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Regional anaesthesia for awake intubation

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Awake intubation has stood the test of time, as a gold standard therapy for anticipated difficult airway management where performance, time and ease, patient's comfort and safety primarily depend on the quality of upper airway anaesthesia provided either topically or by regional blocks.

The NAP4 identified numerous cases where Awake Fibreoptic Intubation (AFOI) was indicated but was not used. The project did not enable us to determine why AFOI was not used but there were cases suggesting lack of skills, lack of confidence, poor judgement and in some cases lack of suitable equipment being immediately available. This latter problem was prevalent in ICU. Awake intubation should be used whenever it is indicated.

There are six key airway management decisions in an anticipated difficult airway:

1. Tracheostomy or awake intubation
2. Oral or nasal route
3. Needle based LA blocks or topical anaesthesia or combination
4. Antisialogogue warranted
5. Use appropriate sedation protocol
6. Airway devices: Fiberoptic intubation or video laryngoscope or direct laryngoscope or supraglottic airway devices.

In making up the decision based on abovementioned key elements can be the most terrifying step in one's career depending on the experience of the service provider.

The lecture/notes will focus on point number 3 above: Airway blocks and topical anaesthesia.

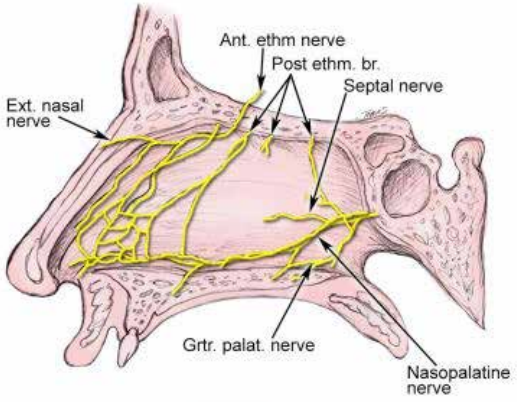
To adequately provide anaesthesia of the upper airway, one requires an understanding of the neuroanatomy of upper airway. The 3 main nerves to be blocked to provide anaesthesia of the nasal cavity, oral cavity and the oropharynx as well as the larynx are the trigeminal nerve (TN), glossopharyngeal nerve (GPN) and the vagus nerve branches i.e. superior laryngeal Nerve (SLN) and recurrent laryngeal nerve (RLN).

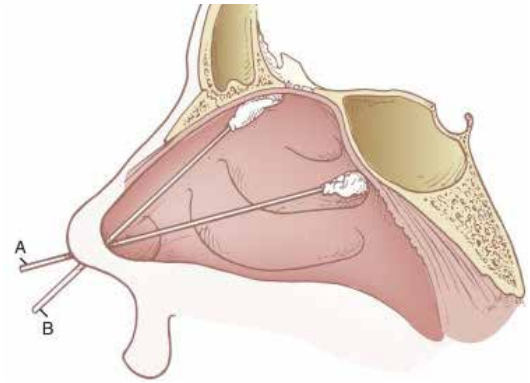
Trigeminal nerve block

Three important branches of the TN should be blocked to anaesthetise the nasal cavity: Anterior ethmoidal nerve and the greater and lesser palatine nerves. Nasal cavity block is only relevant for nasotracheal intubations, for which the topical vasoconstriction is also highly recommended (e.g. Illiadin spray)

Two methods of applying local anaesthetics are popular.

1. Use of cotton tipped swabs soaked in either lignocaine or cocaine.
2. Coating a nasopharyngeal airway with viscous lignocaine mixed with a vasoconstrictor (usually phenylephrine). Cotton wool swabs left for about 10 min or so.
3. This method not only allows for pre-lubrication of the nasal passages with a vasoconstrictor but also ensures that these passages are patent and likely large enough for the passage of the endotracheal tube.





Although the initial placement of the nasal airway can cause some discomfort, it is usually mild and well tolerated by the patient.

Glossopharyngeal nerve block

Provides sensory innervation to the posterior third of the tongue, vallecula, anterior surface of the epiglottis, wall of the pharynx and the tonsils. Topical anaesthesia administered to provide analgesia by blocking tactile receptors in the peroral mucosa but they are considered inadequate to block submucosal deep-pressure receptors innervated by sensory afferent branches of GPN. Given that, GPN block may be more successful in mitigating these reflexes.

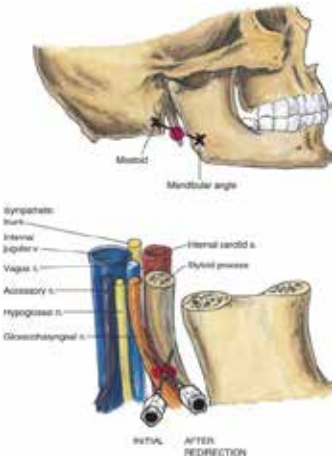
Two approaches can be used: Intraoral and extraoral peristyloid

Intraoral approach

- Enough mouth opening needed to visualise the base of the posterior tonsillar pillar.[1]
- Patient cooperation is essential
- Technique unpopular due to its long-lasting oropharyngeal discomfort.
- Can be used for treatment of neuralgia, for abolition of exaggerated gag reflex during intraoral surgery and for postoperative tonsillectomy.

