Airway Fires during Surgery

Airway surgeries that use ignition sources such as ESU (electrosurgical unit) and laser systems pose a significant and sometimes deadly risk of fire. Hazards exist when ignition sources are within the oxygen-enriched environment (i.e. more than 23% O\textsubscript{2}) that are commonly present in the airway during surgery.

**Ways to Minimize Airway Fires During Electrosurgery**

**During Tracheostomy**

- Establish protocols to address when electrosurgery will be removed from the surgical field. Example: remove the electrosurgical unit when tracheostomy tube is placed on the surgical field.
- Do not use electrosurgical units to cut tracheal rings and enter the airway. Instead, use a “cold” scissors or a scalpel to avoid the risk of fire.

**In the Oropharynx**

- Use insulated probes for the electrosurgical unit. DO NOT USE red rubber catheters as sheaths or insulators for bare probes. The heat from the active electrode will ignite rubber even in room air.
- Scavenge around the surgical site with separate suction to catch leaking O\textsubscript{2} and nitrous oxide.
- Soak gauze or sponges used with uncuffed tracheal tubes to minimize gas leakage into the oropharynx, and keep the gauze or sponges wet throughout the entire procedure.

**Ways to Minimize Airway Fires During Laser Surgery**

- Limit the laser output to the lowest clinically acceptable power density and pulse duration.
- Use appropriate laser-resistant tracheal tubes during oral or airway laser surgery. Follow manufacturer’s recommendation regarding use of laser wavelength specific tracheal tube.
- Properly cleave and strip the laser fibers before use and as needed during surgery. Cleaving and stripping should be done by trained staff.
- Allow the laser to be activated and fired by the person wielding the laser delivery system (i.e. handpiece, laser fiber) to minimize inadvertent activation.
- Deactivate the laser and place it on STAND BY mode when not in use and before removing it from the surgical site.
- Keep the laser fiber tip in view and make sure it is clear of the end of the bronchoscope or tracheal tube before laser emission.
- Use a water-based rather than oil-based lubricant on tracheal tubes.

**Ways to Fight Airway Fires**

1a **STOP THE GAS LOW**
- Disconnect the breathing circuit – this is the quickest way to stop the gas flow.

1b **REMOVE THE TUBE FROM THE PATIENT**
- Maintain airway patency

2 **EXTINGUISH THE FIRE**
- Operating Room personnel other the anesthesiologist/anesthetist should extinguish the smoldering tube.
- Remove segments of burned tube that may remain in the airway.

3 **CARE OF THE PATIENT**
- Reestablish the airway and resume ventilating with air until certain that nothing is left burning in the airway; then switch to 100% O\textsubscript{2}.

**NOTE:** Step 1a and 1b should be done as quickly and simultaneously as possible.