



## **Upper Airways Endoscopy: Tracheoscopy and Bronchoscopy**

### **Introduction**

- Historically, upper airway endoscopy has been thought of as an operative technique, and in modern times, performed under general anesthesia in the supine position.
- With the evolution of distal chip flexible laryngoscopes and “heads-up” monitor-based viewing, these procedures can safely be performed in the awake adult and perhaps teenage patient, sitting up in the office setting.
- Prior to any procedure, it is imperative that:
  - the patient/responsible party give informed consent with indications, risks and benefits explained, and all questions answered;
  - all instruments, equipment, medications are available and ready;
  - the team caring for the patient with the Otolaryngologist understands the reason and plan for the procedure, possible complications, and the plan for addressing an immediate complication/loss of airway.

### **In-Office Transnasal Tracheoscopy and Bronchoscopy**

- Indications: Evaluation/diagnosis/treatment of stridor, particularly inspiratory, sometimes biphasic or expiratory; hemoptysis; chronic cough; extrinsic airway compression; small mass lesion; airway stenosis; other. *Do NOT make a stable airway unstable.*
- Risks: Pain (usually minimal), epistaxis (rare), gagging (rare if in sniffing position), emesis, vasovagal episode (rare), temporary dysphonia, difficulty breathing, worsening breathing, airway bleeding, cough, dysphagia, loss of airway/need to proceed to OR.
- Instruments: Distal chip video laryngoscope, channeled scope if available; associated tower/video monitor; suction (Yankauer or to attach to channeled scope); biopsy forceps and injection needles as warranted (flexible or curved rigid); +/- nebulizer machine.
- Medications: 2% or 4% topical lidocaine or other; oxymetazoline; steroids as above.
- Room set-up/Topical Anesthesia Considerations: The airway can be topically anesthetized using 4-5cc nebulized lidocaine (*sniffing position for topicalization to oropharynx/base of tongue*); 4-8cc of lidocaine dripped onto the vocal folds while the patient phonates; 4cc lidocaine percutaneously injected into the trachea.
- Operative Technique



- After the nose is sprayed with oxymetazoline and lidocaine, the patient who is positioned forward at the hips in a sniffing position. Topical anesthesia as preferred is applied to the larynx and trachea.
- Photo/video documentation should begin. The telescope is advanced through the glottis, subglottis, trachea to carina then into right mainstem bronchus and segmental bronchi as warranted, partially withdrawn and advanced on the left. The length of abnormalities, distance from the glottis should be measured, and approximation of airway lumen size estimated. Biopsy or injection procedures can ensue at this point.
- Once all instrumentation is removed, the patient is observed for 15 minutes and instructed to avoid oral intake until subjective swallowing returns to normal.

### **In-Office Trans-Stomal Tracheoscopy and Bronchoscopy**

- Evaluation of the upper airway can easily be done via an established laryngectomy stoma or tracheostomy stoma, with or without a lary/laryngectomy/tracheostomy tube in place. This can be done with or without topical anesthesia.
- Indications/Risks, Instruments, Medications: As above.
- Operative Technique
  - After the trachea is sprayed with 4% topical lidocaine, the flexible laryngoscope is introduced into the airway and advanced as above.
  - If a tracheostomy stoma is mature, it is generally safe to remove the trach tube to evaluate the upper part of the airway. If you are unfamiliar with a particular patient's airway, it is important to have suction, obturators, extra trach tubes available should stomal collapse be an issue.

### **Operative Tracheoscopy and Bronchoscopy**

- Indications: same as above
- Risks: (injury to tooth, laceration, tongue numbness, change in taste); dysphonia; dysphagia; loss of airway; need for emergent tracheotomy; airway fire; death; other.
- Instruments and Equipment
  - Rigid laryngoscope; rigid telescopes (0 and 30 degree) with camera; appropriately sized rigid bronchoscope; all bronchoscope connectors (anesthesia circuit, telescope/instrument adaptors, prisms, stops); all light cords



- Suctions; grasping/biopsy/telescopic foreign body forceps as warranted
- Tracheotomy set available in the room
- Consider adult or pediatric flexible bronchoscope on standby to assess distal airways as warranted via rigid ventilating bronchoscope or endotracheal tube
- Dental guards or 4x4 gauze
- Laser-safe and fire precautions as warranted, suction and/or smoke evacuation
- Medications
  - Topical lidocaine; Topical oxymetazoline and/or 1:10,000 epinephrine; steroid for injection (dexamethasone 10mg/cc and/or Kenalog 40); saline for irrigation..
- Room set-up/Anesthesia Considerations
  - Laryngoscopy cart in the room and accessible with additional instrumentation..
  - Discuss need for spontaneous ventilation, avoidance of sedation and/or paralysis, utility of TIVA (Total Intravenous Anesthesia), jet ventilation.
- Operative Technique
  - Once the patient is under general mask anesthesia, dental guards are placed, the mouth opened with a scissor maneuver, and rigid bronchoscope inserted exposing true vocal folds. Topical lidocaine may be sprayed directly onto the vocal folds. The bronchoscope turned 90 degrees as it is advanced through the glottis, long side now lateral. The bronchoscope is attached to the anesthesia circuit and ventilation confirmed. Turned 90 degrees again, the bronchoscope is advanced through the trachea, keeping its lumen centered in view at all times and noting any structural abnormalities, asymmetries, irregularities, masses, foreign bodies to the level of the carina, into the right then left mainstem bronchi.
  - It is common to perform direct laryngoscopy with an apneic technique, insert a 0-degree telescope and advance through the glottis to evaluate the subglottis, trachea and mainstem bronchi to survey the upper airway.

## **REFERENCES**

Office Procedures in Laryngology. Otolaryngologic Clinics of North America. Ed. Milan R. Amin. Volume 46, Issue 1, Pages 1-106 (February 2013)