FIRE PREVENTION IN THE OR

Operating Room Fire Safety
Would you turn on one of these tanks & strike a match in front of it? That is very similar to what occurs daily in the OR. Cautery & other ignition sources are constantly in use in the Oxygen enriched environment.
The OR is an environment requiring constant monitoring of fire risks.

**STATISTICS**

Number of Surgical Procedures Yearly in the U.S.
- 23 Million Inpatient Surgical Procedures
- 27 Million Outpatient Surgical Procedures
- 50 Million Total Procedures
Statistics

Number of Surgical Fires Yearly

• 100 “Reported” OR Fires Yearly
• 200-300 OR Fires Yearly Not Reported
• Who Knows How Many “Near Misses”

• 20 Patients Injured Yearly
• 2 Patient Deaths Yearly
IT IS IMPORTANT TO UNDERSTAND

OR fires are 100% PREVENTABLE
WHAT DO YOU NEED TO DO TO PREVENT OR FIRES?

1) Understand the causes of fires
2) Take steps to prevent fires
3) Be vigilant in your observation to prevent & contain possible fire situations
4) Model & teach preventative behavior
The Fire Triangle in the OR – The 3 elements that must come together to have a fire occur.
The Elements of the Fire Triangle

1. FUEL SOURCES in the OR

- Alcohol, Linen, Drapes, Sponges
- Plastic Equipment Drapes & Anesthesia Equip.
- OR Table Pads
- Patients’ tissues – Adipose, Skin, Hair
- Solutions, Ointments, Bone Cement
- Soda Lime used by anesthesia
- Patient’s hair – especially after prepping with alcohol
- Surgical caps worn by the patient
Fuel sources

Drapes & other materials used in the OR are fire resistant, but will burn and yield very toxic smoke due to the chemicals in the materials.

So, if the fire isn’t extinguished rapidly (30 seconds) the smoke will be overwhelming.
Use of Alcohol Prep

Alcohol containing antiseptic solutions have unsurpassed antimicrobial properties.

Their use requires thoughtful consideration and site selection.
Fuel Sources - Alcohol

Because of its flammability and potential vapors/fumes, use of alcohol & preps containing alcohol can cause significant risk in the OR. Precautions to be taken when using alcohol:

• Alcohol must be allowed to dry prior to using cautery
• Alcohol fumes should be allowed to dissipate prior to draping or before redraping after reprepping

– THIS PROCESS TAKES APPROXIMATELY THREE 3 MINUTES.
Elements of the Fire Triangle

2. OXYGEN & other gasses in the OR

- Oxygen Enriched Atmosphere
- Nitrous Oxide
- Oxygen per Nasal Cannula
- Tenting & Trapping of Oxygen & Gasses
- Gases in the GI Tract
- Emissions from the Rectum & Perineal Area
Elements of the Fire Triangle

3. HEAT – IGNITION SOURCES in the OR

Most common Ignition sources

- Cautery – Electro surgery
- Fiberoptic Light Cords/Sources
- Lasers

Other Ignition sources

- Defibrillator Paddles
- High Speed Burrs and Drills
- Malfunctioning Equipment
Most Common Anatomical Sites of Fires

- 34% - Airway (Upper Trachea - Bronchus, etc.)
- 28% - Face, Head, Neck and Chest
- 24% - Anywhere Else on the Body
- 14% - In the Body

Why do the face & airway lead at 62%?
Fires of the Face, Head, Neck, Axilla, Upper Chest are close to the Oxygen Source
Airway –
A confined area full of 100% Oxygen
All it needs is a match
(ignition from cautery or a laser)
Fires Can Occur Anywhere Else on or in the Body or in the OR suite

- Perineal area
- Anywhere - Alcohol prep
- Abdomen - Cauterizing – open or laparoscopically
- Drapes ignited by light cords or cautery pencils
- Surgeons’ fiberoptic light cords coming unattached
  - from head lamp.
- Cautery ground pads catching on fire
The key to fighting an OR fire is to PREVENT IT
Prevent – Control the Fuel Source

• Use only Laser ET tubes when lasering in any part of the airway.
• Be conscious of drapes, sponges, towels, linens in proximity to ignition sources
• Protect patient body hair, skin, adipose tissue as appropriate
• Alcohol soaked items or alcohol in close proximity to ignition sources need special precautions
What you can do to prevent OR fires....... Specific measures to prevent fires when prepping with alcohol:

- Control the alcohol when prepping to minimize dripping & pooling.
  - Check any linens coming in contact with the patient to make sure they are not wet with alcohol. Remove wet linens if possible. If not possible, wick (soak up) the alcohol so that it is not pooled beneath the patient and allow linens to dry thoroughly.

- Allow preps containing alcohol to dry & vapors to dissipate before draping and using cautery.
  - THIS PROCESS TAKES A MINIMUM OF THREE (3) MINUTES.

- When prepping in or near hair (e.g., chest, head, armpits, back, etc.), allow the prep to dry. After drying, a water based gel may be applied to coat the hair to keep it away from the incision and prevent it from becoming a potential fuel source.
What you can do to prevent OR fire ..... More specific measures to prevent fires when prepping with alcohol:

• If it becomes necessary to reprep a patient with alcohol
  - Remove drapes if at all possible before reprepping
  - Control alcohol to minimize dripping & pooling
  - Allow alcohol to dry & vapors to dissipate
  - Redrape after alcohol is dry & vapors have dissipated
  - Do not drape over existing drapes left on while reprepping
    - Note: This may trap vapors between the drapes
    - Note: Head hair can wick prep - Bonnets can trap vapors.
Prevention – Control Oxygen & Other Gases

- Be conscious of oxygen – turn off O2 to nasal cannulae/tubing when no longer in use by patient.
- Be conscious of other gases in the environment including methane gas from the patient.
- Pack the rectum with a wet rolled gauze when lasering, cauterizing, etc. near rectum/perineum.
- Locate gas shut offs for OR suite.
Prevention – Control Ignition Sources

- Inspect equipment & send for repair as needed (i.e. frayed cords, activation of electrical alarms)
- Place cautery pencils in holders when not in use.
- Activate light sources only at time of use.
- Put lasers in standby mode when not in use.
Follow RACE Protocol

• **Rescue** those in danger

• **Alert**
  - Shout “Code Red”
  - Pull alarm
  - Call 4911
  - Off campus call 911

• **Confine** the fire by closing doors

• **Extinguish** or evacuate
Know location of extinguishers