

Role of Contact Points in Nose as an Etiological Factor for Headache and its Surgical Outcome

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ABSTRACT

Mucosal contact headache is a newly added secondary headache disorder in the International Classification of Headache Disorders (ICHD-2) supported by limited evidence. Headache is a very frequent symptom, which is the complaint of half of the subjects that come to the physician. The present study was aimed to evaluate the outcome of surgical treatment of patients with refractory headaches with intranasal mucosal contact points. Headache due to the pressure on nasal mucosa of anatomical variations, nasal polyps, or mucosal swelling in the absence of inflammation of the paranasal sinuses is a clinical entity that has gained wide acceptance. Surgical correction of contact points in the nose by functional endoscopic sinus surgery results in relief of chronic headache. In themes with primary headaches, contact points may be connected with the treatment refractoriness.

Keywords:

ICHD-2, nasal mucosa, Headache, endoscopic sinus

1.Introduction

Headache is a very common symptom, which is the complaint of half of the subjects that come to the physician. Chronic headache is distressing for both the patient and the physician; to the former due to its nagging nature and to the latter for his inability to diagnose and for problems of self-medication in many cases. The causes of headache are multi-factorial varying from simple tension headache, migraine, myo-facial spasm, tempero-mandibular joint arthralgia, vascular headache, refractory errors of vision, and brain tumors. It requires a multidisciplinary approach to diagnose the causative factors.

Contact points may be a cause of secondary headache or an exacerbating factor for primary headaches [1]. Mucosal contact headache is a newly added secondary headache disorder in the International Classification of Headache Disorders (ICHD-2) supported by limited evidence.

According to the ICHD-2, these headaches are characterized by intermittent pain localized in the peri-orbital and medial canthal or temporo-zygomatic regions, associated with evidence of mucosal contact points by nasal endoscopy or computed tomography (CT) imaging. The contact between the structures, in addition to being a mechanical stimulus in those regions considered as origin of the pain, promote local inflammatory process, with release of mediators that are related with the painful process [2]. The presence of mediators as substance P and histamine reduces pain threshold in the nasal mucosa receptors [1]. The theory of the local reflex triggered by contact between structures, with release of vasoactive amines and onset of edema is a mechanism valued by the literature [3,4,5]. This mechanism can be the substance P as a mediator of the reflex. P substance is a neuropeptide known since 1931 and found in sensitive nervous fibers of the nasal and paranasal mucosa [6-12].

Various stimuli in the polymodal receptors which is located in the nasal mucosa, such as infectious, chemical or mechanical (pressure) irritating agents may generate an orthodromic impulse to the cerebral cortex. This impulse is mediated by substance P, responsible for the painful stimulus. In addition to orthodromic impulse, such stimuli generate also antidromic impulses, capable of releasing P substance in the nasal mucosa,

mediating plasma leak, vasodilation, smooth muscle contraction and hypersecretion. This mechanism is called axonalreflex.

Mucosa edema may increase the existing pressure among the structures, maintaining the process in a vicious cycle[13-16]. The occurrence of local trauma by the contact and pressure between the structures can also lead to release of substance P in the nasal mucosa^[7]. Here we assess the headache outcome after the surgical correction of contact points in the sino-nasal area (intra-nasal contact between opposing mucosal surfaces) in patients with chronic headaches[17-20].

2. Materials and Methods

Source of data:

Patients attending the Department of Oto-rhino-laryngology & Head and Neck surgery, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry from November 2015 to December 2017 who had fulfilled the inclusion criteria mentionedbelow. Inclusion criteria and Exclusioncriterion was followed

Sample size of thestudy:

A total of 150 cases in ENT out patient in the year Nov 2015 - Dec 2017 with chronic refractory headache those meets the inclusion criteria – were included in the study. These 150 patients of chronic headache were then subjected to detailed ENT examination.

Methods of Data Collection:

All the patients were subjected to detailed history taking, clinical and systemic examination prior to otorhinological examination to rule out any systemic causes like hypertension, migraine, tension headache, neurological causes, ophthalmological examination to rule out refractory errors, gynaecological check up to eliminate premenstrual tension and premenopausal syndrome as cause of headache.

