FIRE SAFETY IN A SURGICAL ARENA
THREE REQUIREMENTS FOR FIRE

Ignition + Fuel + Oxygen

FIRE
IGNITION

- **ELECTROSURGERY** (Bovie)
  - eschar may cinder - spark
  - bovie may arc onto metal - spark

- **LASER**
  - may reflect off an instrument

- **FIBEROPTIC LIGHT CABLE**
  - left in the ‘on’ position, lying on a paper drape
FUEL

- Drapes
  - bed linens
- Sponges
- Clothing
  - patient and staff
  - pt belongings
- Plastics
  - ET tubes
  - plastic drapes
  - O2 masks
- Body hair
- Preps (alcohol based)
  - pooling under drape
  - vapors are flammable
- Anesthetic gases
  - volatile agents
  - expired gases and gases from machine
- Intestinal gases
- Chemical fumes
  - bone cement
- Stored supplies
OXYGEN

- O₂ from anesthesia
  - from O₂ tank or machine
  - closed circuit or via mask
- Non-vented anesthetic gases
  - local/MAC with drapes over head - gases concentrate under drape
- Room air!! (21%)
TYPES OF FIRE IN THE O.R.
1/ AIRWAY FIRES

2/ NON-AIRWAY FIRES

PATIENT

ROOM
AIRWAY FIRE

- SEVERAL DOCUMENTED
- HIGH Fi02+ANESTHETIC GASES
- IGNITION FROM ELECTRO SURGERY
  - LASER
  - BOVIE
- FUELED BY PLASTIC OF THE ET TUBE
- OFTEN PEDIATRIC PT
  - TONSILECTOMY
- DISASTROUS
  - AIRWAY BURNS ARE FREQUENTLY FATAL
AIRWAY FIRE PREVENTION

• REDUCE THE FiO2% DURING AIRWAY SURGERY (to ABOUT 30%)

• DO NOT TENT DRAPES
  – ALLOW ANESTHETIC GASES TO ESCAPE AND NOT POOL

• HAVE SYRINGE OF SALINE AT THE READY FOR ALL HIGH RISK CASES

• BE AWARE OF THE RISKS.. TAKE APPROPRIATE PRECAUTIONS

• LASER SAFETY
  – PACK AIRWAY WITH WET SWABS
  – USE SPECIFIC LASER ET TUBE
  – USE NON-REFLECTIVE INSTRUMENTS
    • FILL CUFF WITH SALINE AND METH. BLUE

• SURROUND FACE AND PAD EYES WITH WET TOWELS
AIRWAY FIRE

TREATMENT

• REMOVE ET TUBE
• TURN OFF O2
• SUSPEND VENTILATIONS
• APPLY SALINE/SUCTION
• VENTILATE PT
• MAINTAIN ANESTHESIA
  – (?IV MEDS)
  – RE-ESTABLISH AIRWAY CONTROL

• BRONCHOSCOPY TO ASSESS DAMAGE
  – TREAT APPROPRIATELY - MEDS (ANTI-INFLAMMATORY AGENTS)
  – IF SEVERE, PT MAY REQUIRE ICU AND LONG TERM INTUBATION
NON-AIRWAY FIRE

- ANYWHERE ON THE PATIENT
  - OFTEN ON THE FACE OR TORSO
- LESS RISK OF FATALITY, BUT STILL VERY INJURIOUS TO THE PATIENT
- RISK OF THE FIRE SPREADING TO THE REST OF THE ROOM AND O.R.
- ROOM FIRE - NOT ON THE PATIENT
NON-AIRWAY FIRE

CAUSES

ON THE PATIENT

- IGNITION SOURCES
  - ELECTROSURGICAL DEVICES
  - HIGH INTENSITY LIGHT
    - FIBEROPTIC CABLE
    - HEADLIGHT
- FUEL
  - DRAPES + SPONGES
  - BODY HAIR
  - LINENS
  - PLASTIC EQUIPMENT
- OXYGEN
  - ROOM AIR
  - SUPPLIMENTAL O2
  - ANESTHETIC GASES

IN THE ROOM

- IGNITION SOURCES
  - ANY ELECTRICAL EQUIPMENT
  - STATIC
- FUEL
  - LINENS
  - SUPPLIES
  - FURNITURE
  - GARBAGE (BATTERIES)
- OXYGEN
  - ROOM AIR
NON-AIRWAY FIRE PREVENTION

