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BRIEF COMMUNICATION

Local Anaesthetic Nerve Blocks in Endoscopic Nasal and Sinus Surgery

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Abstract In the present era, Hemostasis in Endoscopic nasal and sinus surgeries are challenging even with appropriate use of instrumentation and surgical skills. This can be addressed with appropriate local anaesthesia and nerve blocks. Expertise in performing surgery under local anaesthesia can be acquired over years of surgical training. The objective of this article is to define complete nerve blocks which can be used in endoscopic nasal surgeries.

Keywords Endoscopic septoplasty · Local anaesthesia · Nerve blocks · Endoscopic sinus surgery · FESS

Introduction

Functional endoscopic sinus surgery (FESS) is a minimally invasive surgery to restore aeration and drainage of the paranasal sinuses with the preservation of mucosal function and anatomic structures. Septoplasty is a surgical procedure to correct deviated nasal septum. These Surgeries are mostly performed under general anaesthesia or local anaesthesia with sedation in an appropriate operation theatre setting [1].

Local anaesthetic agents have different durations of action and are classified as [2]:

- Short-acting: duration of action of less than four hours, e.g. procaine, chloroprocaine, tetracaine, lidocaine, mepivacaine and prilocaine.
- Long-acting: duration of action of four hours or more, e.g. bupivacaine, levobupivacaine and ropivacaine.

Regional nerve blockade using local anaesthetic agents before endonasal surgery will also help to reduce postoperative pain [3].

How I do it?

Blocks/Infiltration

Nerve blocks are useful for achieving anaesthesia to a specific area of the body. Regional nerve blocks offer many advantages over local tissue infiltration. They are useful when local infiltration may not be possible or could result in tissue damage or distortion. Nerve blocks generally require less anaesthetic medication to produce the desired effect when compared to local infiltration.

Infiltration Solution

Ropivacaine with Epinephrine 1:40,000 (0.5% ropivacaine 20 ml with 0.5 ml epinephrine 1:1000).

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Nasal Packing SOLUTION

Lidocaine with Epinephrine 1:1 (4% lidocaine 10 ml with 10 ml epinephrine 1:1000). We use roller gauze or cottonoid patties dipped in this solution before infiltration for local decongestion effect and surface anaesthesia.

Sphenopalatine Block

Sphenopalatine nerve block performed trans nasally as described below. (Figure 1) Transnasal anaesthesia of the sphenopalatine ganglion is obtained by inserting a 23 gauge spinal needle angled superiorly and laterally at point 5 mm inferior to the posterior end of the middle turbinate submucosally into the sphenopalatine foramen which is located slightly posterior and superior to the attachment of horizontal basal lamella of the middle turbinate, posterior end of the middle meatus.

Insert a 23-gauge spinal needle, bent at 2 cm from the tip of the needle at 45° into the area of the sphenopalatine foramen and a 1.5-ml injection of anaesthetic 1% lidocaine/0.5% Ropivacaine with adrenaline should be administered submucosally after creating negative pressure in the syringe to look for blood, in case it is inside a blood vessel.

Greater Palatine Block

Transoral blocks are especially useful when an obstructive disease such as polyps/septum prohibit trans nasal access. (Also better for work inside maxillary sinus & Inferior Turbinate).

The greater palatine foramen is located posterior and 1 cm medial to the second or third maxillary molar. This depression can typically be palpated before injecting. (Fig. 2).

The Greater Palatine Foramen is 16.2 mm lateral to the sagittal plane of the posterior nasal spine and 6.1 mm anterior to the coronal plane of the posterior nasal spine. The mean thickness of the mucosa overlying the Greater Palatine Foramen is 6 mm. We recommend that the Posterior nasal spine may be used as the bony landmark to locate the position of the Greater Palatine Foramen during Pterygopalatine fossa infiltration [4].

Insert a 23-gauge spinal needle bent at 2.5 cm from the tip of the needle at 45–60° into the area of the greater palatine foramen and a 1.5-ml injection of anaesthetic 1% lidocaine/0.5% Ropivacaine with adrenaline should be administered in adults. The mucosa is first anaesthetized and then advanced through the foramen, which may require slight changes in direction of the needle to localize it.

