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Original Research Article

Prospective evaluation of chronic rhinosinusitis with reference to anatomical variation

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ABSTRACT

Background: Rhinosinusitis is one of the commonest sinonasal condition with chronic Rhinosinusitis affecting 10% of population worldwide. Although the diagnosis of chronic rhinosinusitis is clinical, the final diagnosis should be confirmed by objective measures like radiography and nasal endoscopy. Though anatomical variations in sinonasal region are rare, they have significant impact in the causation of sinonasal diseases and pose difficulties during surgery.
Methods: This was a prospective study conducted on 60 patients who attended to the Department of ENT and HNS, Konaseema Institute of Medical Science, Amalapuram between December 2017 to July 2019. By considering AAO-HNS criteria patients were selected and subjected to high resolution computerized tomography para nasal sinuses and diagnostic nasal endoscopy.
Results: As per study, 60% patients are having deviated nasal septum, followed by aggar nasi in 58.3%, concha bullosa in 26.8%, Haller cells in 11.7%, paradoxical middle turbinate in 11.7%, uncinate pneumatisation in 5%, and onodi cells in 5% of cases.
Conclusions: Anatomical variations in sinonasal cavity predispose to chronic rhinosinusitis and hence require correction. Also, detecting these variations preoperatively by computed tomography of paranasal sinus helps in avoiding complications during functional endoscopic sinus surgery.

Keywords: Chronic rhinosinusitis, Anatomical variation, Deviated nasal septum

INTRODUCTION

Rhinosinusitis is one of the commonest sinonasal condition with chronic rhinosinusitis affecting 10% of population worldwide. Although the diagnosis of chronic rhinosinusitis is clinical, the final diagnosis should be confirmed by objective measures like radiography and nasal endoscopy. Though anatomical variations in sinonasal region are rare, they have significant impact in the causation of sinonasal diseases and pose difficulties during surgery.[1] Conventional radiographs can provide information regarding maxillary and frontal sinus disease but has got limited role in assessing nasal pathologies, sphenoethmoidal complex disease and anatomical variations.[2] MRI has got excellent soft tissue resolution with limited display of skeletal anatomy when compared to computed tomography. As surgeon should aware of these bony anatomical variations before surgery, computed tomography become the imagine modality of choice and serve as a navigation tool intraoperatively for safe surgical outcome. Axial sections, coronal screening along with saggital reconstructions provide detailed microanatomy of paranasal sinuses, different cells and their variations, out flow tract of paranasal sinuses and extent of pathology in paranasal sinuses.[3,4]

The aim of the study was to analyse different sinonasal anatomical variations and their relationship to causation of chronic rhinosinusitis using multi planar computed tomography.

METHODS

This was a prospective study conducted on 60 patients who attended to the department of ENT and HNS, Konaseema Institute of Medical Science, Amalapuram between December 2017 to July 2019. By considering AAO-HNS criteria patients were selected and subjected to high resolution computerized tomography (CT) para nasal sinuses (PNS) and diagnostic nasal endoscopy. For CT examination patient was positioned in prone position with neck extension. Imaging was done from the anterior margin of anterior frontal table to posterior margin of sphenoid sinus and anatomical variations are documented. 1.25 mm thick slides were taken and reconstructed to 0.625 mm thickness slides. The study was performed with the approval institutional ethical committee and written consent was taken from all the patients.

Inclusion criteria

Patients with symptoms and signs of rhino sinusitis between age group of 15-60 yrs; nasal endoscopy suggestive of RS i.e. presence of mucopurlent discharge or edema in middle meatus; CT PNS suggestive of rhinosinusitis i.e. mucosal changes within ostiomeatal complex or sinuses were included.

Exclusion criteria

Patients with adenoid hypertrophy, sinonasal polyposis and AFRS, complicated rhinosinusitis, sinonasal malignancy, previous sinonasal surgery or facial trauma were excluded.

Statistical analysis

Data was collected on Microsoft excel sheet and analysis was done by using SPSS software version 17. Mean and proportion was used to analyze the data.

RESULTS

In our study most of the patients diagnosed as chronic rhino sinusitis are in the age group of 21 to 30 years (33.3%) with slight male (51.7%) preponderance.

Most common complaint among the patients presented to us was nasal obstruction seen in 80% cases followed by headache seen in 70% cases. Mucosal changes are seen commonly in maxillary sinus followed by ethmoid frontal and spenoid sinuses.

Table 1: Age distribution.