ENT examination:

Consisted of detailed history of headache, its periodicity, intensity, localization, precipitating factors, associated symptoms like nausea, vomiting, nasal block, rhinorrhoea, anosmia, epistaxis, and snoring. Anterior and posterior rhinoscopy was done to assess and evaluate any anatomical variation or pathological lesion. X-ray paranasal sinuses water's view and additional views if required were done to rule out any paranasal pathology.

Routinely this was followed by diagnostic endoscopy under local anesthesia. CT scan was ordered in patients who were found to have some evidence of pathology or anatomical variation .Contact points had to be present on CT scan. This was defined by contact between the nasal septum and superior or middle turbinate and/or medial wall of ethmoid sinus. During a headache attack, patients reported significant improvement after topical anaesthesia to the contact area.

The area of the contact point was treated with cotton soaked in decongestant and lignocaine. If the headache completely disappeared or diminished by more than 50% in intensity, subjects were considered candidates for surgery. After a complete work up, these patients submitted to endoscopic sinus surgery and septoplasty for contact point headaches in the same surgical facility, from 2015 through2017.

Surgical technique:

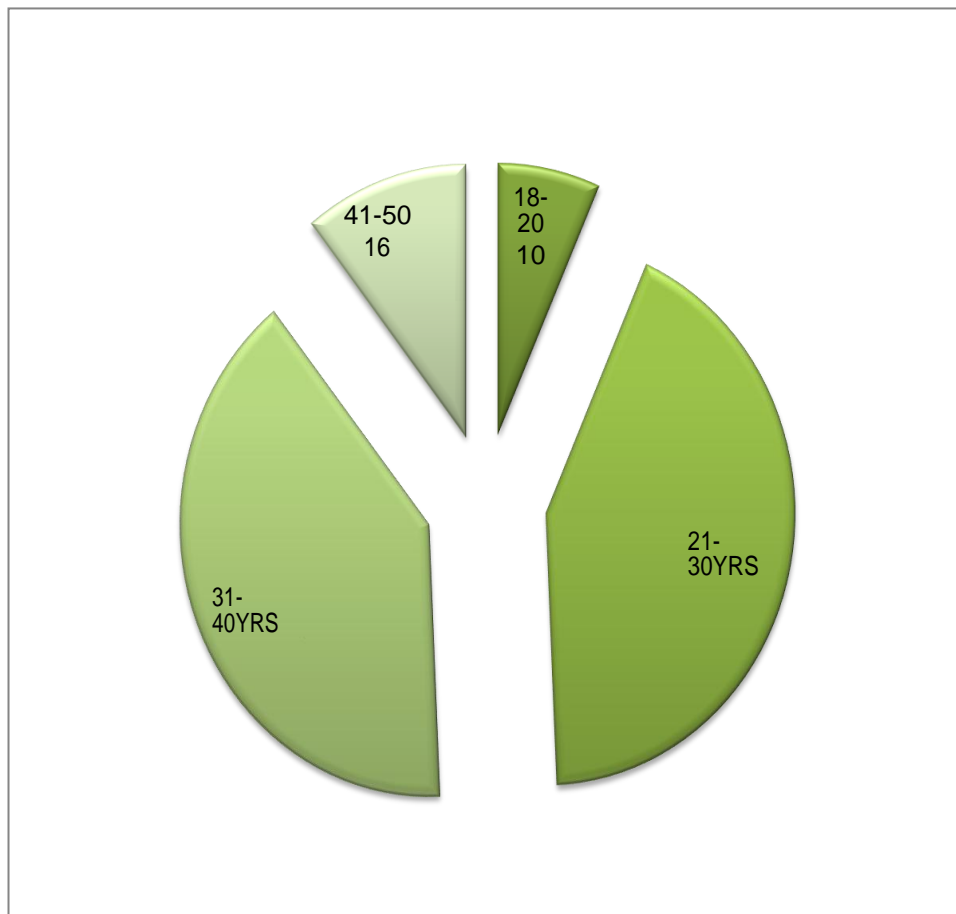
Once the diagnosis was made and consent was obtained, surgery was scheduled. This procedure required general anaesthesia. The area between the septum and middle turbinate and/or ethmoid

sinuses were visualized and the contact point was identified. The surgery (ESS) included septoplasty, middle turbinectomy, uncinectomy and ethmoidectomy. Septoplasty was always performed first, followed by a middle turbinectomy in order to gain access to the medial wall of ethmoid cells. Next, the ethmoidectomy was performed, and the medial wall of ethmoid sinuses was removed. Patients contact between the septum and middle turbinate had a partial middle turbinectomy and septoplasty performed. Headache information was obtained using standardized questionnaires at baseline and at follow-up visit (2–6 months after surgery). At baseline we collected information on headache frequency, severity (10- point ordinal scale, where 0 was no pain and 10 was pain as bad as it can be), at follow-up we repeated the same questionnaire.

