

# Airway Blocks

Local anesthesia of the upper airway is used to facilitate awake bronchoscopy and laryngoscopy and allow for comfortable placement of the endotracheal tube in patients whom awake intubation is indicated.

Blockade of the oral and nasopharynx can be achieved with topical techniques.

Blockade of the bilateral superior laryngeal nerves provide adequate anesthesia of the epiglottis and infraglottic area.

Transtacheal injection of local anesthetic can provide adequate anesthesia of the trachea and alleviate the cough reflex associated with intubation.

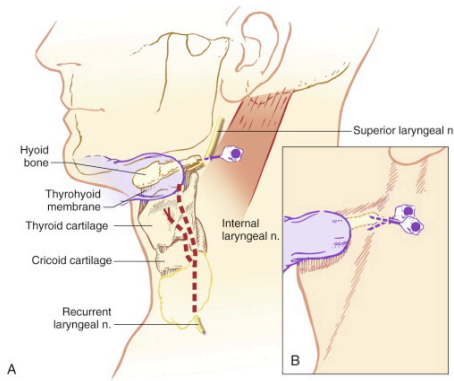
## INDICATIONS

- Facilitation of awake bronchoscopy and laryngoscopy in patients whom an awake technique is indicated

## CONTRAINDICATIONS

- ABSOLUTE**
  - none
- RELATIVE**
  - Caution in those whom a cough reflex may be contraindicated (i.e. increased ICP)
  - Active infection at site of local anesthetic injection
  - Significant coagulopathy (risk of upper airway hematoma, transtracheal bleeding)

## ANATOMY



- hyoid bone (greater cornu)
- thyroid cartilage
- cricothyroid membrane

## INNERVATION OF THE UPPER AIRWAY

- FACIAL NERVE:** oropharynx, nasopharynx, anterior soft palate, anterior 2/3 of tongue
- GLOSSOPHARYNGEAL NERVE:** posterior 1/3 of tongue, posterior oropharynx, posterior soft palate, anterior portion of epiglottis
- INTERNAL BRANCH OF SUPERIOR LARYNGEAL NERVE:** laryngopharynx, piriform fossae, larynx above false cords; superior laryngeal nerve provides motor innervation to cricothyroid muscle (which cause vocal cord to tense)
- RECURRENT LARYNGEAL NERVE:** larynx below false cords, upper trachea, vocal cords; motor innervation of vocal cord abductors (posterior cricoarytenoid) and intrinsic adductors (abductors more susceptible to injury of RLN)

## LARYNX INNERVATION

- Superior laryngeal nerve (branch off vagus nerve)
  - External branch – motor to cricothyroid
  - Internal branch – generalized sensation above level of vocal cords
- Recurrent laryngeal nerve (branch off vagus nerve)
  - All intrinsic muscles of larynx (except cricothyroid)
  - Generalized sensation below the level of vocal cords

| Muscles of Larynx               | Innervation            | Action                 |
|---------------------------------|------------------------|------------------------|
| <b>Cricothyroid</b>             | External branch of SLN | Tenses VC              |
| <b>Posterior cricoarytenoid</b> | RLN                    | <b>AB</b> ductor of VC |
| Lateral cricoarytenoid          | RLN                    | <b>AD</b> ductor of VC |
| Thyroarytenoid                  | RLN                    | Relaxes VC             |
| Transverse arytenoids           | RLN                    | <b>AD</b> ducts VC     |

## DISTRIBUTION OF ANESTHESIA

- SUPERIOR LARYNGEAL NERVE BLOCK:** inferior aspect of epiglottis to vocal cords
- TRANSLARYNGEAL BLOCK:** trachea below vocal cords
- TRANSORAL GLOSSOPHARYNGEAL BLOCK:** posterior tongue, pharynx and epiglottis

## TECHNIQUE:

### SUPERIOR LARYNGEAL NERVE BLOCK

- The patient is placed supine with the neck extended
- The hyoid bone is displaced laterally toward the side to be blocked
- A 25-gauge, 2.5-cm needle is walked off the greater cornu of the hyoid bone inferiorly and advanced 2 to 3 mm

- As the needle passes through the thyrohyoid membrane, a slight loss of resistance is felt
- 3 mL of local anesthetic solution is injected superficial and deep to this structure.
- The block is then repeated on the opposite side.
- This technique produces anesthesia from the inferior aspect of the epiglottis to the vocal cords.

#### **TRANSLARYNGEAL BLOCK**

- A translaryngeal block results in anesthesia of the trachea below the vocal cords
- injection of local anesthetic usually stimulates the cough reflex, and this block should be avoided in patients in whom coughing is undesirable.
- With the patient in the supine position, the cricothyroid membrane is located
- A 20-gauge or smaller, 3- to 5-cm plastic catheter over a needle is introduced in the midline
- The inner steel cannula is withdrawn with the plastic catheter held firmly in place
- aspiration of air confirms correct catheter placement
- Between 3 and 5 mL of a 2-4% lidocaine solution is injected rapidly and usually results in a vigorous cough, which aids in spread of the solution within the trachea.

#### **GLOSSOPHARYNGEAL NERVE BLOCK**

- The glossopharyngeal nerve (i.e., cranial nerve IX) supplies sensation to the posterior third of the tongue, the pharynx, and the superior surface of the epiglottis
- Inject 5 mL of local anesthetic into the base of each posterior tonsillar pillar
- An angled 22-gauge, 9-cm needle, which can be formed by bending the distal 1 cm of a spinal needle with its stylet removed, is used for this block.
- Visualization of the posterior pillar is facilitated by the gentle use of a no. 3 MacIntosh laryngoscope blade after topical anesthetic has been applied to the tongue
- Careful aspiration before injection is mandatory because of proximity of the carotid artery.

#### **EQUIPMENT**

- Topical lidocaine (2-4%) for oropharyngeal/nasopharyngeal anesthesia
- 5cc of 2-4% lidocaine for most upper airway blocks
- 22-25g needle of varying lengths
- 5cc syringe
- consider IV glycopyrrolate as adjunct to upper airway manipulation

#### **COMPLICATIONS**

- intraarterial injection (carotid with glossopharyngeal nerve block)
- local anesthetic toxicity (upper airway mucosa takes up LA very quickly – watch total dose used)
- caution in patients with ‘full stomach’ – abolish airway reflexes with upper airway blockade

#### **REFERENCES**

Miller Anesthesia Chapter 52