Original Research Article

# A study on sinugenic headache patterns at a tertiary care hospital

Santosh Kumar Belamkar[1], Jyoti Tugave[2*]

[1]Sr. Specialist, Department of ENT, General Hospital, Doddballapur, Karnataka, INDIA.
[2]Resident, Department of ENT, MRMC, Gulberga, Karnataka, INDIA.
**Email:** jyotitugave@yahoo.com

## Abstract

**Background:** Drainage and ventilation of the larger sinuses are essential to the maintenance of their normal functions. The ventilation and drainage of the maxillary and frontal sinuses pass through very narrow and complicated clefts before they reach the middle meatus. These clefts, the ethmoidal infundibulum and frontal recess respectively, are parts of the anterior ethmoid. **Methodology:** Patients presenting with sinugenic headache during study period of two years inclusive of all age groups and sex. The data was collected on the basis of detailed history, systemic examination, ENT examination and investigations. They were then divided into different age groups for a comparative study. **Results:** The mean incidence was 29.2 years with median of 25.5 and standard deviation 12.87, minimum age was 15 years and maximum was 68 years. **Conclusion:** The average age group of study population were 21.20 ± 12.87 years
**Key Words:** Sinugenic Headache, Frontal Sinuses, CRS.

***Address for Correspondence:**
Dr. Jyoti Tugave, Resident, Department of ENT, MRMC, Gulberga, Karnataka, INDIA.
**Email:** jyotitugave@yahoo.com
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## INTRODUCTION

The sinuses are lined with pseudostratified ciliated columnar epithelium, which is in continuity with the mucosa of the nasal cavities. The epithelium of the sinus is thinner than that of the nose. There are four basic cell types; these include ciliated columnar epithelial cells, non -ciliated columnar epithelial cells, basal cells and goblet cells. The ciliated cells have 50-200 cilia/cell with the usual structure of (9 + 2) microtubules with dynein arms. These cells beat 700-800 times a minute, moving the mucous blanket at the rate of 9 mm/min. Non - ciliated cells are characterized by microvilli which cover the apical aspect of the cell and serve to increase the surface area, likely to facilitate humidification and warming of the inspired air. The exact function of basal cells is not known. They vary in size and shape and are supposed to serve as stem cells, which differentiate, when needed. Goblet cells produce glycoproteins, which are responsible for viscosity and elasticity of the mucous. They are innervated by the sympathetic and parasympathetic nervous system. Parasympathetic stimulation induces thicker mucous and sympathetic stimulation induces watery secretion. The epithelial layer is supported by a thin basement membrane, lamina propria and periosteum. Both serous and mucinous glands tract down into the lamina propria. The maxillary sinus has the highest density of goblet cells. The ostia of the maxillary, sphenoid and anterior ethmoid sinuses seem to have an increased number of submucosal serous and mucinous glands [1,2]. The ciliated cells in each sinus beat in a specific direction. A specific pattern of mucus flow results. The mucociliary transport of the mucous occurs in a genetically predetermined fashion. The transport is always towards the natural ostia and a dependent opening like intranasal antrostomy does not necessarily help in drainage. In fact, this sometimes results in mucous drainage from natural ostia, reentering the sinus via the newly created opening and cycling through, the sinus again. Mucosa contact between two adjacent areas arrests the mucociliary transport leading to stagnation and

