

Role of Nasal Endoscopy and Rhinogenic Headache

Dr. Viral Prajapati*, Dr. Akruti Parmar**, Dr. Keyur Mehta***, Dr. Mitesh Modi****

Abstract:

Headache is a frequent and common painful state, which affects humans. Headache may remain undiagnosed in spite of detailed examination and elaborate battery of tests. Some of these undiagnosed cases may be of rhinosinogenic origin even when the cause is not suspected on preliminary evaluation. **Aim-** To evaluate the usefulness of nasal endoscopy in diagnosing and managing sinogenic headache. **Methodology-** The study includes 100 patients who presented to the OPD of two tertiary level centres during the period of April 2006 to December 2009, selected on systematic sampling, who had symptoms and signs of chronic headache. **Results-** Among 100 patients had Endoscopic abnormalities, 82 cases showed anatomical/pathological variations, the commonest cause being. Septal deviation Other changes were enlarged middle turbinate, paradoxical MT, Concha Bullosa. ethmoid infundibulum. **Conclusion-** The study highlights the importance of the anatomical/pathological abnormalities in the nose and Paranasal sinuses. Variations in endonasal anatomy may be functional or anatomical combination of these variations cause narrowing of OMU, which predisposed patients to persistent symptoms. This study also highlights the importance of the use of cold light nasal endoscopy for diagnosis of sinogenic headache.

Key Words: Endoscopy, Headache, FESS in Sinogenic Headache.

*Assistant Professor, Department of ENT, B. J. Medical College, Ahmedabad, ** Assistant Professor, Department of Anatomy, Govt. Medical College, Bhavnagar ***Assistant Professor, Department of ENT, Govt. Medical College, Bhavnagar, **** Assistant Professor, Department of ENT, SAL Medical College, Ahmedabad,

Corresponding author email: drviralmsent2009@gmail.com

INTRODUCTION:

Headache is a frequent and common painful state, which affects humans. Headache may

remain undiagnosed inspite of detailed examination and elaborate battery of tests. Some of these undiagnosed cases may be of

rhinosinogenic origin even when the cause is not suspected on preliminary evaluation. Cold light nasal endoscopy has opened new vistas in peeping into inaccessible areas and niches of fronto-ethmoid complex and sphenoid sinus.

Hirshman performed the first attempt at nasal and sinus endoscopy in 1901 using a modified cystoscope¹. The most significant development in nasal endoscopy was noticed during 1950's when Hopkin's developed solid rod lens with proximal cold light source. In latter part of twentieth century sinonasal endoscopy has been established as an important component in our diagnostic and therapeutic armamentarium². Anatomically, areas of maxillary contact are most likely to occur in the mucosa lined channels of middle meatus and the ethmoid air cells system, in patients with chronic and recurring sinus infections^{2,3}.

The study was conducted in patients with chronic headache to study the anatomical and pathological abnormalities with the help of nasal endoscope, to correlate Endoscopic findings

Aim

To evaluate the usefulness of nasal endoscopy in diagnosing sinogenic headache.

Methodology

The study includes 100 patients who presented to the OPD of two tertiary level centre during the period of April 2006 to December 2009, selected on systematic sampling, who had symptoms and signs of chronic headache.

Inclusion criteria: Patients presenting with sinogenic headache. The data is collected on the basis of detailed history, systemic examination, ENT examination and investigations.

Exclusion criteria: All patients presenting with clinical features other than sinogenic headache are excluded.

Subsequently all the selected candidates were worked up on the history, general examination, and ENT examination carried out. To confirm diagnosis, x-ray PNS was done in all the patients, CT PNS was done wherever necessary. Diagnostic Nasoendoscopy under local anesthesia done to record the condition of nasal mucosa, septum, & inferior turbinates and to assess

the condition of the nasopharynx and eustachian tube opening, to look for the presence of mucopus or polyp in the middle meatus/ sphenoidal recess/ nasopharynx. Also, any co-existing anatomical variations of the lateral wall of the nose were noted.

Statistical analysis in this study was done by Chi-square test of significance. Proportions were compared using chi-square (χ^2) test for (r x c) tables.

Observation And Results : 100 patients were included in this study conducted at the department of ENT, GG Hospital, JAMNAGAR. Over the period of year 2006 to 2009.

There were 60 male (60%) and 40 (40%) in the study, the ratio being 1.5:1, the age range was from 16-60 years, the average age being 32 years.

Most patients belonged to the lower and the higher middle income group as evidenced by their monthly salary. Majority had attended the O.P.D. after a trial of various types of medication and wanted some permanent relief for their headache.