S.no	Age (in years)	Sex		Total
		Male	Female	
		N (%)	N (%)	N (%)
1	15-20	05 (16.1)	04 (13.8)	09 (15)
2	21-30	08 (25.8)	12 (41.4)	20 (33.3)
3	31-40	10 (32.3)	08 (27.6)	18 (30)
4	41-50	05 (16.1)	04 (13.8)	09 (15)
5	51-60	03 (9.7)	01 (3.4)	04 (6.7)
Total		31 (51.7)	29 (48.3)	60 (100)

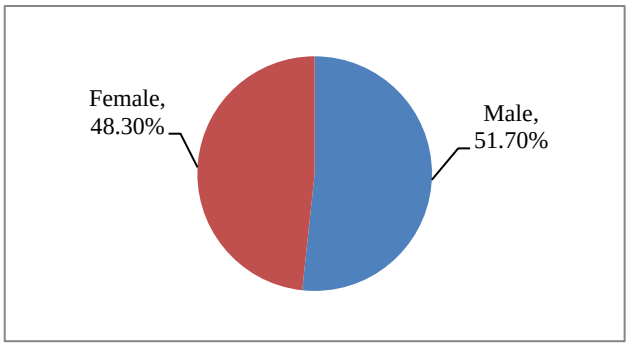

Figure 1: Sex distribution.

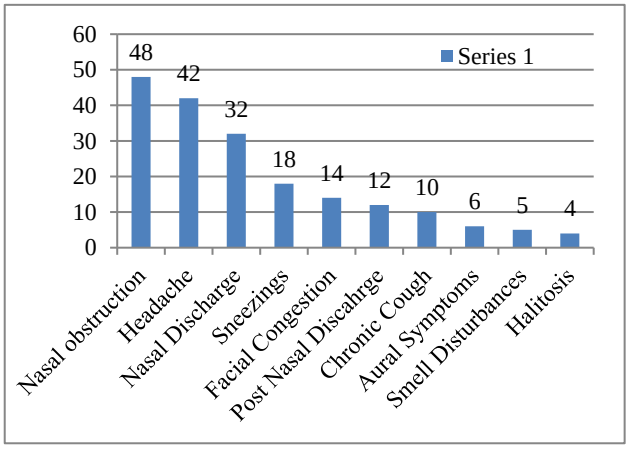

Figure 2: Incidence of symptoms in rhinosinusitis.

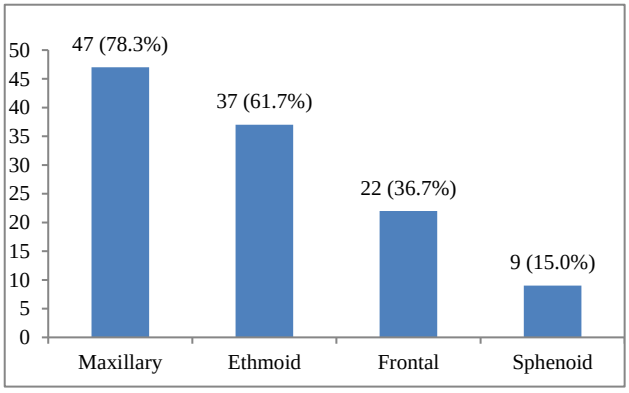

Figure 3: Involvement of sinuses.

In our study 36 (60%) patients are having deviated nasal septum with predominance to left 13 cases (36.1%) when compared to right 7 cases (19.4%).

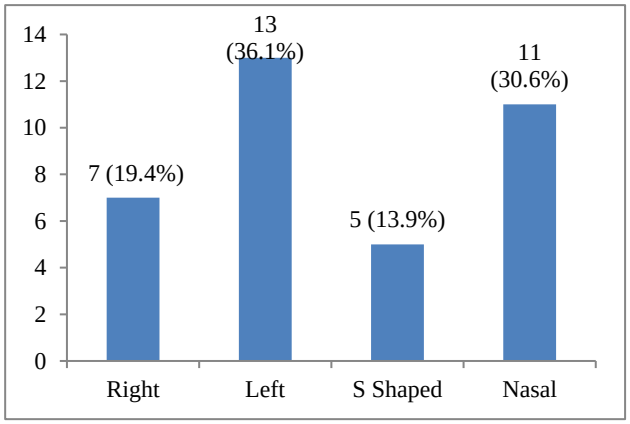

Figure 4: Frequency of DNS.

Among special cells in the paranasal sinuses the most common cell is aggar nasi seen in 58.3% cases followed by supraorbital cell in 13.7% cases, Haller cells in 11.7% cases and onodi 5% cases.

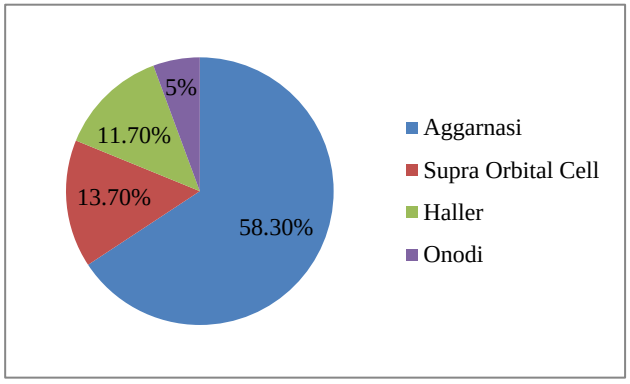

Figure 5: Frequency showing special cells in PNS.