subsequent infection. Clearance of the disease is accomplished when mucociliary transport mechanism has been restored[3]. Mucociliary clearance in the frontal sinuses advances along the sinus roof, and then moves laterally along the roof and medially along the floor towards the ostia. Backflow, resulting from re-circulation in frontal recess, may be a cause of initial infection. In the maxillary sinus, mucociliary movement is towards the ostium. It starts at the floor and radiates along the wall of the sinus superiorly. Even after creation of antral windows during inferior meatotomymucociliary movements persists in its upward direction towards the natural ostium. The frontal and maxillary sinuses are dependent sinuses, subordinate to their prechambers in the ethmoid and lateral nasal wall[4]. Drainage and ventilation of the larger sinuses are essential to the maintenance of their normal functions. The ventilation and drainage of the maxillary and frontal sinuses pass through very narrow and complicated clefts before they reach the middle meatus. These clefts, the ethmoidalinfundibulum and frontal recess respectively, are parts of the anterior ethmoid. The larger sinuses therefore are dependent on the health and proper functioning of these prechambers. Those disorders that produce any additional stenosis of these very narrow key areas may result in the contact of the mucosal surfaces with mucus retention. According to Naumann, a vicious cycle is initiated by the infundibular blockage. Interruption of ventilation and drainage caused by ostial obstruction leads to stagnation of the secretory products and damage to ancillary function of the respiratory epithelium with consequent inflammation. The inflamed mucosa in turn contributes to the ostial obstruction, thus completing the cycle[5]. Despite the fact that the symptoms of infection in these larger sinuses are usually dominant symptoms, the underlying cause is generally not to be found in the larger sinuses themselves, but in the clefts of the anterior ethmoid in the lateral nasal wall. Messerklinger in his study noted that limited resection of the disease with the clearing the key areas of the anterior ethmoid, re-establishes the drainage and ventilation via the natural pathways. Even massive mucosal diseases in the dependent frontal and maxillary sinuses usually heal without direct intervention in these sinuses. Chronic Rhinosinusitis is one of the most common health care problems for which an individual seeks medical care resulting in high direct medical costs, including costs of an office visit, diagnostic tests, antibiotics or other pharmaceuticals, procedures or surgeries, hospitalization and/or complications of treatment [55]. Estimates suggest that CRS is more wide spread than arthritis and hypertension. CRS impacts quality of life, even in comparison to chronic debilitating diseases such as diabetes mellitus and congestive heart failure. Furthermore, CRS not only causes significant physical symptoms but also results in substantial functional and emotoinal impairment.[6] A better understanding to the etiopathogenesis of CRS is therefore essential in order to develop effective treatment. Recently there has been a concept of "one airway disease", as the upper and lower airways, PNS and middle ear cleft are related anatomically and functionally. Hence disease in one portion of the airway is prone to spread over into the other parts of the airway. This is extremely important to realize as therapy of patients with CRS may lead to improvement in lung function. One fifth of the patients with CRS have nasal polyposis and a subset of them suffer from aspirin sensitivity often associated with asthma and allergic rhinitis.

## MATERIAL AND METHODS

50 patients attending ENT Out Patient Department at Teaching and General Hospital with clinical features and investigations suggestive of CRS were randomly selected after applying the following inclusion and exclusion criteria:

**Inclusion Criteria:** Patients presenting with sinugenic headache during study period of two years inclusive of all age groups and sex. The data was collected on the basis of detailed history, systemic examination, ENT examination and investigations. They were then divided into different age groups for a comparative study.

**Exclusion Criteria**: All patients presenting with clinical features other than sinugenic headache are excluded. Cases of sinugenic headache with confirmed etiology and already on treatment are also excluded.

## RESULTS

**Table 1:** Age distribution

| Age (years) | Number of Patients | Percentage |
|---|---|---|
| 15-25 | 24 | 48 |
| 26-35 | 14 | 28 |
| 36-45 | 7 | 14 |
| 46-55 | 2 | 4 |
| 56-65 | 1 | 2 |
| 65-70 | 2 | 4 |
| **Total** | **50** | **100** |

In our study, majority of the patients belonged to 5-25 years 48%, followed by 28% in 25-35 years. The lowest incidence is seen in the age group 55-65 years – 2% incidence. The average age group of study population were 21.20 ± 12.87.

**Table 2:** Age statistics

| Measures | Age (in years) |
|---|---|
| Mean | 29.20 |
| Median | 25.5 |
| Mode | 17 |
| Standard deviation | 12.87 |
| Minimum | 15 |
| Maximum | 68 |

The mean incidence was 29.2 years with median of 25.5 and standard deviation 12.87, minimum age was 15 years and maximum was 68 years.