3. Results and Discussion

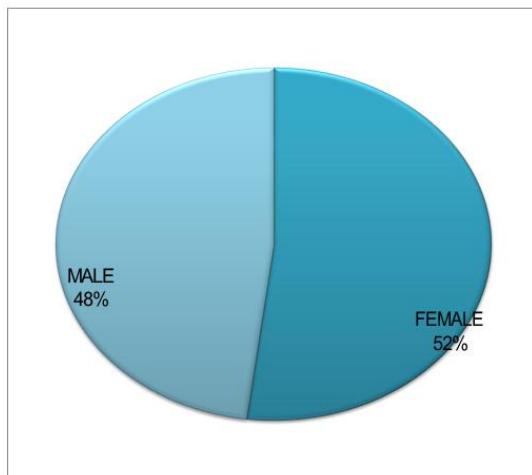
In our study the age of patients ranged from 18years to 50 years and majority of them were found to be in age group of 21-30years (42.7%) which was shown in the figure 1. The Mean age was of 26.7years.

FIGURE 1: AGE WISE DISTRIBUTION



In was clearly shown in the figure 2 that, in the present study majority of the patient were females (52%) followed by males (48%).

FIGURE 2 : SEX WISE DISTRIBUTION



In our present study majority of the patients fall in the middle socioeconomic status (57.3%) followed by low socioeconomic status(38.7%) and then by high socioeconomic status(4%) which was shown in figure 3