Negative pressure should be applied prior to injection and resistance felt. Aspiration of blood signifies entry into a blood vessel and aspiration of air signifies nasopharynx and requires repositioning. Transoral anaesthesia of the sphenopalatine ganglion/Nerve is obtained via a greater palatine block.

Anterior Ethmoidal Block

It provides anaesthesia and vasoconstriction to the anterior ethmoid neurovascular bundle. It is for middle turbinate and frontal recess surgeries. The block is given in the lateral nasal wall anterior to the root of the middle turbinate with a 23 gauge spinal needle. About 0.5ml of local anaesthetic solution of 1% lidocaine/0.5% Ropivacaine with adrenaline is injected submucosally. (Fig. 3).

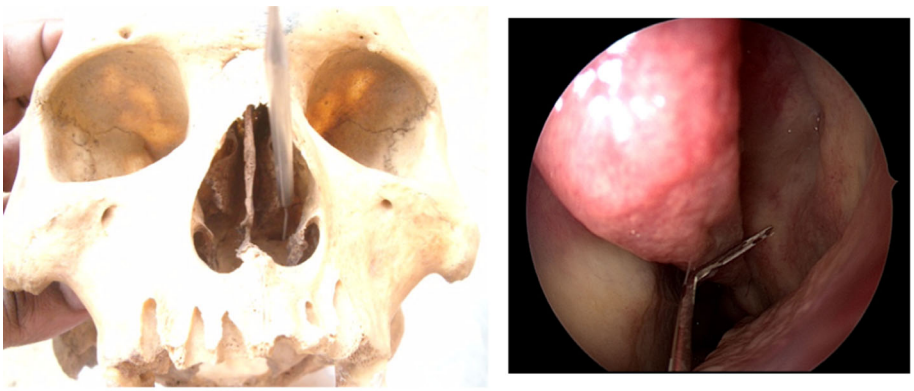

Fig. 1 Sphenopalatine block, surface marking, endoscopic view

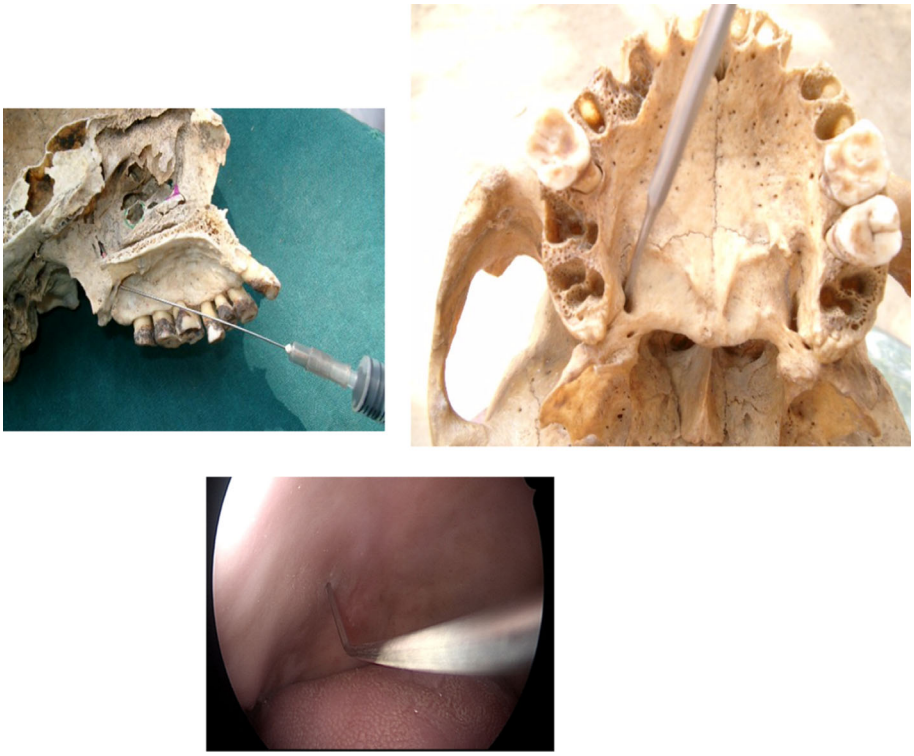

Fig. 2 Greater palatine nerve block- surface marking, endoscopic view

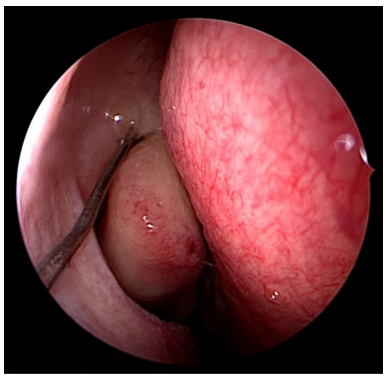

Fig. 3 Anterior ethmoidal block, Endoscopic view

Frontal Block–Supra and Infra Trochlear, Supra Orbital Nerve

Infiltration of 1ml of anaesthetic solution (1% lidocaine/ 0.5% Ropivacaine with adrenaline) is injected 3 cms from midline, by palpating supra orbital notch on either sides on superior margin of eyebrow with a 23 gauge normal 1.5 inch needle with the same above mentioned solution. (Fig. 4).

Infraorbital Block