Most of the females in the study were housewives. Other professions included shopkeepers, office clerks, college students, teacher, barber and mill workers.

The patients presented with headache affecting them over a period ranging from 3 months to 5 years. While 68 patients presented within a year of their symptoms, 32 patients presented between 2 years and 5 years after onset of symptoms.

Patients were asked to subjectively classify headache as either a dull ache or severe throbbing pain. 52 patients complained of a dully type of pain, while it was severe in 35 cases.

The headache was found to be unilateral (hemifacial) in 38 cases, while it was bilateral and diffuse in 62 cases. The site of headache was over the medial canthal area in 70 % frontal in 63 % maxillary in 30 % and temporal in 21 % cases. Majority of patients experienced pain at 2 or more sites intermittently, very few patients experienced a continuous type of headache.

32 patients showed isolated pain over medial canthus, while 20 patients had

isolated frontal headache. Diffuse pain involving all the sites was presents in only 3 cases.

While the headache in most cases had no diurnal variations, 18 cases (18%) experienced pain on waking up in the morning, while 15 cases (15%) had pain in late afternoon and evening. all the patients showed relief of headache on applying topical decongestants. Almost all the patients had taken lots medicine like anagesic, antihistaminic, and decongestants. Some were on antidepresants, topical and systemic steroids and antibiotics with temporary or no relief. None of the patients had any aura, vomiting, migraine related symptoms, refraction errors or dental aches.

Evaluation Of Associated Symptoms : Next major symptom apart from headache was of intermittent nasal obstruction, seen in 90 cases (90%) another common nasal discharge, seen in 80 cases (80%). Post nasal drip was present in 30 cases(30%) while sneezing was present in 50 cases (50%). Other associated symptoms included impaired sense of smell, and cpitaxis, the incidence of various symptom in this study are depicted in the following table.

Associated History: None of the patients had history of trauma over nose, diabetes mellitus or chronic respiratory illness.

30 patients were allergic to either smoke, dust or perfumes (!3%) 30 patients were chronic smokers (30%) while 12 cases werehypertensive on medication(12%) 30 patients had undergone either septoplasty of FESS for their complains in the past. These patients were got relieved of their headache by these procedures. None of this patients in the study had undergone antral puncture or any other surgical procedure.

Clinical Examination : A thorough ENT Examination was done in all patients. Moderate to severe septal deviations was present in 79 patients (79%) Paranasal sinus tenderness was ellected in 85 patients (94%) Other associated findings included granular pharyngitis, post nasal drip, serous otitis media.

Maximum tenderness was present in the region between the two eyes followed by tenderness in the region of the frontal sinuses. No painful lesions of the oral cavity, teeth or temporal mandibular joint abnormalities were found in any of the 100

cases. None of the patients had refraction or signs of raised intraocular pressure.

Investigations : Routine blood and urine investigation revealed nothing significant and no patient had an absolute eosinophil count over 500.

Endoscopic Evaluation Of Ostio-Meatal

Complex: Rigid nasal endoscopic evaluation was always done before advising a CT Scan of the paranasal sinuses. While looking into and around the hidden areas of the ostiomeatal complex, endoscopy served to expose the limitations in evaluation of patients with nasal disorders by routine anterior Rhinoscopy.

A Deviated nasal septum / spur can impinge on the middle turbinates, impeding mucociliary clearance and can cause mucosal contract areas. A posteriorly situated spur often goes undetected on anterior rhinoplasty and may narrow the ventilation of the middle meatus area. Septal deviations contributing to headache were present in 82 (82%) cases, among which 20 had associated spurs(20%) . Amongst these patients, 18 had no undergo septoplasty along with FESS, while 13 patient underwent septoplasty and

11 patients undersent SMR alone for the relief of their symptoms.

The uncinata process is a sickle shaped curved constant landmark on the lateral nasal wall. If it is enlarged or rotated medially or laterally, it can cause pathological narrowing of the ethmoid infundibulum. Uncinate process variations were found in 5 patients, of which in 3 cases, uncinata process was absent, while in 2 cases, it was bent medially.

A concha bullosa, which is an enlarged conchal cell of the middle turbinate was suspected endoscopically in 05 cases (05%) . A concha bullosa may act as a reservoir of infection for recurrent ethmoiditis, block the middle meatus and contribute to headache.

The normal curvature of the middle turbinate is convex medially. If the contour is reversed, it bulges laterally and hence obstructs the middle meatus, predisposing to recurrent sinus infections. Paradoxically curved turbinate was present in only 7 cases (7%).