FIGURE 3 : SOCIO ECONOMIC STATUS

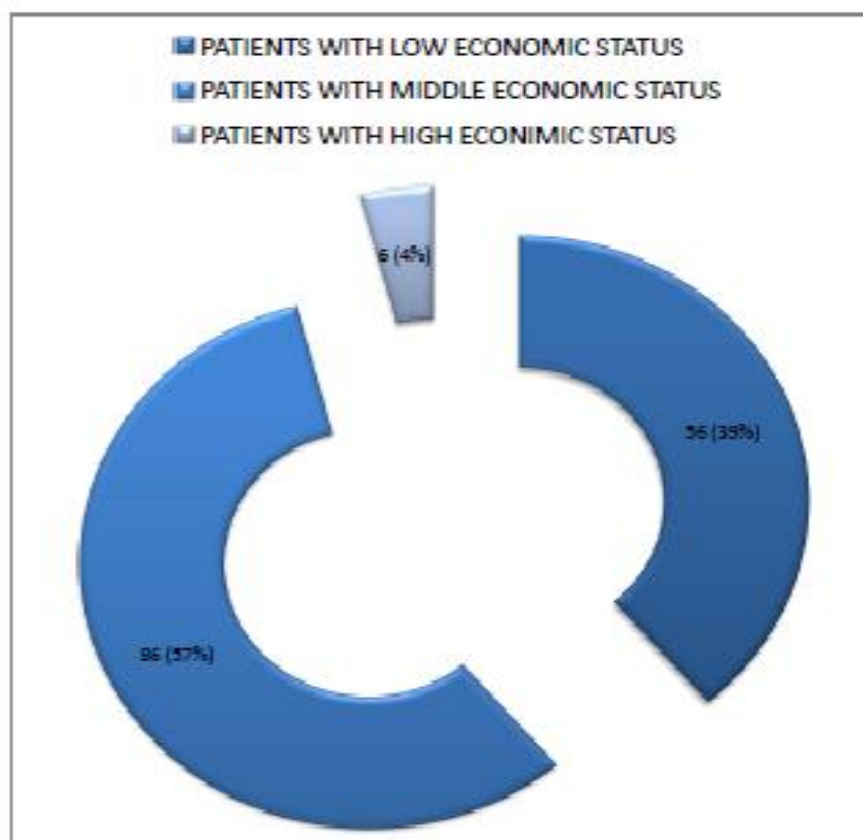
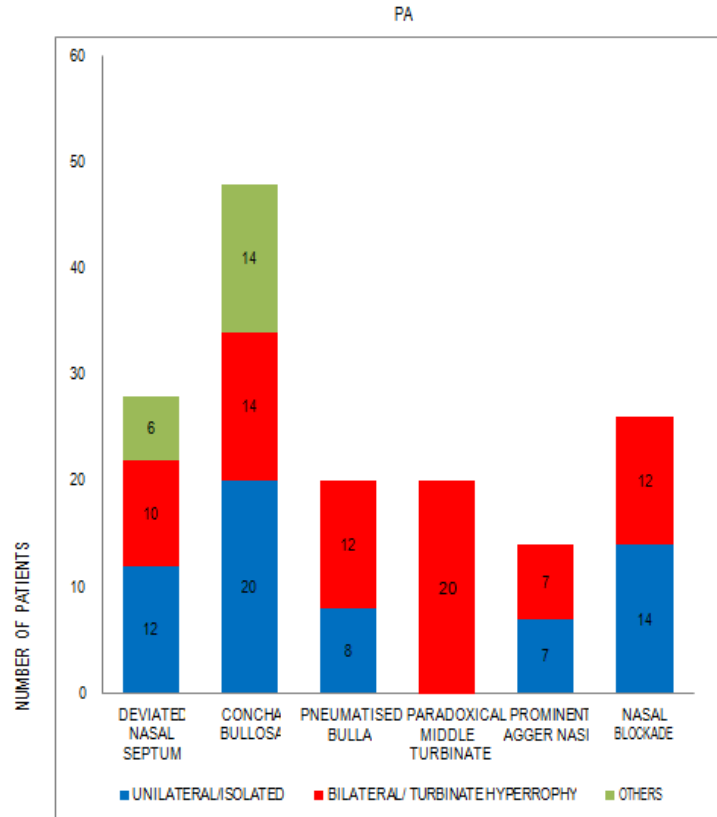
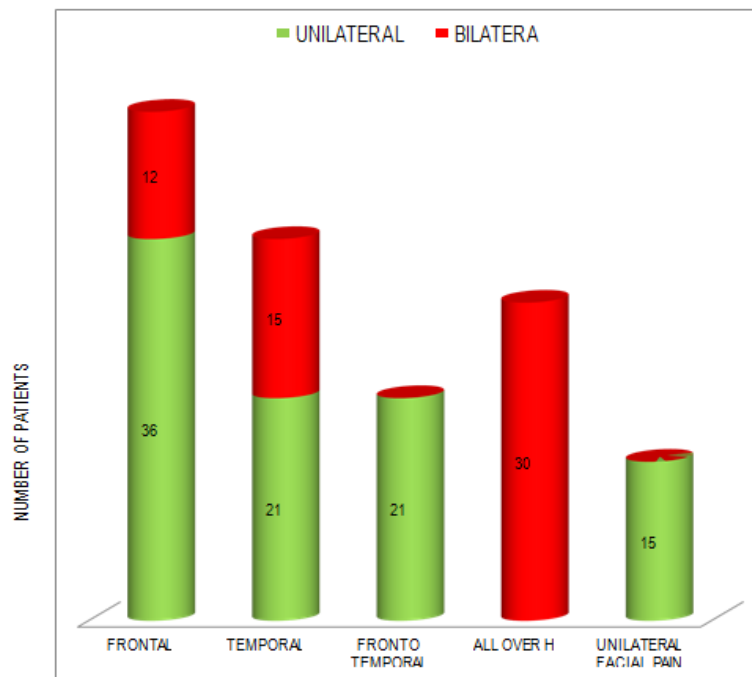


FIGURE 4: CAUSES FOR HEADACHE (TOTAL 150 PATIENTS)



