Microdirect Laryngoscopy (Suspension Microlaryngoscopy or Direct Laryngoscopy)

Redirecting to: https://medicine.uiowa.edu/iowaprotocols/microdirect-laryngoscopy-suspension-microlaryngoscopy-or-direct-laryngoscopy

Suspension Microlaryngoscopy

return to: Laryngology, Flexible Fiberoptic Laryngoscopy (written instruction)

see: Microdirect Laryngoscopy case example

see: Management of Specific Voice Disorders

see: Laryngeal Leukoplakia Case Example

(With and Without Laser)

1. GENERAL CONSIDERATIONS
   a. Indications
      i. Suspected or known malignancy
         1. Laryngeal lesions that require precise staging and anatomic localization
            a. A large biopsy of a cancer to be treated with irradiation is more likely to result in greater dysphonia than a small biopsy.
            b. A small biopsy of a suspected cancer does not sample the lesion as well as an excisional biopsy
            c. Frozen section analysis is useful in many cases to confirm adequate tissue sampling
            d. Frozen section analysis may 'waste' tissue that would best be evaluated by processing with permanent section (discriminate dysplasia from cis or microinvasive CA)
            e. Smaller superficial lesions that can be sampled through excisional biopsy are often better assessed through permanent section histologic analysis
               i. see: Endoscopic Resection of Vocal Cord (Fold) Leukoplakia
         2. Treatment of cancer through endoscopic resection: laser/cold steel/microdebrider/Freche monopolar cautery
         3. May be done in concert with rigid esophageal endoscopy, flexible fiberoptic bronchoscopy (see Panendoscopy).
   ii. Evaluation and treatment of hoarseness (see Laryngeal Diagnostics protocol)
      1. Vocal nodules, polyps, cysts
      2. Polypoid corditis, Reinke's space edema
      3. Vocal process granulomata
      4. Sulcus vocalis
      5. Laryngeal web
      6. Dysphonia without clear etiology
      7. Use of videostroboscopic equipment with improved imaging of the larynx in the clinical setting has decreased the use of microlaryngoscopy for diagnostic purposes. The capacity to evaluate the undersurface of the vocal folds and to palpate, manipulate, and possibly offer a temporary (trial) injection maintains the value of microdirect laryngoscopy as a diagnostic tool.
   iii. Other
      1. Recurrent respiratory papillomatosis (RRP) (see Pharmacot therapy for Recurrent Respiratory Papillomatosis (RRP))
      2. Other laryngeal lesions - either identified or suspected
b. Contraindications
   i. Unstable cervical spine
      1. Recommend evaluating patient in clinic with neck extension (coordinate with mouth opening)
      2. Question about arm/leg numbness/weakness, h/o rheumatoid disease, Down syndrome, whiplash injury, or other cervical spine abnormality - have a low threshold for obtaining flexion-extension cervical x-rays.
      3. Despite this - may still have problems - see reference Hindman et al 2011.
   ii. Coagulopathy - note the common practice is to stop anti-platelet or anti-coagulation therapy preop to decrease bleeding which may obscure visualization and cause complications from hemorrhage (Sylvester 2012)
      1. Traditional teaching: stop all antiplatelet and anticoagulation therapies 7-10 days before surgery
      2. Recent study by Francis et al (2014) suggests that microlaryngeal surgery may be done despite antplatelet therapy (small numbers of patients in study - only 8 on Coumadin with INR>1.5)
   iii. Unable to obtain exposure of the larynx (ie, retrognathic) – may consider alternatives to direct laryngoscopy
      1. Exposure and instrumentations transorally employing indirect mirror
      2. Flexible fiberoptic laryngoscopy employing biopsy port
      3. External approach through laryngofissure

