1. Compile a list of potential flammable substances that could be present in an operating room and identify strategies for fire prevention. What is the protocol at your hospital in the event of an operating room fire?

In order for a fire to occur 3 components are required: a fuel source, an ignition source and an oxidizer. If all 3 of these components are in very close proximity to each other and under the ideal conditions, then a fire can occur. All 3 of these components are often found in close promixity to each other in the operating room (OR) setting and thus a fire is a very real possibility.[1]

Possible flammable substances (fuel source):[1,2]

- Degreasers
- Skin prep solutions such as chlorhexidine and other alcohol-based substances
- Drapes, towels, sponges, dressings, adhesive tapes,
- PPE
- Ointments such petroleum jelly
- Parafin/wax
- Patient hair/skin
- GI gases
- Airway devices such as: ETT, LMA, masks, nasal canullas

Common ignition sources in the OR:[1,2]

- Electrosurgical device
- Lasers
- Fiberoptic light source
- Defibrillator
- High speed drills

Common oxidizers in the OR:[1,2]

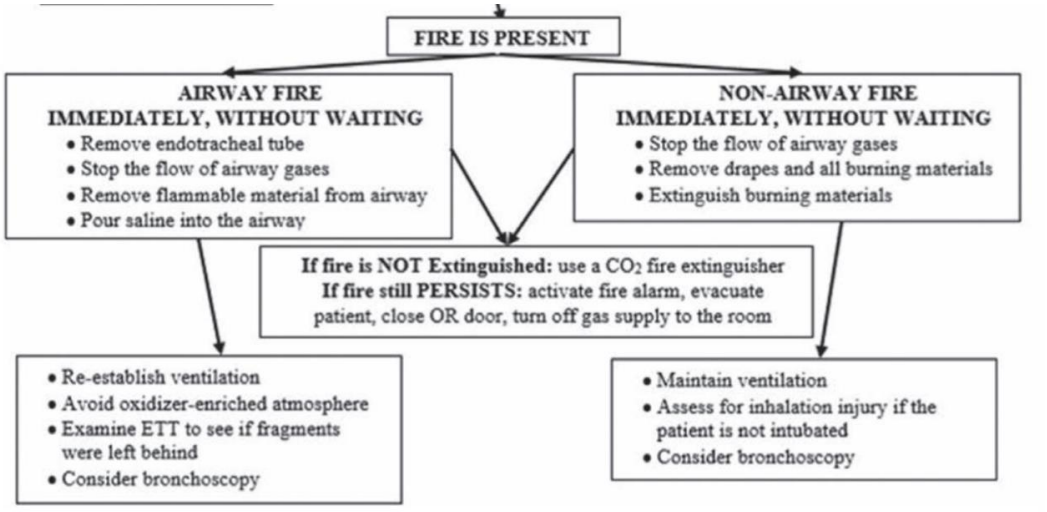
- Oxygen
- Nitrous oxide

To eliminate the fire risk in the OR setting one of the 3 components needs to eliminated so that fires do not occur. Unfortunately, this is not easily feasible as all 3 components

are often abundantly available in close proximity within the OR setting. However, the following strategies listed below can be taken to help mimimize fir while never fully eliminating this risk:

- Fire prevention startegies:[1]
  - Whenever possible keep ignition sources (fuel source) away from oxidizers such as an oxygen and > 30% nitrous oxide
  - Ensure that surgical drapes are arranged in such a way that it minimizes the accumulation of oxidizers
  - When using alcohol-based skin prep solutions allow sufficient time for them dry (follow manufacture specific drying times)
    - Allow avoid using excessive amounts of alcohol-based solutions which could result in pooling of prep solution which will not dry effectively
  - Use moistened sponges and gauze when near ignition sources

What do I do if there is fire present? The actions taken will depend on if the fire is present in the patient airway or not. See the algorithm below which has been adapted from American Society of Anesthesiologists Practice Advisory on the Prevention and Management of Operating Room Fires.



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At my facility we have similar steps that we take in the event of a fire in the operating room. In addition to these steps a “Code Red” is activated by staff with any fire or suspected fire. The Code Red response team that will arrive to all fires at my facilities will investigate the fire and help determine if an evacuation from the operating room is necessary.

References:

1. Jones TS, Black IH, Robinson TN, Jones EL. Operating Room Fires. Anesthesiology [Internet]. 2019 Mar 1 [cited 2024 Nov 19];130(3):492–501. Available from: https://doi.org/10.1097/ALN.0000000000002598

2. Hart SR, Yajnik A, Ashford J, Springer R, Harvey S. Operating Room Fire Safety. Ochsner J [Internet]. 2011 [cited 2024 Nov 20];11(1):37–42. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3096161/