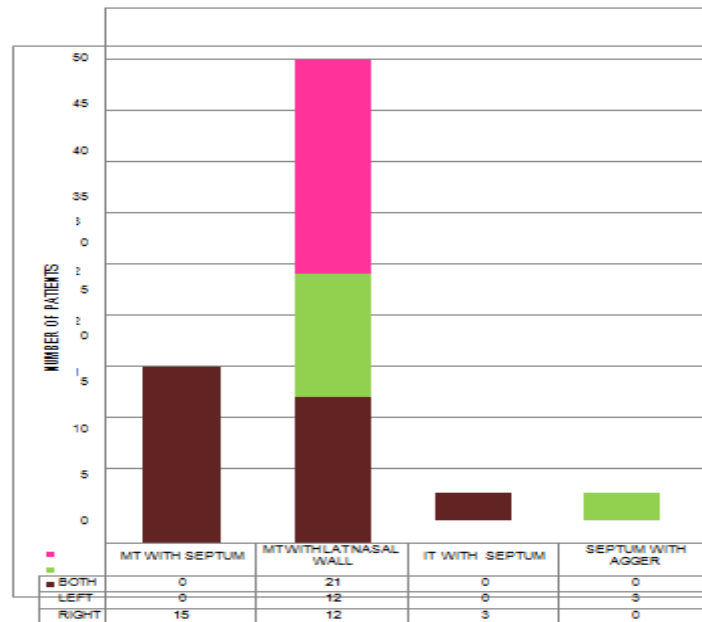
It was clearly shown in the figure 5 that out of 150 patients majority of them had frontal headache (48 pts) followed by temporal area (36 pts), all over the head (30 pts), fronto-temporal (21 pts) and unilateral facial pain (15pts).

FIGURE 5: HEADACHE REGIONS



In figure 6 it was shown that the commonest mucosal contact zone is found between middle turbinate with lateral nasal wall, followed by middle turbinate with nasal septum.

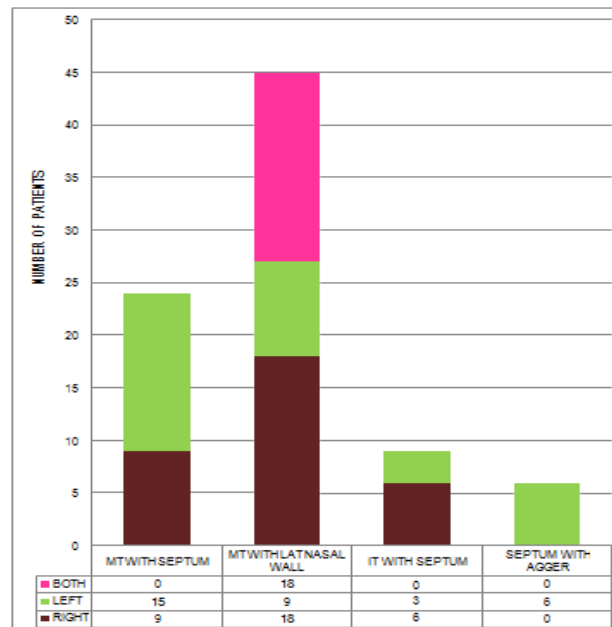
FIGURE 6 : Mucosal Contact Zones In Male Patients



MT- Middle turbinate IT-Inferior turbinate

In figure 7 it was shown that the commonest mucosal contact zone is found to be between middle turbinate with lateral nasal wall, followed by middle turbinate with nasal septum.

FIGURE 7: MUCOSAL CONTACT ZONES IN FEMALE PATIENTS



Most of the patients underwent lateral lamellectomy (30%) followed by lateral lamellectomy with anterior ethmoidectomy (26%). The third most common procedure done in our study was submucous resection of septum (22%). The fourth most common procedure done in our patients was lateral lamellectomy with uncinectomy(10%) which was followed by submucous resection of septum and lateral lamellectomy(8%) and agger nasi cell removed(4%). This was clearly showed in the figure 8 in our study.