2. PREOPERATIVE PREPARATION
   a. Evaluation
      i. Essential preoperative studies (benign lesions)
         1. Speech pathology assessment
         2. Consider trial of nonsurgical therapy
         3. Videolaryngoscopy - note: videostroboscopy as we perform it (by Speech Pathology - usually with a rigid scope through a transoral route) is a good way to evaluate the vocal folds and permits concurrent high-quality voice recording.
            Transnasal fiberscopic examination by an Otolaryngologist often provides a more comprehensive examination of the pharynx and, in selected cases, permits a better view of the vocal folds and subglottic area.
      ii. With history of neck arthritis or neck surgery/injury: Lateral neck radiographs in flexion and extension
      iii. Optional studies: Acoustic and aerodynamic evaluation (see The Voice Clinic protocol)
      iv. Offer to most patients with dentition: Dental prosthethics evaluation preoperatively to fashion a tailored (custom-made) acrylic dental splint
         1. To prevent dental injury more effectively than the standard plastic "gump"
         2. To patients who will undergo multiple microscopic direct laryngoscopy procedures (hence greater possibility of dental exposure; ie, RRP) (see suggested reading "Dental Protection During Rigid Endoscopy")
         3. To improve exposure of the larynx by permitting greater pressure to be distributed across the custom dental guard
         4. Less expensive dental protectors may be purchased and prepared by the patient - see Custom Dental Guards for Micro Direct Laryngoscopy (Suspension Laryngoscopy)
   b. Consent for Surgery
      i. Describe procedure and expected recovery: Placement of rigid tube through your mouth into your voice box to expose the vocal cords. With a bright light attached for illumination and a microscope in place for magnification, the vocal cords will then be . . . (depends on the procedure to be done)
      ii. Potential complications (not inclusive)
         1. Bleeding, infection, reaction to the anesthesia
         2. Damage to adjacent structures
            a. Lips, teeth, tongue
            b. Larynx, pharynx
            c. "numb tongue, altered taste, TMJ syndrome, dental injury"
         3. Potential hoarseness, breathing, or swallowing problems
         4. "A surgical incision - whether it be on the vocal cords or
elsewhere - always results in a scar. Our goal is to minimize the amount of scarring with an effort to make it imperceptible."
5. Mention prolonged intubation or temporary tracheotomy if it is more than an extremely remote possibility.
6. Mention possibility of developing a numb tongue or hypoglossal nerve paralysis from pressure of the laryngoscope (usually temporary).

3. NURSING CONSIDERATIONS
   a. Room Setup; See Panendoscopy Room Setup
   b. Instrumentation and Equipment
      i. Standard
         1. Direct Laryngoscope Tray
            a. included Dedo laryngoscope and Lindholm
         2. Bronchoscopy Tray, Adult
         3. Laryngoscope Holder Tray
         4. Laryngoscope Instrument Tray, Microscopic Direct
         5. Telescope, Storz, Hopkins straight 0° 5.5 mm x 20 cm
         6. Telescope, Storz, Hopkins straight 0° 4.0 mm x 30 cm
         7. Telescope, Storz, Hopkins 70°, 4 mm x 30 cm
         8. Storz fiber optic light cable
         9. Stryker camera adapter (if flexible bronchoscope used)
         10. Microscope plus video unit
      ii. Special
         1. Tracheotomy Tray (available only)
      c. Medications (specific to nursing)
         i. 4% lidocaine solution, topical: Draw up in Luer Lock syringe to secure 25-gauge needle (used to spray vocal cords) with 25 gm x 1.5 in. Lidocaine should be preservative free.
         ii. 1% Lidocaine with 1:100,000 epinephrine
         iii. Oxymetazoline HCL nasal spray, 0.05% (for hemostasis on 1/2 in x 1/2 in neurosurgical cottonoid). 4% cocaine can also be used for topical hemostasis.
         iv. FRED (fog reduction elimination device); used to defog the telescopes used in imaging the larynx; FRED is variable in effectiveness to prevent fogging; HH’s preference: use hot water to warm the tip of the telescope to prevent fogging
         v. Kenalog 40 mixed 1:3 with 1% Lidocaine with 1:100,000 epinephrine (final dilution: Kenalog 10) for granuloma injections.
   d. Prep and Drape
      i. No prep
      ii. Drape
         1. No need for shoulder roll if patient appropriately positioned on table:
            a. Head of patient at end of bed with 'head extension' flexed down
            b. Raise back of bed 30 degrees to elevate head above abdomen
         2. Two unfolded pillowcases with towel clamp for a head drape oriented to protect eyes
         3. Tape eyes (employ moistened eye pads and cloth tape if use of laser is possible)
         4. Cloth drape across chest
   e. Drains and Dressings
      i. None
   f. Special Considerations
      i. Keep small amount of clean saline set aside to place biopsies in and to clean off biopsy forceps to avoid cross-contamination between specimens.
      ii. Open 18-gauge needle when taking biopsies to remove tissue from forceps. Place on Telfa for pathology.
      iii. May use silver nitrate sticks to control extensive bleeding from the pharynx or supraglottic larynx (not recommended on the vocal folds). Alternatively, have the monopolar cautery available to touch to suction as it is applied to bleeding site through the laryngoscope with care to avoid contact with the laryngoscope; a safer monopolar cautery is the shielded Freche micro-cautery unit.
      iv. Topical 1:100,000 epinephrine or oxymetazoline for application to vocal folds on 1/2 in x 1/2 inch neurosurgical cottonoid for hemostasis. Topical cocaine can also be used.
v. Patients may have premade tooth guards.
vi. Instruments should be set up prior to induction and remain assembled until patient is extubated and patent airway is established.

