Management of airway fire in laser microlaryngoscopy

Pharyngeal pouch

Local anaesthetic for tonsillectomy
Management of airway fire in laser microlaryngoscopy. How can this be avoided.

Laser microlaryngoscopy
High energy laser (CO₂ or Nd-YAG) used alongside the ETT
0.5%-1.5% incidence of airway fire
Usually laser igniting ETT or swabs

Minimizing risk
Surgeon
  Control of laser direction and operation
  Non-reflective instruments
  Moistened swabs
  Copious sterile water on setup
  Fire drill should be agreed or rehearsed

Choice of ETT
Metal tube: Mallinkrodt “Laser Flex”
Metal coated silicone tube: Xomed “Laser Shield”
Metal tape coating on regular tube
  Flammability silicone < rubber < PVC
  Toxic debris silicone > PVC > rubber
Cuff is still vulnerable
  Fill with saline ± methylene blue
  Second cuff on Laser Flex
  Distal placement of cuff (out of sight)
  Place moist swabs on wires above cuff
Metal can be ignited or cut by Nd-YAG laser
Consider jet ventilation or oscillator

Airway gases
Minimize use of oxidant gases
  Minimal required FiO₂
  No N₂O
  Helium retards ignition
Air available for ventilation in case of fire

Maintenance
Immobility required: deep anaesthesia or paralysis
High level of vigilance for fire
Good communication with surgeon

Managing fire
Remove source of fire and extinguish with water
Stop ventilation, turn off O₂
Mask ventilate with air, then 100% O₂ once fire is extinguished
Laryngoscopy and rigid bronchoscopy to remove debris
Lavage and fibreoptic bronchoscopy if indicated by airway injury
Common pattern is worst injury at the surgical site and little distal injury
If severe injury
  Maintain ventilation
  Consider low tracheostomy
  IV corticosteroids may be helpful
  CXR, ABG with co-oximetry for smoke inhalation assessment
Outline management of anaesthesia for resection of pharyngeal pouch.

Surgery
- Elective, moderate risk
- High risk of aspiration
- Close to major structures in neck

Assessment
- Routine plus
- History
  - Dysphagia, regurgitation and aspiration of food
    - Positional or on waking
- Examination
  - Complications of lesion
    - Malnutrition, pneumonia
- Investigations
  - Imaging of pouch: contrast studies, CT

Preoperative
- Premedication to reduce aspiration risk: H$_2$ blocker

Monitoring
- Routine plus
- Arterial line, CVC
- Epidural if thoracic incision

Induction
- Rapid sequence induction with cricoid pressure
- Pharynx may need to be suctioned
- Avoid high-pressure mask ventilation
  - Risks distension ± rupture of pouch
- Consider cervical plexus block if neck incision

Maintenance
- Usually supine with head turned to side
- If lateral, increased risk of pressure areas
- No nasogastric before surgery
  - May pass into pouch

Emergence
- Aim for extubation when awake
- Usually do not require HDU care
Local anaesthetic for tonsillectomy

Anatomy
- Tonsil innervated by branches of glossopharyngeal n. which runs along stylopharyngeus and anterior palatal arch

Technique
- Initial topical anaesthesia to pharyngeal arches with lignocaine
- Tongue depressed with spatula
- Infiltration of posterior palatal arch, then anterior palatal arch (IX n.)
- Tonsil grasped with forceps and drawn medially
- Tonsillar attachment infiltrated
- Careful aspiration at all points because of proximity of ICA

Local anaesthetic
- Lignocaine 0.5% 10-15 ml each side