FIGURE 8: COMMON SURGICAL PROCEDURES

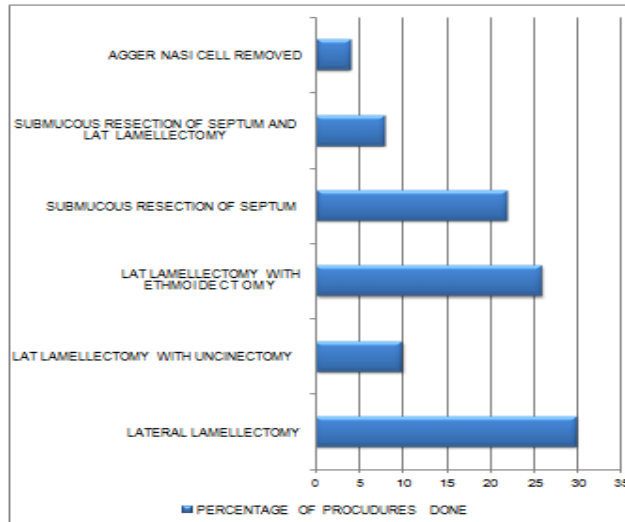
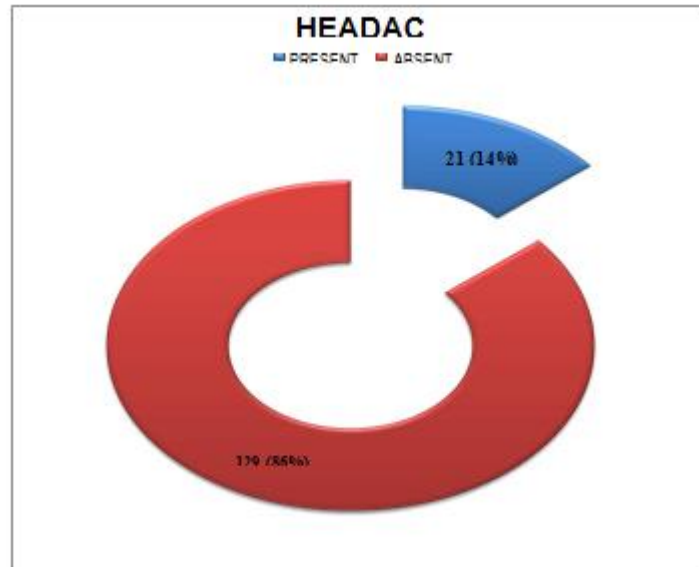


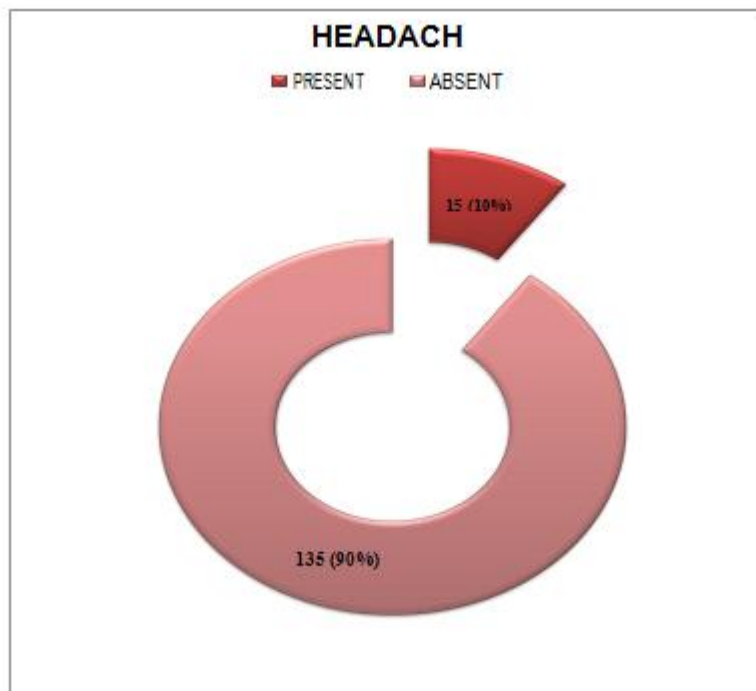
FIGURE 9: POST OPERATIVE FOLLOW UP OF THE PATIENTS AT second MONTHS



In figure 9 it was shown that about 129 patients out of 150 patients were free of headache at the end of two months. But still 21 patients had headache. The Mean headache Frequency was reduced from 14.2 days to 2.4 days after 2 months of surgery. The Mean Headache Severity was reduced from 5.9 to 1.48 at 2 months.

In figure 9 it was shown that about 135 patients out of 150 patients were free of headache at the end of six months. But still 15 patients had headache.

