Original Research Paper

Volume-8 | Issue-3 | March-2018 | PRINT ISSN No 2249-555X

Anesthesiology

STUDY COMPARING THE ANALGESIC EFFICACY OF ANTERIOR ETHMOIDAL NERVE BLOCK WITH GREATER PALATINE NERVE BLOCK AND TOPICAL ANAESTHESIA FOR SEPTAL AND ENDOSCOPIC SINUS SURGERIES

Dr.C.Chitra — M.D;D.A;Assistant Professor,Department of Anaesthesiology, Govt.Chengalpattu Medical College and Hospital,Chengalpattu, Tamilnadu, India.

Dr R. Mala* — M.D. D.A., Associate Professor, Department of Anaesthesiology, Government Chengalpattu Medical College and Hospital, Chengalpattu,Tamil Nadu, India. *Correspondence Author

ABSTRACT This study observes the postoperative analgesic efficacy of the Anterior Ethmoidal Nerve Block and Greater Palatine Nerve block in septal and endoscopic sinus surgery patients. A Total of 60 patients were enrolled in this study after obtaining informed consent. All the patients are posted for elective septal or sinus surgery [FESS]. They were randomly divided into two groups. Group A and Group B. Group A patients received preoperative topical anaesthesia nasal pack with 4% lignocaine and surgery proceeded under general anaesthesia. Group B patients received bilateral Anterior Ethmoidal Nerve Block and Greater palatine Nerve Block after intubation preoperatively and surgery proceeded thereafter. The postoperative Analgesic efficacy was compared in both the groups using Visual Analogue Scale [VAS] and the need for rescue analgesia also observed. The results were statistically analyzed. In our study we conclude that patients of Group B who were given nerve blocks showed statistically significant reduced pain scores and decreased need for rescue analgesic in the post operative period when compared to Group A.

KEYWORDS : Anterior Ethmoidal Nerve Block, Greater Palatine nerve block, FESS, Septoplasty, VAS Pain scale

INTRODUCTION

Pain is a fundamental protective biological phenomenon.Adequate pain management in the perioperative period is the key for the patient satisfaction. Regional nerve block has gained importance in the recent days for efficient pain relief.Peripheral nerve blocks have definite advantages in the perioperative pain management because of its superior pain control and they are devoid of somnolence, respiratory depression, nausea and vomiting unlike opiods. Patients will be conscious and comfortable. These techniques also attenuate the stress response following surgery.

ANATOMY OF PARANASAL SINUSES(1)(2):

The paranasal sinuses are air containing cavities around the nasal cavity. They are named as frontal, ethmoidal, maxillary and sphenoidal sinuses.

NERVE SUPPLY OF THE PARANASAL SINUSES:

Frontal sinus: Supraorbital nerve
Ethmoidal sinus: Anterior and Posterior Ethmoidal nerve
Maxillary sinus: Anterior,Middle,Posterior superior alveolar branches of maxillary nerve and Infraorbital nerve

Sphenoidal sinus: Branches from sphenopalatine ganglion

NERVE SUPPLY OF THE NOSE(3)(4)(fig 1 and 2)

1. **Olfactory nerves:** 12-20 nerves pass through the cribriform plate and end in the olfactory bulb. They supply the olfactory region of the nose and carry sense of smell.
2. **Autonomic nerves:** Parasympathetic nerve fibres from Greater Superficial Petrosal nerve [vasodilatation and nasal secretion]. Sympathetic nerve fibres from Deep Petrosal nerve [vasoconstriction].
3. **Nerves of general sensation:** They are derived from the ophthalmic and maxillary divisions of Trigeminal nerve.

1. Anterior Ethmoidal nerve: The anterior parts of nasal cavity- both the lateral walls and the septum is supplied by this nerve.
2. Infraorbital nerve-supply the vestibule of the nose both the lateral and medial side.
3. Branches of the Sphenopalatine ganglion [Nasopalatine, Greater Palatine nerves supply posterior part of the nasal cavity, the lateral walls and the septum of the nose.

Mechanism of action:

Local anesthetics (5((6) act on the voltage-gated sodium channels that conduct electrical impulses and mediate fast depolarization along nerves. Most of the local anesthetics target open channels and prevent ion flow. Lidocaine preferentially binds to the inactivated state of voltage gated sodium channels, but has also been found to bind potassium channels, G-protein coupled receptors, NMDA receptors, and calcium channels in vitro. Duration of the block is mostly influenced by the amount of time the anesthetic is near the nerve. Lipid solubility, blood flow in the tissue, and presence of vasoconstrictors with the anesthetic all play a role in this. High lipid solubility makes the anaesthetic more potent and increase the duration of action.