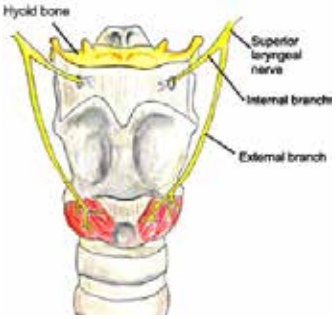
Extraoral peristyloid approach

Peristyloid approach associated with an increased risk of upper airway obstruction, related to the concomitant block of the hypoglossal nerve and the vagal nerve, proximal to the origin of the RLN. Styloid process can be difficult to palpate due to its small width.



Superior laryngeal nerve block

The superior laryngeal nerve is made up of 2 components: - the internal (iSLN) and external branches (eSLN)



A block of the internal branch of the superior laryngeal nerve (iSLN) provides anaesthesia to the base of the tongue, posterior surface of the epiglottis, aryepglottic folds and arytenoids. It abolishes the glottis closure reflex. It has no motor innervation.

Identification of the hyoid bone can be difficult, especially in short, thick or oedematous necks but is facilitated by the fact that it does not articulate with any other bones and is thus fairly mobile. Risk of blocking iSLN is vessel puncture with haematoma and LA toxicity.

The external branch provides sensory innervation to the anterior subglottic mucosa and motor innervations to the cricothyroid muscle. The iSLN pierces the thyrohyoid membrane whereas the eSLN remains superficial to the membrane.

Recurrent laryngeal nerve (translaryngeal block)

Translaryngeal block is a method of topical application of local anaesthesia to the trachea and the larynx where sensory innervation is provided by the recurrent laryngeal nerve (RLN).

Since it is invasive and potentially risky, it is grouped together with the other airway nerve blocks.

RLN supplies all muscles of the larynx except the cricothyroid and conveys visceral sensation to the vocal cords and the infraglottic regions.

Blocking this nerve provides anaesthesia to the infraglottic larynx and upper trachea immediately following injection and used to prevent cough reflex.

Topical anaesthesia

Lignocaine (LA)

It has become the most widely used local anaesthetic agent in the world. It is available in many concentrations (0.5% to 10%) and many forms (liquids, ointments, creams, paste, patches etc). Its advantages include ready availability, relatively low CNS and cardiac toxicity, reasonably quick onset of action and clinically useful duration of action (30-60 minutes after topical application and 1-2 hours after infiltration).

Generally 1-2% solutions are used for infiltration and nerve block, while 2-4% solutions are used for topical application. However, it can be quickly absorbed from oral and tracheal mucosa reaching a toxic level > 5 mg/ml even when moderate amounts of high concentrations are used.

Vasoconstrictors: sometimes used as adjuncts to local anaesthetic. Epinephrine (normally in the concentration of 1:200 000) added to lignocaine has several theoretical advantages. It helps prolong the duration of the nerve blocks and topically causes mucosal vasoconstriction, which improves

visualisation during the procedure and helps limit the bleeding. 0125%-0.5% phenylephrine and 0.05% oxymetazoline are often the commonly used vasoconstrictors.

Methods of topicalisation

Spraying of local anaesthetic can be achieved in different ways, including the use of commercially prepared aerosol spray cans, atomisers and nebulisers.

Gargling

Most commonly, several millilitres of a 2-4% lignocaine solution are placed in the mouth and the patient is instructed to gargle with this solution. While this method can provide adequate anaesthesia to the oral mucosa, it does not often cover the larynx or trachea adequately.

Aspiration

It involves slow dripping of an anaesthetic solution onto the posterior portion of the tongue while it was being manually pulled forward, of a supine subject. Retraction of the tongue is the key because it prevents swallowing whilst promoting aspiration of the LA.

Nebulisation

Nebulisation of lignocaine 2-4% via the facemask or oral nebuliser for 15-30min can achieve highly effective anaesthesia of the oral and tracheal for intubation. Advantages: simplicity and lack of discomfort. In addition, very little working knowledge of the anatomy is required for its successful implementation. Disadvantage: lignocaine wastage and toxicity

Atomisation

Ideal for nasopharyngeal airway topicalisation.

Reference

1. Shawn T.Simmons, Arno R Schleich: Airway regional anesthesia for awake fiberoptic intubation; Regional Anesthesia and Pain Medicine Vol 27 (2) March-April 2002. review