Small polyps arising in the middle meatus are often not visualized on anterior

Rhinotomy, but well seen on rigid nasal endoscopy. They were seen in 15 cases (15%), Caldwell observed that "the one absolute proof of sinusitis is the detection of pus escaping from the sinus". While in all cases in this study, the acute infection was treated with appropriate medication for at least 10 days, purulent discharge from the middle meatus was seen in 40 cases (40%), in most of the cases the disease was bilateral and associated with some anatomical abnormality in the ostiomeatal complex. No disease in the frontal recess or agger nasi was detected on routine nasal endoscopy, Prominent or large bulla ethmoidalis can obstruct the ostiomeatal complex from behind. Enlargement is usually pathological and can cause headache. A prominent ethmoidal bulla was seen in 38 cases (38%). In 20 cases (20%), the bulla was touching the lateral nasal wall causing mucosal contact, predisposing to headache.

Computed Tomography Of Nose And Paranasal Sinuses

All patients were subjected to C.T. scan prior to surgery. The sinuses most commonly involved were the maxillary and anterior ethmoids.

Maxillary sinus was diseased in 70 cases (70%) among these, 18 patients have

unilateral involvement while there was bilateral disease in 52 cases. Involvement of the sinuses were in form of mucosal thickening, cyst or haziness. Anterior ethmoids were the most common sinus to be diseased in 76% of cases, 27% cases had unilateral involvement of anterior ethmoids, while bilateral involvement was seen in 49% cases. Posterior ethmoids were involved in 50% cases, most of the patients having bilateral disease (33%) The frontal sinus was involved in 45% of cases, 10% of cases had unilateral frontal disease, while 33% patients had bilateral frontal disease. The sphenoid was the least commonly involved sinus in 13% cases.

The infundibulum was involved in significant in a significant number of cases (91%). while ostio-meatal complex was obliteration in (67%) and there was (24%) cases narrowing of ostio-meatal complex. When ostio-meatal complex is narrowed / blocked. it promotes stasis of secretions and local hypoxia, predisposing to headache.

The commonest anatomical variation was a deviated nasal septum which was found in 82% of patients. This was followed by concha bullosa which was seen in 15% of

cases. The concha was bilateral in 08 cases. A right concha bullosa was seen in 4 cases while 3 cases had a concha on left side.

Paradoxically curved middle turbinate was seen in 7 cases, among which 2 were on right side and 5 were on left side. The uncinate process was absent on the right in 1 case and 2 on left side, while it was bent medially in 2 cases, narrowing the OMC. Haller cells was seen in 1 case, on the right side.

Agger nassi cells were found in 22 cases, among these bilateral in 10 cases, while 12 cases shows unilateral involvement.

Frontal recess found to be diseased in 40 cases among which 23 cases had a bilateral frontal recess blockage. A blocked recess is one of prime pathogenesis leading to stasis of secretion and consequently malventilation of sinuses leading to headache.

Endoscopy Versus C.T. Scan:

Septal deviation /spur to compress the ostiomeatal area by impinging on the turbinate and causing mucosal contact areas leading to headache was quite uniformly detected on both endoscopy and C.T. Scan.

Concha bullosa is essentially a radiological diagnosis. It is one of the most common causes of narrowing of the ostiomeatal area leading to headache. Although we were able to suspect a concha endoscopically because of its size in 05 patients, the confirmation was given by doing a C.T. Scan. C.T. Scan also detected 10 more cases of concha bullosa, which were not suspected endoscopically.

Paradoxically bent middle turbinate was detected equally on C.T. as well as endoscopically.

As demonstrated by Messarklinger, the infundibulum is one of the key areas in nasal/paranasal pathologies. Infundibular disease was suspected endoscopically in 66 cases(66%) in the form of either polyps or mucopus. C.T. Scan not only confirmed this, but was also able to pick up infundibular disease in another 25 cases(25%) in form of mucosal thickening or polyps.

Disease in the frontal recess and agger nasi were detected exclusively on C.T. examination.

Thus C.T. Scans hold a distinct advantage over endoscopy in diagnosing disease in the infundibulum, frontal recess, agger nasi region and confirming pneumatication of the middle turbinate – concha bullosa. However, endoscopy prior to C.T. Scan does make one aware of the disease status of the patient in the form of congested mucosa, presence of mucosal contact areas, mucopus in middle meatus, spurs, hypertrophied middle turbinate etc. to conclude that nasal endoscopy and C.T. Scans are complementary to each other in the assessment of disease in the ostiomeatal complex region and go along way in diagnosing possible pathogenesis in cases of rhinogenic headache.