FIGURE 1:
NERVE SUPPLY OF LATERAL NASAL WALL

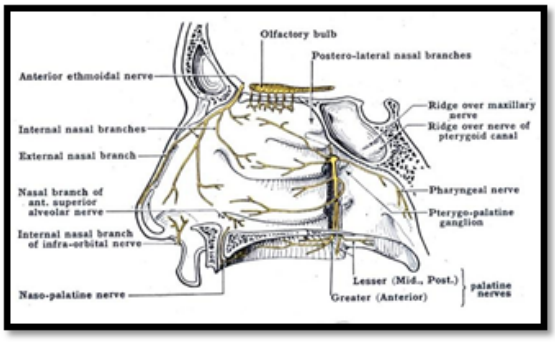
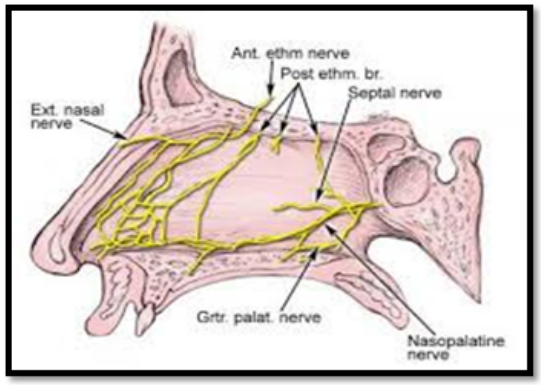


FIGURE 2: NERVE SUPPLY OF THE NASAL SEPTUM



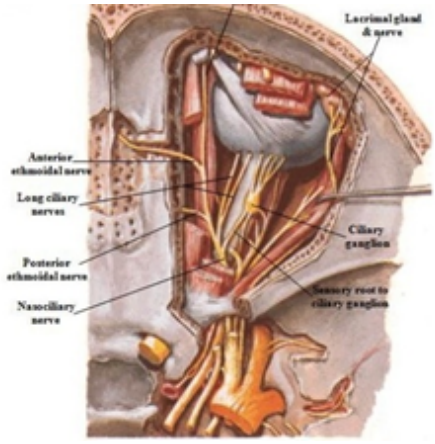
NEUROANATOMY OF ANTERIOR ETHMOIDAL NERVE:

The opthalmic division is the first division of the Trigeminal nerve. It gives rise to the nasociliary nerve.The nasociliary nerve gives off its

four branches:1.Ramus communicans to ciliary ganglion, 2.Long ciliary nerve, 3. Infratrochealar nerve, 4.Posterior Ethmoidal nerve and after crosssing the Optic nerve it run below the superior rectus and the superior oblique muscle and then continues as the Anterior Ethmoidal nerve near the medial wall of the orbit.

The Anterior Ethmoidal nerve gives sensory branches to the meninges and it transverse through the anterior ethmoidal foramen and run along the cribriform plate to the nasal cavity through the slit lateral to the crista galli. It then divide into the external and internal nasal branches.The external nasal branch supply sensation to the skin of the nasal ala,distal aspect of the dorsum and tip of the nose.The internal nasal branch divides into the medial and lateral nasal branches which supply the mucosa of the nasal septum and the lateral nasal wall respectively.

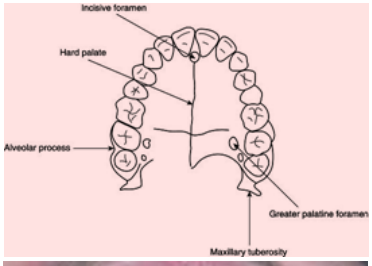
FIGURE 3:
ANATOMY OF ANTERIOR ETHMOIDAL NERVE

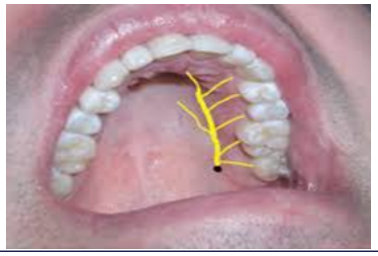


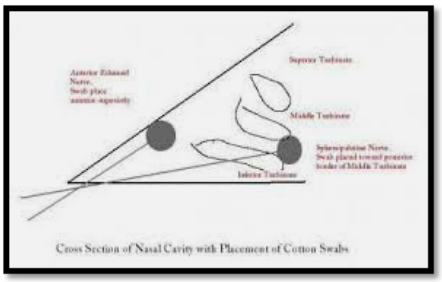
NEURO ANATOMY OF GREATER PALATINE NERVE:

