common fuels in the operating room. Of note, nearly all materials, even those marked "nonflammable," become flammable when the oxygen content is elevated

Operating room (OR) fire prevention and management algorithm:



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CONCLUSION:

Prevention is the first step in dealing with operating room fire, it includes trained personnel, fire drills, each person given the assigned task, water sprinkling system, smoke alarm should be there in operating room, fire extinguishers should be freely available. Team approach along with vigilance and communication is important in case of an event.

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