vii. **Tracheotomy Tray** should be available for emergency tracheotomy.

viii. Second Mayo stand may be used for support for surgeon to rest hands during microlaryngeal surgery may be useful in selected cases.

ix. Rigid telescope with fiberoptics attached to camera and printer with Polaroid film for immediate still pictures to be entered into chart at time of laryngoscopy. Ideally, 0-degree and 70-degree telescopes will be available for imaging.

x. Laser is generally not used except for papillomata and occasionally for malignancy to improve the airway. Laser attachment to the microscope can be placed preoperatively if lateral cordotomy is to be made to “spot weld” the mucosa back together (rarely needed).

xi. **Laryngoscopes**
1. Jackson laryngoscope: Rarely used, best to introduce rigid bronchoscope
2. Hollinger anterior commissure laryngoscope: Poor monocular exposure; useful when exposure is impossible with other laryngoscopes
3. Dedo laryngoscope: The “workhorse” provides adequate exposure of the glottis in most patients; limited for laser surgery by absence of smoke evacuation port
4. Ossoff-Karlan laryngoscopes: Good exposure but cannot be used in all patients because of larger size; best for laser surgery because of smoke evacuation port
5. Weerda laryngoscope: Expands both proximally and distally to provide excellent exposure for supraglottic surgery
   a. note - the Jackson and Lindholm scope have more acute angles at the corners allowing the surgeon to rest the laryngeal instrumentation with greater stability than other scopes, specifically the Kleinsasser.

xii. **Concept of ‘floating the lesion’**: Generally performed using a Treace injector and lidocaine with epinephrine. The injection is placed just submucosally to effectively perform hydrodissection and create the correct plane for microflap elevation and/or excision of a lesion.

4. **ANESTHESIA CONSIDERATIONS**

a. **General Anesthesia**
   i. Communication with anesthesia staff is essential
      1. Oral endotracheal intubation with small (4.0 to 6.0) endotracheal tube (MLT tube = microlaryngeal/tracheal tube)
      2. Use laser-safe endotracheal tube if intraoperative laser use is planned
      3. Short-term paralysis (duration dependent on procedure; communicate with anesthesiologist)
   4. Consideration for alternative methods
      a. Jet anesthesia
      b. Apnea with intermittent mask
      c. Spontaneous ventilation
      d. Local anesthesia with sedation (see Local Anesthesia for Rigid Endoscopy protocol)
   e. The surgeon should be in the operating room during induction if there is potential for airway compromise.

b. **Preoperative Systemic Medications**
   i. Glycopyrrolate 0.1 to 0.2 mg IM on call to operating room
      1. The drying effect improves exposure; consider avoiding in patients with xerostomia, cardiac disease; contraindicated with glaucoma or urinary retention
      2. Vagolytic effect
      3. IM administration has longer half-life than IV, but onset of action for IM is 15-30 minutes, versus 1 minute for IV
   ii. Consider Decadron 8 to 10 mg IV to decrease edema
      1. Contraindications: diabetes, ulcer disease, other
   iii. Antibiotics administered only if biopsies or incisions are made in an
infected or contaminated region (not usually employed for vocal fold surgery) (see Antibiotic Prophylaxis in Head and Neck Surgery protocol)

c. Positioning
i. Head of table turned 90° from anesthesia, anesthesia on right
ii. Arms tucked for placement of suspension laryngoscopy support
iii. Head extended
iv. Head of bed elevated to 30°
v. Have ETT taped to right upper lip and affix to right upper corner of the table to aid surgical manipulation and avoid accidental extubation.

