

Anatomical Variations in Chronic Rhinosinusitis: A Clinical Study.

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ABSTRACT

Background: Evaluation of a patient with chronic rhinosinusitis also requires proper radiological examination apart from otolaryngological examination and diagnostic nasal endoscopy. Various anatomical variations can be seen on CT Scan of nose and paranasal sinuses. **Methods:** This was a prospective cross sectional study carried out in department of ENT at Government Medical College &Dr. Susheela Tiwari government hospital, Haldwani during the period of October 2014 to October 2015. 30 adults patients of Chronic rhinosinusitis diagnosed clinically by revised task force criteria were included in the study. Acute rhinosinusitis, benign and malignant nasal and paranasal disease, previously operated for sinonasal pathology and facio-maxillary trauma were excluded from the study. After clinical diagnosis all patient underwent non contrast CT scan of nose and paranasal sinuses. The study reviewed coronal, sagittal and axial view in bony windows of all CT scan films. Anatomical variations were noted and their correlation with chronic rhinosinusitis was discussed. **Results:** Of the 30 patients of the study group, 28 (93.33 %) with DNS, 10 (33.33%) with concha bullosa, 8 (26.66%) with enlarged bulla, 6 (20%) with agger nasi, 2 (6.66%) with onodi cell were found. **Conclusion:** Anatomical variations are common in the osteomeatal complex. Deviated nasal septum was the most common anatomical variation encountered in our study followed by concha bullosa and enlarged ethmoidal bulla.

Keywords: Chronic Rhinosinusitis, Nose, Paranasal sinuses.

INTRODUCTION

Chronic rhinosinusitis is a group of disorders characterized by inflammation of the mucosa of the nose and paranasal sinuses of at least 12 consecutive weeks' duration. A widely accepted set of classifications or definitions was developed by the Rhinosinusitis Task Force of the American Academy of Otolaryngology-Head and Neck Surgery^[1] and reported by Lanza and Kennedy.^[2] These criteria are based in large part on temporal time frames. Host factors and environmental factors play an important role in rhinosinusitis. Genetic abnormalities such as immotile cilia syndrome or cystic fibrosis and anatomic abnormalities such as a concha bullosa, septal spur or paradoxical turbinate and certain systemic diseases are all included in host factors.

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Environmental factors include bacterial, viral, or fungal infections, inflammation that occurs secondary to fungal or bacterial colonization^[3, 4]

trauma, primary or secondary tobacco smoke exposure^[5], chronic and acute irritants, noxious chemicals etc. Iatrogenic factors include surgery, medications, nasal packing or nasogastric tube placement. Computed tomography (CT) is currently the modality of choice in the evaluation of the paranasal sinuses and adjacent structures.^[6-11] Its ability to optimally display bone, soft tissue, and air facilitates accurate depiction of anatomy and extent of disease in and around the paranasal sinuses.^[6-9,11] In contrast to standard radiography, CT can clearly show the fine bony anatomy of the ostiomeatal channels. Although the role of anatomical variations of ostiomeatal complex in the etiology of sinonasal disease is controversial^[3] but knowledge of these variations in every patient is important before surgery is planned to avoid damage to surrounding vital structures like the orbit and the brain.

MATERIALS AND METHODS

This was a prospective cross sectional study carried out in department of ENT at Government Medical College & Dr. Susheela Tiwari government hospital, Haldwani during the period of October 2014 to October 2015. 30 adults patients of Chronic rhinosinusitis diagnosed clinically by revised task

force criteria were included in the study. Acute rhinosinusitis, benign and malignant nasal and paranasal disease, previously operated for sinonasal pathology and facio-maxillary trauma were excluded from the study. After clinical diagnosis all patient underwent non contrast CT scan of nose and paranasal sinuses. All the 30 patients underwent CT scan, using a 64 slice CT system. The study reviewed coronal, sagittal and axial view in bony windows of all CT scan films.

RESULTS

A total of 30 patients of chronic rhinosinusitis were examined. Out of 30 patients with age ranging from 17 to 56 years, there were 26 male and 4 females patients.

Of the 30 patients of the study group, 28 (93.33 %) with DNS, 10 (33.33%) with concha bullosa, 8 (26.66%) with enlarged bulla, 6 (20%) with agger nasi, 2 (6.66%) with onodi cell were found [Table 1; Figure 1, 2 & 3].

Table 1: Table Showing the Anatomical Variations.

Variable	No. of Patients	Percentage
1. DNS	28	93.33
2. Concha Bullosa	10	33.33
3. Enlarged Bulla	8	26.66
4. Agger Nasi	6	20
5. Onodi Cell	2	6.66
6. Paradoxical MT	Nil	Nil
7. Haller Cell	Nil	Nil

DNS- Deviated nasal septum; MT- Middle turbinate

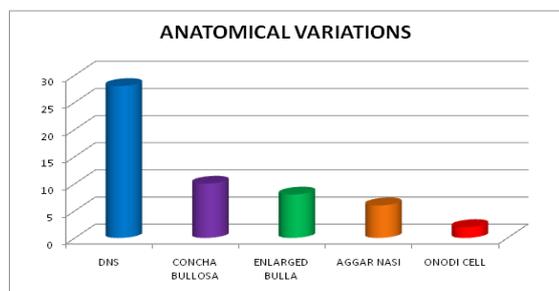


Figure 2: Anatomical Variations.