The infraorbital nerve innervates the area of the lower eyelid, the side of the nose, the upper lip, upper incisor, canine, premolars, and root of the first molar. It only provides sensory innervation. An infraorbital nerve block is very useful for procedures that involve the skin between the lower eyelid and upper lip and anterior wall of the maxilla. The infraorbital nerve block is easily achieved by infiltrating an anaesthetic solution in the area of the infraorbital nerve. This can be done by an intranasal and intraoral approach. The intraoral approach is achieved by injecting anaesthetic solution into the mucosa opposite the upper second bicuspid teeth approximately 0.5 cm from the buccal margin. The intranasal approach involves injecting anaesthetic solution into the tissues around the infraorbital foramen through the nose, anterior to the pyriform aperture to reach below the lower orbital margin where the infraorbital nerve exits from the anterior face of the maxilla. (Fig. 5).

Inferior Turbinate Block

Given at the anterior end of inferior turbinate about 1 ml of local anaesthetic solution, along with sphenopalatine block. (Fig. 6).

Fig. 4 Frontal block, surface marking

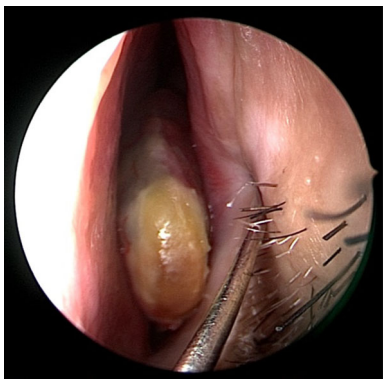

Fig. 5 Infraorbital block, Endoscopic view

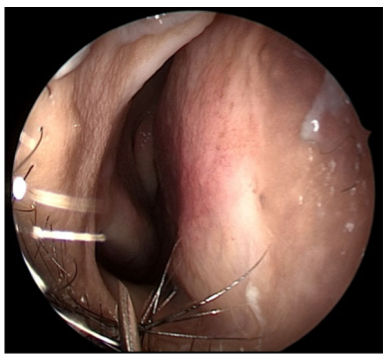

Fig. 6 Inferior turbinate block

Inside Maxillary and Sphenoid Sinus–Surface Anaesthesia

Long Roller gauze or cottonoid lint soaked (according to the size of the sinus approximately 6cms) in 4% lidocaine with epinephrine in ratio 1:1 is inserted into maxillary sinus after doing Middle Meatal Antrostomy or into sphenoid sinus after doing sphenoidotomy, kept for 2 min coating all area of the sinus. (Fig. 7).