**Table 3:** Gender distribution

| Gender | Number of Patients | Percentage |
|---|---|---|
| Male | 24 | 48 |
| Female | 26 | 52 |
| **Total** | **50** | **100** |

Majority of patients were females 26 and males 24 in a total of 50 patients

**Table 4:** Severity of presenting complaints Grading

| Severity | Nasal | Non nasal |
|---|---|---|
| No | 0 | 0 |
| Mild | 1 | 1 |
| Moderate | 2 | 2 |
| Severe | 3 | 3 |

**Table 5:** Number of patients

| Severity | Nasal | Non nasal | Percentage |
|---|---|---|---|
| No symptom | 0 | 33 | 66 |
| Mild | 0 | 17 | 34 |
| Moderate | 31 | 0 | 62 |
| Severe | 19 | 0 | 38 |

In our study group, patients were graded according to severity of symptoms nasal-nasal obstruction, postnasal discharge, Non nasal- Headache, ear pain, dental pain, cough were taken into considerations. 62% patients had moderate nasal symptoms. 38% patients had severe nasal symptom 66% had no non- nasal symptoms, 34% had mild non-nasal symptoms.

## DISCUSSION

Headache has been described in old literature 5000 years back, continues to be the most common symptom patients approaching physician, agonizes both the sufferer and physician equally, management continues to remain a dilemma due to its ill known aetiopathogenesis. International headache society (IHS) constituted a headache classification committee in the year 1988, laid down broad diagnostic criteria for headache disorders and facial pain [7]. Some used for research purposes to maintain uniformity in diagnostic criteria. The studies of Wolff, Dalessian and Green field have shown that vascular enlargement in response to tissue injury leads to release of vasoactive amines. Apart from neurotransmitters like noradrenaline and acetyl choline, neuropeptides have been found to be responsible for induction of pain. Substance P (SP) is the commonest neuropeptide which has strong vasodilator effect along with plasma extravasation, hypersecretion and smooth muscle contraction. The release of SP can be triggered by stimuli such as chemicals, infections, thermal irritants and even mechanical pressure. SP mediates pain from receptors of mucosa through unmyelinated C fibres to cortex [8,9]. Jacob in his study has shown that the symptom of sinusitis have improved even in the presence of disease as shown by CT scan by opening the blockage by cleaning the recess without touching the fronto-nasal ostium or sinus[10]. Brain L Mathew *et al* (1991) documented nasal obstruction as the commonest symptoms (n = 146, 96%) followed by postnasal drip (n=143, 12%) and facial pain / headache (n = 139, 90%) overall, 140 patients (91%) believed that surgery was beneficial. Patients with facial pain preoperatively showed greatest improvement [11]. Nasser A Fageeh in a study of 129 patients with CRS showed that the commonest complaint was nasal obstruction (76%), followed by headache (74.4%), anosmia (56.5%) and facial pressure / pain (50%). Post operatively, patients were followed up for 6 months. The most significant improvement was noticed in patients with nasal obstruction (60%). The least improvement occurred in patients with anosmia (40%). All the symptoms were assessed pre and postoperatively according to the severity of their symptoms by allotting grades. 85% of patients had favourable opinion of procedure, recommend it to others with similar problems[12]. Jakobsen J and Svendstrup F (2000) conducted a prospective study on 237 consecutive patients suffering from chronic sinusitis and or nasal polyposis. Nasal obstruction was the most frequent symptom (61%) followed by purulent nasal discharge, anosmia, frontal pain, headache and maxillary pain. Duration of symptoms averaged 9.3years. At the end of 1 year follow up 45% were totally satisfied with the results and were symptom free and 44% were definitely feeling better [13]. Damm M *et al* (2002) conducted a study on patients with CRS to assess impact of FESS on the symptoms profile. Leading symptoms of CRS were nasal obstruction (92%) and postnasal drip (87%). Further more, patients reported dry upper respiratory tract syndrome in 68%, hyposmia in 66%, headache in 64% and asthmatic complaints in 34%. After a mean postoperative follow up of 31.7 months, an improvement in quality of life was achieved in 85%, no change in 12% deterioration in 3% mainly responsible for this improvement was the postoperative decrease of nasal obstruction (84%), headache (82%) and postnasal drip (74%). (All symptoms; $p < 0.01$). Hence it was concluded that symptoms improved in excellent fashion by FESS in

majority of the patients, achieving better quality of life in the long term [14].

## CONCLUSION

In our study group, patients were graded according to severity of symptoms nasal-nasal obstruction, postnasal discharge, Non nasal- Headache, ear pain, dental pain, cough were taken into considerations. 62% patients had moderate nasal symptoms. 38% patients had severe nasal symptom 66% had no non- nasal symptoms, 34% had mild non-nasal symptoms.

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