- Maintain clean, uncluttered work areas
- Use proper application and drying of prep
- Keep flammable liquids away from ignition sources
- Put electrical equipment on standby when not in use
- Ensure fire blanket/fire extinguisher readily available
- Place drapes to allow venting of gases
NON-AIRWAY FIRE TREATMENT

ON THE PATIENT
- SMOTHER FLAMES
- WET TOWELS
- SALINE
- WATER
- REMOVE DRAPES

• EASE

IN THE ROOM
- E
- A
- S
- E
Team Response TO NON-AIRWAY FIRE

- **Anesthesia**
  - turn off O2
  - maintain airway

- **Circulator**
  - call Dr REDMAN
  - INFORM CONTROL DESK
  - unplug electrical equipment
  - apply sterile wound dressings
  - help pull off drapes
  - prepare patient for potential evacuation

- **Surgical Team**
  - put fire out
  - remove drapes

- **Control Desk**
  - send response team
  - hold surgeries until Dr Redman is cleared
  - communicate with others in the OR
  - turn off main gas valve as indicated by Anesthesia

- **Response Team**
  - report with fire extinguishers
  - assist as needed
  - update control desk
RESPONSE TO SMOKE ENTERING THE OR

- block doorway with sheets/blankets
- feel door for heat - never open a warm door
- surgeon decides whether it is safe to abort surgery and evacuate
- communicate with control desk - EASE
• **EVACUATE**
  
  – EVACUATE PERSONS FROM IMMEDIATE AREA OF FIRE
  
  – ASSIST TO REMOVE STAFF AND PATIENTS
  
  – USE EVACUATION MATS/BOARDS AS REQUIRED
  
  – REMOVE ELECTRICAL CABLE OF BURNING EQUIPMENT FROM OUTLET
  
  – REMOVE DRAPES FROM PATIENT
  
  – REMOVE ET TUBE FROM AIRWAY
    
    • DISCONTINUE OXYGEN SUPPLY
ALARM

- CALMLY ‘PULL’ THE ALARM
- INFORM OR DESK COORDINATOR

• DO NOT CAUSE ALARM
  • no need to run around screaming
• SWITCHBOARD
  - CALL THE EMERGENCY NUMBER 5222
  • CALL DR REDMAN
  • GIVE LOCATION
• **EXTINGUISH**
  
  – USE APPROPRIATE EXTINGUISHER FOR BURNING MATERIAL
    
    • WATER - PAPER, PEOPLE - **NOT** ELECTRICAL
    
    • CO2 - ALL SortS
  
  – WET TOWELS
  
  – SALINE ON THE SURGICAL FIELD
• EVACUATE
  – REMOVE PATIENTS AND STAFF FROM THE BUILDING
  – EXIT VIA FIRE ESCAPE ROUTES, UNLESS OBSTRUCTED BY THE FIRE
  – ASSEMBLE IN DESIGNATED AREAS
  – TAKE A ROLL CALL
Evacuation Routes
North OR

• *HALLWAY leading up to Same Day Surgery*
  – Hallway leading to Same Day Surgery (down stairs to the ER entrance or down the connector hall)
  – Hallway leading past the Cath Lab to the main lobby or down the stairs and out toward SON
  – Hallway leading to the main Lobby by the Kitchen

(out to the parking lot- preferred way to take patients as there are no stairs)
Outpatient Surgery

• Evacuate to hallway by Medical Outpatient
  – Turn left to ambulatory desk and then through the main lobby to the parking lot
  – Turn right toward the North OR and exit through Same Day Surgery

• Evacuate to the front hallway and to the right through the main lobby to the parking lot
CATH LAB

• Evacuate north towards the main lobby
• Evacuate south through the OR
• Evacuate down the stairwell to Medical Imaging
TYPES OF FIRE EXTINGUISHERS
Types of Fire Extinguishers

ABC Dry Chemical

- exits extinguisher as a jet of dry chemical
  - present in OR Hall Ways
  - spray has cooling effect
  - no chemical residue - evaporates
  - unlikely to injure patient/staff if used correctly
  - can potentially decrease the severity of burns
Using ABC Fire Extinguisher

- Pull the pin
- Aim the extinguisher or nozzle at the base of the fire
- Squeeze the handle and release the extinguishing agent
- Sweep the extinguisher from side to side across the base of the fire until it appears to be out
Close this window to take the test