Our Experience

The Senior author has been doing most (more than 90%, except Children) of the Nasal, Septal and Sinus Surgeries (FESS) under local anaesthesia with sedation for the past 22 years. Sedation is given in the form of intramuscular pentazocine and promethazine (Inj. pentazocine: 1 ml–30 mg (0.6 mg/per kg body weight, Inj. promethazine–2 ml- 50 mg) intramuscularly 45 min before surgery or intraoperatively intravenous fentanyl and dexmedetomidine as an infusion (Inj. fentanyl–100mcg (2 ml) intravenously (divided into quarterly every 15 min), Inj. Dexmedetomidine–1 mcg/kg–intravenously in 10 min loading, followed by 0.3 to 0.5 mcg/ kg per hr IV maintenance (flexible) to get a desired sedation.

The nasal cavity is packed with roller gauze or lint soaked with Lidocaine with Epinephrine 1:1 (4% lidocaine

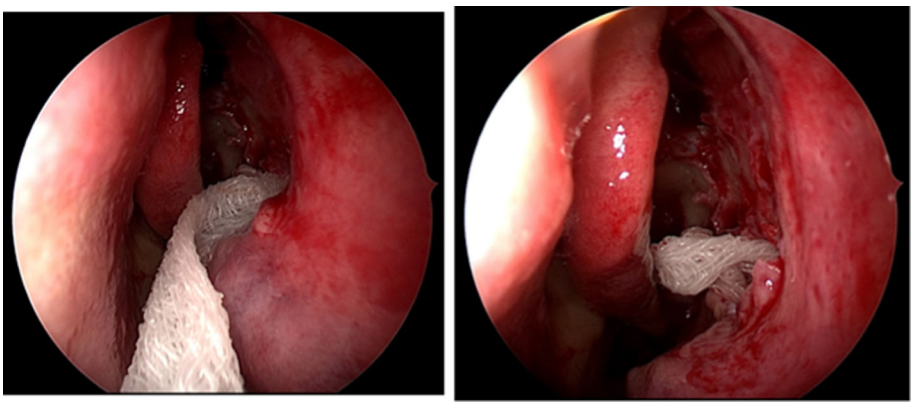

Fig. 7 Maxillary sinus, surface anesthesia

10 ml with 10 ml epinephrine 1:1000) on the table, followed by the required blocks depending on the surgery. The senior author avoids infiltration into middle turbinate, uncinate, floor and nasal wall since they cause oozing and constantly fogs the telescope and cause tissue edema and narrow the working space. For septal correction, infiltration is done into the septum on either side for hydro elevation of the flaps.

We haven't come across any complications with these blocks in the past 22 years of practice. The Patient's cooperation with intravenous sedation is very good.

Discussion

A major drawback to endoscopic visualization is intraoperative bleeding, which in turn will lead to increased risk of complications, including skull base injury, orbital or optic nerve injury and catastrophic bleeding from major vessels (e.g., internal carotid artery). This is highly problematic in patients with extensive nasal polyposis and infections. Hence adequate haemostasis has a major role in providing an optimum surgical field thereby reducing the incidence of complications [5].

Nasal packs that are sometimes used to reduce postoperative bleeding can increase the patient's pain and discomfort. Thus, effective analgesic strategies are needed to reduce pain after surgery. Local anaesthesia includes the injection (regional block) and local application (via nasal packing) of an anaesthetic agent [2].

From a technical standpoint, the application of local anaesthetic delivery is a crucial aspect of the procedure. With basic surgical skills, it is possible to use some of the newer technologies that are available. However, to maximize the patient's ability to tolerate awake procedures, the practising otolaryngologist must have sufficient surgical skill to perform procedures with little extraneous trauma [6].

Conclusions

The use of local anaesthetic blockade in endoscopic nasal surgery provides several advantages. These include reduced intraoperative and postoperative pain, bloodless surgical field, enhanced patient satisfaction, with no general anaesthesia complications, reduced length of hospital stay and improved quality of care [7]. Nasal cavity packing after nasal and sinus surgeries is not required under local anaesthesia.

Declarations

Conflicts of interest The authors declare that they do not have any conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from individual participant included in the study.

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