5. OPERATIVE PROCEDURE
see: Adult Airway in the Operating Room
a. General Principles
i. Respect the integrity of the vocal fold and, in particular, the vocal ligament.
ii. Perform a systematic search (inspection/palpation) for synchronous laryngeal pathology not identified preoperatively (ie, sulcus vocalis, scarring, webs).
iii. Perform a conservative resection of diseased tissue.
iv. Avoid operative treatment of the anterior aspect of both vocal folds at the same time to avoid webbing.
v. Employ the largest laryngoscope possible to maximize exposure.
vi. Hemostasis
   1. Topical application of ephedrine or epinephrine
   2. Judicious use of needle tip Freche monopolar electrocautery
vii. Avoid procedures that increase risk of vocal fold scarring
   1. Better to leave benign diseased tissue rather than excise too much normal tissue
   2. An irregular edge to the vocal fold with preservation of pliable mucosa is usually a better phonatory result than a scarred straight edge
viii. Infusion of 1% lidocaine with 1:100,000 epinephrine into the superficial layer of the lamina propria may be of benefit in selected cases to define the vocal fold lesion and improve visualization during surgical intervention. This technique, known as "floating the lesion," may be performed using the Xomed-Treace Injection Tray.
ix. Although it is not clearly established to be of value, placement of Kenalog 10 into or onto the surgical bed may be beneficial in selected cases.
x. Respect the principle of unilateral surgery in laryngology, with care to avoid creating opposed raw surfaces on both vocal folds. This leads to scarring and stenosis.

b. Nodules
i. Strict attention to the proper selection of patients in need of surgery to
   1. Remove nodules only after a long period of voice therapy
   2. Remove nodules only after behavior has been modified to diminish the risk of nodule recurrence after resection
ii. Nodules are superficial mucosal lesions
   1. Conservative removal of superficial abnormal mucosa
   2. Avoid use of laser

c. Polyps
i. Preoperatively, speech pathologists are generally involved in the evaluation; speech therapy usually employed postoperatively.
ii. Polyps are usually superficial lesions and often are associated with a "feeding blood vessel."
   1. Preservation of all of the abnormal epithelium overlying the polyp is usually not useful.
   2. Endoscopic suturing or use of fibrin glue to reapproximate epithelium after removal is of questionable benefit.
   3. Monopolar cautery (Freche) is done superficially and on a low setting to the feeding blood vessel.

d. Cysts
i. Preoperatively, speech pathologists are generally involved in the evaluation; speech therapy usually employed postoperatively.
ii. A lateral cordotomy is generally the best approach to cyst removal with preservation of overlying epithelium and underlying vocal ligament.
   1. Ensure that epithelium overlying the cyst is normal before
performing a lateral cordotomy.
2. If the epithelium overlying the cyst is abnormal, access for removal of the cyst may be done through judicious resection of the abnormal epithelium.

e. Vocal Process Granuloma
   i. Indications for removal
      1. Biopsy to rule out cancer
      2. Airway compromise
      3. Persistent symptoms despite adequate nonsurgical therapy
   ii. Nonsurgical therapy
      1. Antireflux measures
      2. Consider Nissen fundoplication for refractory cases
      3. Consider voice therapy
      4. Consider a trial of antibiotics and steroids
   iii. Operative approach
      1. Inject base with Kenalog before excision
      2. Grasp granuloma with forceps and resect with scissors
      3. Avoid use of laser if possible
      4. Employ perioperative antibiotics
f. Polypoid Corditis AKA Reinke's space edema
   i. Indications for removal
      1. Symptomatic dysphonia refractory to nonsurgical management
      2. Airway obstruction due to advanced disease
      3. Concern for malignancy
   ii. Nonsurgical therapy
      1. Voice therapy
      2. Antireflux medication
      3. Smoking cessation (smoking cessation halts disease progression)
   iii. Operative approach

6. POSTOPERATIVE CARE
   a. Most procedures are done as outpatient; concern regarding adequacy of airway may warrant hospitalization.
   b. Medications
      i. Consider additional IV Decadron postoperatively if laryngeal manipulations cause edema.
      ii. Consider antibiotics (Ancef/Keflex) if implants placed or if there is infection identified.
      iii. Consider Zantac/Prilosec/omeprazole with antireflux instructions if findings suggestive of laryngopharyngeal reflux (LPR) (see Antireflux instructions).
      iv. Humidification (bedside humidifier)
      v. Hydration (drink non-caffeinated fluids "until your urine is pale")
   c. Voice Rest
      i. Usual: Absolute voice rest for 48 hours (provide writing pad and bell). "Arm's length rule" ensures voice conservation for two weeks postoperatively. Do not speak to anyone farther away than an arm's length away.
      ii. Confer with speech pathologist regarding special cases. Voice professional may require longer period of voice rest.
      iii. Usual follow-up
         1. Reevaluate two weeks postoperatively (earlier if cancer diagnosed).
         2. Videolaryngoscopy with speech pathology assessment at 6 weeks postoperatively.
         3. Further follow-up is individualized.
   d. Please see Airway Monitoring protocol

7. SUGGESTED READING
   d. Pinkston DR, Garlan MG, Hoffman HT. Pathology quiz case: ductal cysts of