FIGURE 10: POST OPERATIVE FOLLOW UP OF THE PATIENTS AT THE END OF SIX MONTHS



Headache being a very commonly presented symptom and their causes are multifactorial varying from simple tension headache, Migraine, Myofacial spasm, Temporo mandibular joint arthralgia, Vascular headache, Brain tumors and so on. Nasal contact points may be a cause for secondary headache or an exaggerating factor for headache. Mucosal contact headache is a secondary headache disorder in the International classification of headache supported by limited evidence [21-25]

Contact zones in nose occurs due to nasal septum having contact with lateral wall structures such as in case of septal deviation which is very common due to high chances of anatomical variation in the nose. Contact headache relieves temporarily either by topical application of local anesthesia at contact zones and permanently within seven days of surgical intervention of the same [26-28]

Majority of the patients in our study belongs to the age group of 21- 30yrs followed by 31 – 40yrs. In contrast to our study no patients were seen in the age group of more than 40yrs. When patients less than 20 yrs were compared our present study showed very less patients compared to other two studies. So our theory is growth of facial skeleton is completed at the age of 20 years [29-34]. So the mucosal contact point headache due to anatomical variant is common in these age groups. This may be due to the difference in the zone where the study was done and also their living pattern. Our study was similar to other two studies where female patients were found to be more than the male patients. This shows that contact point headache are more common in female population than the male population.

4. Conclusion

Surgical corrections of Contact points in the nose by ESS results in relief of Intractable Headache. The results of surgical outcome of treatment of Contact Headache is evident – mostly within 2

months of treatment. Contact point – as an etiological factor for headache is more relevant in 20-30 years age group (3rd decade) i.e. after completion of development of facio-maxillary skeleton. Refractory headache can be successfully treated in carefully selected patients after precise pre-operative localisation of exact points by investigations (Nasal Endoscopy) and appropriate surgical interventions (ESS – Endoscopic Sinus Surgery). Patients diagnosed to have chronic refractory headache/ transformed migraine should be assessed for Mucosal Contact Point Headache and its appropriate Surgical Management for Cure.

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Ethical approval: The study was approved by the Institutional Ethics Committee

5. Conflict of Interest

The authors declare no conflict of interest.

6. Acknowledgments

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References

- [1] Goldsmith AJ, Zahtz GD, Stegnjajic A, Shikowitz M. Middle turbinate headache syndrome. *Am J Rhinol* 1993; 7: 17-30.
- [2] Wigand ME. Endoscopic surgery of the paranasal sinuses and anterior skull base. New York: Thieme, 1990
- [3] Adams RD, Victor M. Headache and other craniofacial pains. In principles of neurology. 3rd ed. New York: Mcgraw Hill Book Company; 1985. 129-48.
- [4] Blaugrund SM. The nasal septum and concha bullosa. *Otolaryngol Clin North Am* 1989; 22: 2.
- [5] Lundblad L, Lundberg JM, Brodin E, Ängaard A. Origin and distribution of capsaicin-sensitive nerves in the nasal mucosa. *Acta Otolaryngol* 1983; 96(56): 485-93.
- [6] Stammberger H, Wolf G. Headaches and sinus disease: the endoscopic approach. *Ann Otol Rhinol Laryngol Suppl* 1998; 134(97): 3-23.
- [7] Clerico DM, Fieldman R. Referred headache of rhinogenic origin in the absence of sinusitis. *Headache* 1994; 34: 226-9.
- [8] Paludetti G, Alinadori G, Scarano E, Deli R, Laneri de Bemart A, Maurizi M. Nasal obstruction and skull base development: experimental study in the rat. *Rhinology* 1995; 33: 171-3.
- [9] Ohki M, Naito K, Cole P. Dimensions and resistances of the human nose: racial differences. *Laryngoscope* 1991; 101: 276 - 8.
- [10] Becker DG, Weinberger MS, Greene BA, Tardy ME. Clinical study of alar anatomy and surgery of the alar base. *Arch Otolaryngol Head Neck Surg* 1997; 123: 789-95.
- [11] Cole P, Haight JSJ, Love L, Oprysk D. Dynamic components of nasal resistance. *Am Rev Respir Dis* 1985; 13: 1229 - 32.