In our study concha bullosa was identified in 26.7% (16) cases with right predominance in 13.3% (08) cases when compared to left 8.3% (05) cases. Bilateral concha was observed in 5% (3) cases.

Table 2: Concha bullosa.

Side	Cases (%)
Right	08 (13.3)
Left	05 (08.3)
Bilateral	03 (05.0)
Total	16 (26.7)

Among middle turbinate variations paradoxical middle turbinate was observed in 11.7% (7) cases. Uncinate pneumatisation was observed in 3 (5%) cases.

In cribriform plate type I in common seen in 55% (33) cases followed by type II seen in 35% (25) cases.

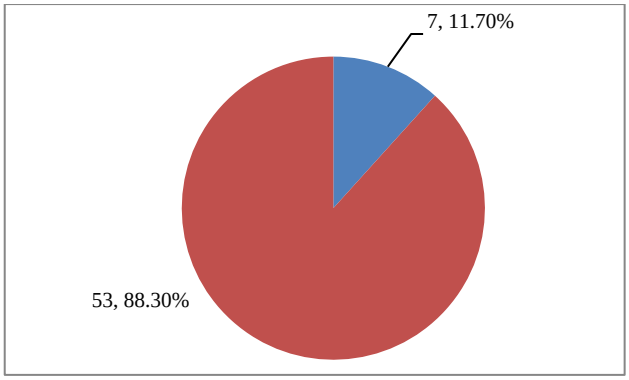

Figure 6: Middle turbinate.

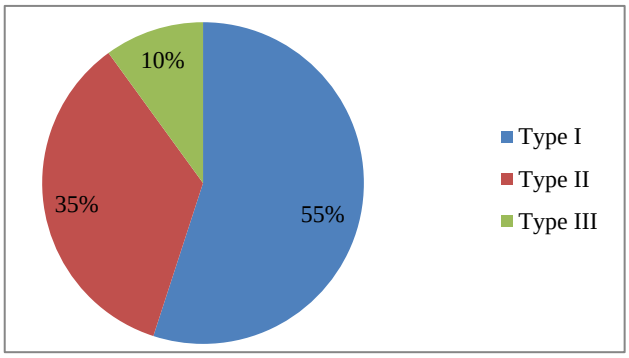

Figure 7: Cribriform plate variations.

DISCUSSION

A variety of sinonasal anatomic variants exist and are commonly seen on paranasal sinus CT scans. The most common ones are nasal septal deviation, agger nasi cells, Haller cells, onodi cells, and concha bullosa.[1-3] A variety of of the anatomic variants have been reported to be linked with chronic rhinosinusitis, probably leading to inflammation by obstructing drainage pathways from the sinuses and nasal cavity.[4,5] In our study most of the patients diagnosed as chronic Rhino sinusitis are in the age group of 21-30 years (33.3%) with slight male (51.7%) preponderance

Most common complaint among the patients presented to us was nasal obstruction seen in 80% cases followed by headache seen in 70% cases. Mucosal changes are seen commonly in maxillary sinus followed by ethmoid frontal and sphenoid sinuses.

In our study 60% (36) patients are having deviated nasal septum with predominance to left 36.1% (13 cases) when compared to right 19.4% (7 cases) the incidence of nasal septal deviation varies between 19.4 to 79% as per the previously reported studies.[6,7]

Among special cells in the paranasal sinuses the most common cell is aggar nasi seen in 58.3% cases followed by supraorbital cell 13.7% cases, Haller cells in 11.7% cases and onodi 5% cases.

Incidence of aggar nasi is 10% as per Schaefer et al, while in anatomic dissection study by Van Alyea had observed an incidence of 89%.[8,9] Rao et al, study show 41% of the Agger nasi.[10] In present study the Haller cells are 11.7%, in Kennedy et al study Haller cells are encountered in 10% of the population, while Bolger et al.[11,12] reported a prevalence of 45%. In present study onodi cells are 5%, in other studies onodi cells ranged from 7% to 12%: Jones et al 7-9% and Arslan et al 12%.[12-15]

In our study concha bullosa was identified in 26.7% cases with right predominance in 13.3% cases when compared to left 8.3% cases. Bilateral concha was observed in 5% cases as per Laine.[15] occurrence of concha bullosa varies commonly among investigators ranging from 4% to 80%. study by Kennedy et al, incidence of concha bullosa was found to be 34%, while in Joe et al study it is in 37%.[16,17] Among middle turbinate variations paradoxical middle turbinate was observed in 11.7% cases. In other studies, paradoxical middle turbinate was observed ranged from 12% to 26.1%: Calhoun et al- 12%; and Bolger et al- 26.1%.[12,18]

In present study uncinate pneumatization was observed in 3 (5%) cases, other studies reveal a prevalence of 0.4-2.5%.[12]

CONCLUSION

Anatomical Variations in sinonasal cavity predispose to chronic rhinosinusitis and hence require correction. Also, detecting these variations preoperatively by computed tomography of paranasal sinus helps in avoiding complications during functional endoscopic sinus surgery.

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

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