The Greater Palatine nerve (Anterior Palatine nerve (7)(8) is a branch of the pterygopalatine ganglion that carries both general sensory fibres from the maxillary nerve and parasympathetic fibers from the nerve of the pterygoid canal. It descends through the greater palatine canal, emerges upon the hard palate through the greater palatine foramen, and passes forward in a groove in the hard palate, nearly as far as the incisor teeth. In the pterygopalatine canal it gives off lateral posterior inferior nasal branches which enter the nasal cavity through openings in the palatine bone, and ramify over the inferior nasal concha and middle and inferior meatus; at its exit from the canal, a palatine branch is distributed to both surfaces of the soft palate. This nerve supplies the lateral part of nose, gums ,mucous membranes and glands of the hard palate

FIGURE 4:
LOCATION OF GREATER PALATINE FORAMEN AND THE PATH OF GREATER PALATINE NERVE







ANTERIOR ETHMOIDAL NERVE BLOCK TECHNIQUE:
A 3 cm 25G needle is taken and slightly bend it along the middle about 1.5 cm from the tip of the needle. The needle is inserted 1cm above the medial canthus and redirected posterolaterally along the bone to a depth of 1.5 cm. 2ml of 0.25% Bupivacaine is given after careful aspiration.Pressure is applied immediately after withdrawing the needle.

This block provide sensory anaesthesia to the ethmoidal sinuses, anterior part of the septum and anterior part of lateral wall of the nose[11].

The complications of Anterior Ethmoidal nerve block are Ecchymosis,accidental intravascular injection and injury to the adjacent orbital structures.Usage of 3cm small length needle will help to avoid such complications.

FIGURE 6:
ANTERIOR ETHMOIDAL NERVE BLOCK

GREATER PALATINE NERVE BLOCK TECHNIQUE (12) (13):
A cotton swab is placed between midline of hard palate and the maxillary alveolar process. Starting in the region of the maxillary first molar apply pressure with the cotton swab while moving posteriorly. The swab will fall into the depression created by the greater palatine foramen about 1 to 2cm away from the 1st or 2nd molar tooth. Clean and dry the area with the sterile gauze. Move the cotton applicator posteriorly so it is directly over the greater palatine foramen and apply sufficient pressure to blanch the tissue for 30 seconds. Direct the syringe from the opposite side of the mouth at a right angle to the target area with orientation of the needle bevel against the blanched tissue. Slowly advance the needle approximately 8mm to 10mm until palatine bone is contacted. Withdraw 1mm and deposit a small volume of local anaesthetic solution. In our study we used 0.5 ml of 0.25% Bupivacaine on both side.

FIGURE 7:
GREATER PALATINE NERVE BLOCK

VISUAL ANALOGUE SCALE [VAS]:
It is the most commonly used pain scale for quantification of pain The subjects will specify their level of measurement of pain by indicating a position along a continuous line between two end points from none to extreme amount of pain.. It is a straight horizontal line of fixed length usually 100mm. The VAS scale is completely filled by patients themselves. The perception of pain is marked by the patients along the line at a particular point.VAS score is determined by measuring in millimeters from left hand end of the line to the point that the patient marks.Based on the intensity of pain (15)in the VAS score in post surgical patients the is quantified as No pain (0-4mm),mild pain(5-44mm),moderate pain(45-74mm),and severe pain (75-100mm).

RESULTS AND DISCUSSION:
Abbreviations:
TA-Topical Anaesthesia
NB= Nerve Block [Anterior Ethmoidal Nerve block and Greater Palatine Nerve block]
ASA=American Society of Anaesthesiologist Classification
Group A=TA=Topical Anaesthesia Group
Group B=NB= Nerve Block group
VAS=Visual Analogue Scale scoring

In our study sample size calculated was 58.32. So we enrolled a total of 60 patients for our study with 30 patients in each group. Thus n=30 in Group A and Group B. The demographic data included was Age, Gender, Type of surgery and ASA classification.

AGE DISTRIBUTION:
Age group for this study is 18-65 years. In group A age distribution is between 19 to 60 years. In group B age distribution is between 18 to 63 years. The p value is 0.6228 [No statistical significant difference]. Hence both the groups are comparable in age distribution.

GENDER DISTRIBUTION:
Both group are comparable in Gender distribution and p value is not statistically significant.

TYPE OF SURGERY:
The association between the intervention groups and type of surgery has p value more than >0.05 as per Fishers exact test. Hence both the groups are comparable.