- [12] Kennedy DW. Overview. *Otolaryngol Head Neck Surg* 1990; 103: 847–54.
- [13] Proctor DF, Andersen I, Lundquist G. Clearance of inhaled particles from the human nose. *Arch Intern Med* 1973; 131: 131- 6.
- [14] Stammberger H, Wolf G. Headaches and sinus disease: the endoscopic approach. *Ann Otol Rhinol Laryngol Suppl* 1988; 97[134]: 3-6.
- [15] Morgan NJ, Mac Gregor FB, Birchall MA, Lund VJ, Sittampalam
- [16] Y. Racial differences in nasal fossa dimensions determined by acoustic rhinometry. *Rhinology* 1995;33: 224- 8.
- [17] Al-Sebeih KH, Bu-Abbas MH. Concha bullosa mucocele and mucopyocele: A series of 4 cases. *Ear Nose Throat J.* 2014; 93: 28–31.
- [18] Lee JH, Hong SL, Roh HJ, Cho KS. Concha bullosa mucocele with orbital invasion and secondary frontal sinusitis: a case report. *BMC Res Notes.* 2013; 3; 6:501.
- [19] Aramani A, Karadi RN, Kumar S. A study of anatomical variations of osteo meatal complex in chronic rhino sinusitis patients - CT findings. *J Clin Diagn Res* 2014;8: KC01–4.
- [20] Koo SK, Kim JD, Moon JS, Jung SH, Lee SH. The incidence of concha bullosa, unusual anatomic variation and its relationship to nasal septal deviation: A retrospective radiologic study. *Auris Nasus Larynx* 2017;44: 561-570.
- [21] Bolger WE, Butzin CA, Parsons DS. Paranasal sinus bony anatomic variations and mucosal abnormalities: CT analysis for endoscopic sinus surgery. *Laryngoscope* 1991;101 :56-64.
- [22] Drake AF, Davis JU, Warren DW. Nasal airway size in cleft and non cleft children. *Laryngoscope* 1993; 103:915-7.
- [23] Van Loosen J, Van Zanten GA, Howard CVI, Vewoed-Verhoef HL, Van Velzen D, Venvoerd CGA. Growth characteristics of the human nasal septum. *Rhinology.*1996; 34: 78-82.
- [24] Zinreich SJ, Kennedy DW, Rosenbaum AE, Gayler BW, Kumar AJ, Stammberger H. Paranasal sinuses: CT imaging requirements for endoscopic surgery. *Radiology* 1987; 8-12.
- [25] Kennedy DW, Zinreich SJ. Functional endoscopic approach to inflammatory sinus disease: current perspectives and technique modifications. *AmJ Rhinol* 1988; 2: 89-96.
- [26] Novak VJ, Marek M. Pathogenesis and surgical treatment of migraine and neurovascular headaches with rhinogenic trigger. *Head Neck* 1992; 14(6): 467-9.
- [27] Schaefer SD, Manning S, Close LG. Endoscopic paranasal sinus surgery: indications and considerations. *Laryngoscope* 1989; 99: 1- 5.
- [28] Van Alyea OE. Ethmoid labyrinth: anatomic study, with consideration of the clinical significance of its structural characteristics. *Arch Otolaryngol ogy Head Neck Surg* 1939; 29: 881-90.
- [29] Shalom AS. The anterior ethmoid nerve syndrome. *Journal of Laryngology and Otology* 1963; 77: 315-25.

- [30] Ryan RE, Ryan JR RE. Headache of nasal origin. *Headache* 1979; 19: 173.
- [31] Morgestein KM, Krieger MK. Experiences in middle turbinectomy. *Laryngoscope* 1980; 90:1596-603.
- [32] Gerbe RW, Fry TL, Fischer ND. Headache of nasal spur origin: an easily diagnosed and surgically correctable cause of facial pain. *Headache* 1984; 24: 329-30.
- [33] Novak VJ, Marek M. Pathogenesis and surgical treatment of migraine and neurovascular headaches with rhinogenic trigger. *Head Neck* 1992; 14(6): 467-72.
- [34] Littell JJ. Disturbances of the ethmoid branches of the ophthalmic nerve. *Arch Otolaryngol* 1946; 43: 481-99.
- [35] Ritter FR. *The paranasal sinuses: anatomy and surgical technique*. St.Louis: Mosby, 1973:24-36.