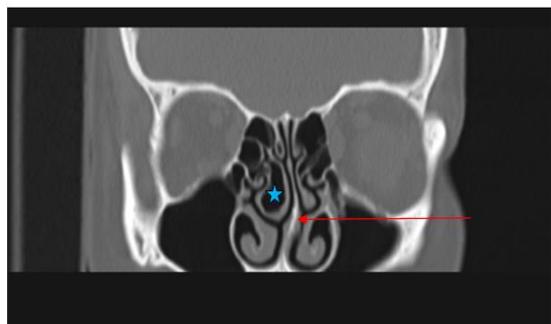


Figure 1: Showing deviated nasal septum.

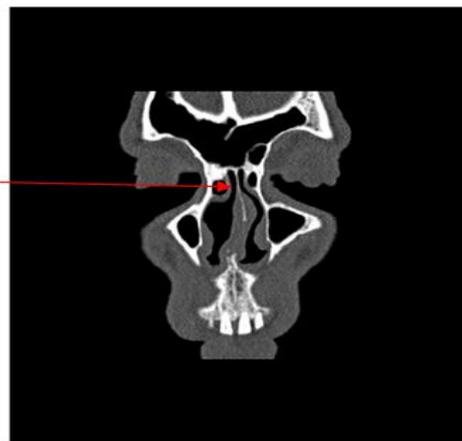


Figure 2: Showing agger nasi cells

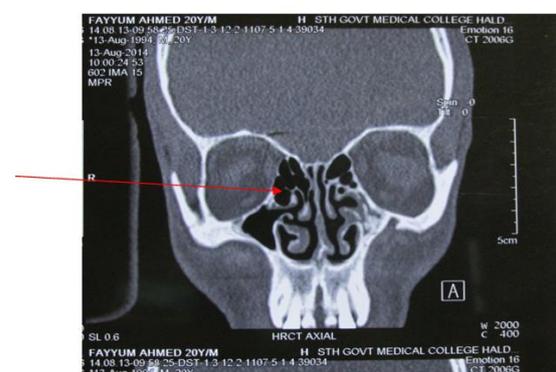


Figure 3: Showing enlarged bulla

DISCUSSION

Anatomical variations in the sinonasal region are common. Recent advances in CT scanning have made the extent of these variations apparent. Local anatomic variations including concha bullosa, deviated nasal septum (DNS), Haller cells, paradoxical middle turbinates, agger nasi cells etc. may be the source of middle meatal obstruction and subsequent rhino sinusitis.

In our study we found anatomical variation in osteomeatal complex of 93.33% chronic rhino sinusitis patients, out of which 33.33% had two or more anatomical variations and the remaining 60% had one or two anatomical variation. Liu X et al, observed prevalence of about 81% anatomical variations in chronic rhinosinusitis cases.^[14] Severino Aires de Araujo Neto et al, reported relatively less anatomical variations 65% in the osteomeatal complex of the chronic rhino sinusitis cases.^[15] Perez et al, also observed similar prevalence of anatomical variations in the chronic sinusitis cases.^[13]

Nasal Septal Deviation

Nasal septum is fundamental in the development of the nose and paranasal sinuses. It is the epiphyseal platform for the development of the facial skeleton.

^[12] It is the most common anatomical variation seen in chronic rhinosinusitis cases. 93.33% of the patients in our study presented with nasal septal deviation [Figure 1-marked by arrow]. Deviated nasal septum causes a decrease in the critical area of the osteomeatal unit predisposing to obstruction and related complications. Perez et al., who reported the prevalence of deviated nasal septum to be about 80%.^[13] Infact in various studies the finding of nasal septal deviation ranged from 14.1% to 80%, Dutra and Marchiore et al.,^[14]14.1%, Arslan et al.,^[15] 36%, Earwaker et al.,^[16] 44%. Dua et al., and Asruddin et al., found prevalence of 44% and 38% of deviated nasal septum in their respective studies.^[17,18] Stallmann et al., and Mamtha et al., also reported lesser prevalence of 60% and 65% deviated nasal septum in chronic rhino sinusitis cases respectively.^[19,20]

Concha Bullosa

Concha bullosa (pneumatized middle turbinate) [Figure 1-marked by star] has been implicated as a possible a etiological factor in the causation of recurrent chronic rhino sinusitis. It is due to its negative influence on paranasal sinus ventilation and mucociliary clearance in the middle meatus region as quoted by Tonai.^[21] Concha bullosa was seen 33.33% of the chronic rhinosinusitis case which is similar to study conducted by Wani et al., Dua et al.,(36%,30%). Perez-Pinas et al., and Scribano et al., reported higher prevalence of concha bullosa i.e. 73% and 67% in chronic rhino sinusitis cases.^[13,23] The prevalence of concha bullosa in our study is on the lower side when compared to the findings of Stallmann et al.,^[19], Maru et al.,^[24] and AlkireBC et al.,^[25] who reported it to be 44%, 42.6% and 41.7% respectively.

Agger nasi cell

Agger nasi cells [Figure 2] lie just anterior to the anterosuperior attachment of the middle turbinate and frontal recess. In our study it is seen in 6(20%) cases. The prevalence is very less as compared to 98.5% by Bolger ^[26], 88.5% by Maru^[24], 86.7% by Tonai and Baba ^[27] and 48% by Asruddin.^[18]

Enlarged bulla

In our study it was seen in 8(26.66%) cases [Figure 3] but in study done by Singh 1999 it was reported in (6.25%) cases.

Onodi cell seen in 2(6.66%) cases but in other studies reported (0-9%).

CONCLUSION

From the result which has been obtained from our study we have come to conclusion that anatomical variations are common in the osteomeatal complex. Deviated nasal septum was the most common anatomical variation encountered in our study

followed by concha bullosa and enlarged ethmoidal bulla CT scan must be done prior to any functional endoscopic sinus surgery. They help in assessing the extent of sinus disease and to know the anatomical variations. Awareness of the possibility of such variations helps in making surgical decisions.

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