Surgery	Group A	%	Group B	%	p value
Fess	19	63.33	19	63.33	1.0000
Smr	1	6.67	1	0.33	0.4915
Fess+Smr	5	10	3	16.67	0.7065
Septoplasty	1	6.67	2	2.33	>0.9999
Fess+ Septoplasty	4	13.33	5	16.67	>0.9999

FIGURE 8:
VISUAL ANALOGUE SCALE

VAS		1 Min	30 Min	1 Hr	3 Hr	4 Hr
A group	N	30	30	30	30	30
	MEAN	1.23	1.45	1.8	2.6	3.13
	SD	0.68	0.80	0.8	0.9	0.97
B group	N	30	30	30	30	30
	MEAN	0.10	0.17	0.2	0.5	0.80
	SD	0.31	0.38	0.4	0.6	0.94
P value		0.01	0.01	0.0	0.0	0.00

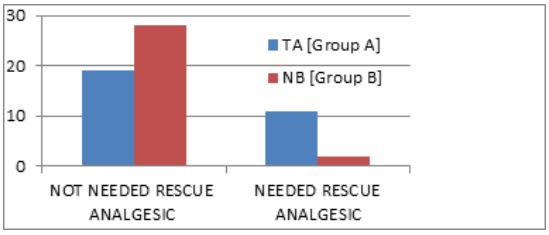
VAS		5 Hr	6 Hr	12 Hr
A group	N	30	30	30
	MEAN	3.53	3.60	3.9
	SD	1.04	0.86	1.85
B group	N	30	30	30
	MEAN	1.30	1.53	3.8
	SD	1.15	0.90	1.92
P value		0.038	0.042	1.012

The p value <0.05 is statistically significant.

In our study we inferred that the Group B [Nerve block group] showed statistically significant less pain scores when compared to Group A.

This inference was obtained starting from immediate postoperative period ,15 minutes.30 minutes,1 hour,2 hour, 3 hour,4 hour,5 hour,6 hour postoperatively. In the 12 hours postoperative period both the groups have almost same pain scores and does not show much difference.

NEED FOR RESCUE ANALGESIA:
In our study we used intramuscular Diclofenac as rescue analgesic if the pain score VAS is equal or above 40mm.



Thus in our study we observed need for rescue analgesia is very less in Group B subjects who received Anterior Ethmoidal and Greater Palatine Nerve blocks when compared to Topical Anaesthesia Group A.

CONCLUSION:
Patients who received nerve block [Anterior ethmoidal nerve block+ Greater palatine nerve block] had minimal pain in the postoperative period. Their post operative VAS score was less and statistically significant difference is obtained in the first 6 hours period when compared to other group. The need for rescue analgesia is also less in this group. Thus nerve blocks in nasal surgeries produce superior patient comfort and usage of such nerve blocks will be promising in reducing the postoperative stress .

REFERENCES

1. Millers Anaesthesia. Anaesthesia for ear,nose and throat surgery.2014:8:2523-2549.
2. Morgan&Mikhails. Anesthesia for otorhinolaryngologic surgery.2014:5:773-787.
3. Stoelting. Anesthesia and coexisting diseases.Disease of Eye,Ear,and Throat.661-668.
4. PL Dhingra. Diseases of Ear,Nose and Throat.Anatomy of Nose.1998:2:133-137.
5. Wildsmith and Armitage .Principles and Practice of Regional Anesthesia.1987:1:1-7.
6. Stoelting Pharmacology and Physiology in Anesthetic Practice. Local Anaesthetics.2015:5:282-314.
7. Methathrathip D, Apinhasmit W, Chompoopong S, Lertsirithong A, Ariyawatkul T, Sangvichien S, et al. Anatomy of greater palatine foramen and canal and pterygopalatine fossa in Thais: Considerations for maxillary nerve block. Surg Radiol Anat. 2005;27:511–6.
8. Sharma NA, Garud RS. Greater palatine foramen-key to successful hemimaxillary anaesthesia: A morphometric study and report of a rare aberration. Singapore Med J. 2013;54:152–9.
9. Molliex S.British Journal Of Anaesthesia. Regional Anaesthesia for out patient nasal surgery.1996 S
10. Devyani Lal. Nose Anaesthesia. Overview, Indications, Contraindications. Nov 14, 2014.
11. Kim HS. Int J Oral Maxillo Fac Surg. Decreased post operative pain after reduction of fractured nasal bones using nerve block of Anterior Ethmoidal nerve.
12. Lepere A. Maxillary nerve block via the greater palatine canal: New look at an old technique. Anesth Pain Control Dent. 1993;2:195–7.
13. Georges Aoun, Ibrahim Zaarour. J Int Soc Prev Community Dent. 2015 Sep-Oct; 5(5): 359–364. Maxillary nerve block via the greater palatine canal: An old technique revisited.
14. Mc Cormack HM, Horne DJ, Sheather S. Clinical applications of visual analogue scale: A critical review. Psycho Med 1988;18: 1007-19.15. Joos E, Peretz A, Beguin S, et al. Reliability and reproducibility of visual analogue scale and numeric rating for therapeutic evaluation of pain in rheumatic patients. J Rheumatol 1991; 18: 1269-70.