Discussion: Craniofacial pain and headache are very frequent complaints, which are difficult to study symptoms because of the wide variety of clinical presentation and little objectivity obtained with its assessment. The multiplicity of etiologies is another important factor. Naso sinus multiplicity of etiologies is another important factor. Naso-sinus etiology or rhinogenic headache is a known cause of pain. Nasal and Paranasal structures take a large territory of the face and expose their

vast mucosa surface to environmental affections. Acute sinusitis, intranasal tumors, nasal polyps, allergic rhinitis and headache by septal contact are considered causes of rhinogenic headache. Major emphasis is placed on the anatomical aspects of the nasal cavity, which present frequent variations including septal deviations, spurs, hypertrophy, pneumatization or other concha affection and variations of the lateral wall nasal cavity structures and even contact between them.

Once we stimulate the nasal mucosa, be it through faradic current, chemical substances or pressure, it causes pain on the back on the regions of ophthalmic and maxillary nerve distribution. The middle concha portion and the area that corresponds to nasal septum would be especially implicated and the variations affecting this region, especially septal deviations and hypertrophy or middle concha hypertrophy or pneumatization, are very valued as a cause of pain. Such region has its innervations through the anterior ethmoidal nerve, branch of the ophthalmic nerve. This nerve has a superficial pathway that crosses the nose channels and ends as an external nasal nerve, of cutaneous distribution. Such

characteristic make the branches exposed to pathological processes.

Another evidence of the anatomical role, by mechanical stimulus and especially of the reported region, is the realization of pain relief when applying in this region an anesthetic or vasoconstriction substance. We can observe in this study that there are other factors involved when we have nasal anatomical variation that causes contact between the structures and / or narrowing of the nasal cavity, which may be related with pain onset. Among them, we include mucocilliary function, with accumulation of mucus, creating an environment prone to the development of an infectious process and logically with the release of inflammatory mediators capable of generating the painful symptom. The presence of anatomical variations can also cause obstruction of the paranasal sinuses ostia drainage, which because of hypoventilation and hypoxia, may also cause pain. These two factors demonstrate that the infectious aspect cannot be disregarded, and a sinusopathy is likely, considering that we have the necessary ingredients, such as mucociliary dysfunction and ostium obstruction is critical areas. We

can consider that anatomical and infectious factors are interconnected.

Climatic abnormalities of humidity and temperature, chemical allergic and hormonal stimuli are reported as causes of nasal mucosa edema, especially in narrow regions, which may cause the contact between the structures. The participation of neurogenic edema, through the action of mediators released by nervous sensorial fibers, for example, P substance, is also an important cause. Stimuli for its triggering are mechanical, chemical infectious and caloric.

The diagnosis of presentation of headache related with nasal anatomical variation is based on clinical suspicion, that is, history and physical examination. The affection to physical examination may be subtle, being necessary to assess them by nasal endoscopy and C.T. Scan. The test with anesthetic is very valuable for the diagnosis.

Surgical treatment is emphasized, because we observed it, the anatomical role is very valuable in pathophysiology. The various procedures proposed included septoplasty, spur excision functional

endoscopic sinus surgery and occasionally turbinate reduction (SMD).

Conclusions :

- The most common site of headache in patients attending ENT OPD at M.P. Shah Medical College, Jamnagar was between two eyes (medial canthal)..
- Nasal obstruction, nasal discharge, post nasal drip and sneezing are common associated symptoms.
- Paranasal sinus tenderness is a common clinical sign of patients with Rhinogenic headache.
- Most of the patients show presence of mucopus, enlarged ethmoidal bulla or other contact areas in the Ostio – meatal complex.
- Anatomical abnormalities like Deviated nasal septum, spurs, concha bullosa and paradoxical curved turbinate have an important role to play in the pathogenesis of sinugenic headache.
- C.T. Scan (PNS) and Nasal Endoscopy are complementary to each other and are the gold standards in the diagnosis and management of rhinogenic headache.
- Local decongestants when applied topically relieve the headache associated with a rhinogenic disease.

- Functional endoscopic sinus surgery along with Septoplasty remain the ultimate treatment of patients with rhinogenic headache.

References:

1. Dieulate L. Morphology and embryology of the nasal fossae of vertebrates. Ann Otol Rhinol Laryngol, 1906; 15: 1-60, 267-399, 514-584.
2. Maltz M. New Instrument: The sinuscope. Laryngoscope 1925; 35: 805-811.
3. Mathew BL, Smith LE, Jones R, Miller C and Brookschmidt JK. Endoscopic sinus surgery – outcome in 155 cases. Otolaryngol Head Neck Surg, Surg 1991; 04 (2): 244-246.