



A RETROSPECTIVE OBSERVATIONAL STUDY OF ANATOMICAL VARIATIONS ON ENDOSCOPY AND RADIOLOGY IN PATIENTS WITH CHRONIC RHINOSINUSITIS

ENT

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ABSTRACT

INTRODUCTION: Chronic rhinosinusitis is a group of disorders characterized by inflammation of mucosa of nose and paranasal sinuses of at least 12 consecutive weeks' duration.¹

AIMS: To know the common anatomical variation in patients with chronic sinusitis.

MATERIALS AND METHOD: It is a retrospective observational study in which DNE and CT PNS of 100 cases of chronic rhinosinusitis patients were studied who attended the ENT OPD of Sola Civil hospital, Ahmedabad from January 2018 to January 2019.

RESULTS: In our study, we observed that 90% patients with chronic rhinosinusitis had anatomical variations in nasal cavity whereas 10 % showed no evidence of any anatomical variations on Direct Nasal Endoscopy(DNE) and Computed Tomography(CT) scan of paranasal sinuses. The most common abnormality was deviation of nasal septum.

CONCLUSION: The results of this study highlights that Diagnostic nasal endoscopy and CT scan are complimentary in diagnosis of anatomical variations of nose and paranasal sinuses.

KEYWORDS

Deviated nasal septum, nasal endoscopy, Computerised tomography, Chronic rhinosinusitis, concha bullosa.

INTRODUCTION

Chronic sinusitis is repeated episodes of acute infection or persistent inflammation of the sinuses.

Normal structures and anatomical variations both are seen best on a coronal section of the CT PNS. The normal structures that can be well appreciated on CT PNS are: Superior, middle and inferior turbinates, all the paranasal sinuses like frontal, anterior and posterior ethmoid, maxillary and sphenoid; frontal and sphenoethmoidal recesses; ethmoidal infundibulum, hiatus semilunaris.

The signs suggestive of chronic sinusitis on CT Scan are: mucosal thickening, sinus opacity, retention cyst, and bone changes such as deformity or sclerosis, polyposis. Computed tomography and diagnostic nasal endoscopy offer detailed study of anatomical variations in patients with chronic rhinosinusitis.

Endoscopic examination using a three pass technique should enable visualization of the (1) inferior meatus (2) middle meatus (3) superior meatus (4) spheno-ethmoidal recess (4) olfactory cleft (5) septal areas (6) nasopharynx; mucosa of the nose which in patients of CRS is found to be of allergic type; and certain other anatomical variations can also be visualized.

Diagnostic nasal endoscopy (DNE) and imaging are complimentary to each other as small polyps in the areas of sinus ostia can often be missed in a CT scan. CT scan is still the mainstay of diagnosis for inflammatory sinonasal pathology. The coronal plane, specifically, is considered as a map for assessing the anatomy that varies significantly even between both sides in the same individual. CT scan gives complete information about normal anatomy, anatomical variations, the extent of disease, and relation of sinuses to adjoining vital structures such as orbit and intra cranial areas.

AIMS AND OBJECTIVES

To know the common anatomical variation in patients with chronic sinusitis

MATERIALS AND METHOD

It is a study in which 100 cases of chronic rhinosinusitis patients attending the ENT OPD of Sola Civil hospital, Ahmedabad from

January 2018 to January 2019. These patients were suffering from rhinosinusitis of more than 3 months duration.

SAMPLE SIZE- 100

DURATION- 1 year

STUDY TYPE- Retrospective observational Study

SELECTION CRITERIA

Inclusion criteria: Patients who were diagnosed as chronic sinusitis with clinical findings in CT nose and PNS and diagnostic nasal endoscopy.

Exclusion criteria: Patients with complaints of headache or facial pain, with no clinical findings suggestive of sinusitis; patient with previous history of FESS were excluded.

Patients attending ENT outpatient department with symptoms like post nasal drip, facial congestion, nasal blockage, loss of smell, nasal discharge, excessive sneezing, in which the patient was having more than two symptoms lasting for more than 12 weeks were subjected for DNE followed by CT nose and PNS.

Diagnostic Nasal Endoscopy (DNE) is the examination of the nose performed with endoscopes. At our institution, we use scope with diameter of 4mm and zero degree. It is performed after the application of decongestant combined with a local anaesthetic with patient in supine position and three pass technique is used.

Computerized Tomography (CT) scan of the paranasal sinuses (PNS) at our institution the scan is performed with 16 slice multidetector computed tomography (MDCT) with the patient in supine position. Axial images of the sinuses are acquired with 0.75 collimation and from this raw data sagittal and coronal reformations are obtained using both soft tissue and bone window algorithms. The slice thickness is 6mm

RESULTS

In our study of 100 patients which was conducted in ENT OPD of GMERS medical college and Sola civil hospital from January 2018 to January 2019, we observed that 90% patients with chronic rhinosinusitis had anatomical variations in nasal cavity whereas 10 % showed no evidence of any anatomical variations in nasal cavity on DNE and CT.

Table 1: Anatomical Variation In Chronic Sinusitis

ANATOMICAL VARIATIONS	NUMBER	PERCENTAGE
DEVIATED NASAL SEPTUM	40 U/L B/L	44.4%
CONCHA BULLOSA	18 3	23.3%
MEDIALIZED UNCINATE PROCESS	9	10%
PARADOXICAL MIDDLE TURBINATE	6	6.67%
PNEUMATISATION OF ETHMOIDAL BULLA	5	5.56%
AGGER NASI CELLS	2 2	4.4%
HALLER CELLS	2 1	3.3%
ONODI CELLS	0 2	2.2%

Out of 90% patients in whom anatomical variations were observed, the most common abnormality was deviation of nasal septum followed by concha bullosa, medialized uncinate process, paradoxical middle turbinate, pneumatization of ethmoidal bulla, Agger nasi cells, Haller cells, Onodi cells

Table 2: Average Age

Variable	N	Minimum	Maximum	Mean
Age	100	18	50	30.54

The minimum age was 18 years and maximum was 50 years. The average age was 30 years.

Table 3: Multiple Anatomical Variations

S. NO	ANATOMICAL VARIATION	TOTAL	PERCENTAGE
(1)	DNS+ CONCHA BULLOSA	28	31.1%
(2)	AGGER NASI+ONODI CELLS	2	2.2%

In our study it was observed that 33.3% patients had more than one anatomical variation.

DISCUSSION

With the arrival of Functional Endoscopic Sinus Surgery, the approach to the patient with CRS has been changed. Certain anatomical variations of lateral wall of nose are important as they contribute in blockage of osteomeatal complex, ventilation and drainage of paranasal sinuses. Preoperative evaluation of these variants is important as a part of surgical safety.

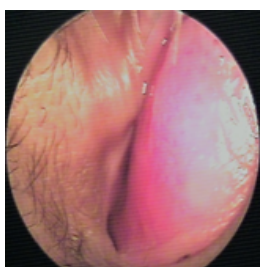
Diagnostic Nasal Endoscopy and Computed tomography play a vital role in accurate assessment of osteomeatal complex and anatomical variations at this area.

Diagnostic Nasal Endoscopy acts as a complimentary tool to Computed Tomography as certain structures like accessory ostium and allergic mucosa can only be visualized on endoscopy and not on CT.

Among patients with chronic rhinosinusitis, the most common abnormality that we found in our study was deviation of nasal septum followed by concha bullosa, medialized uncinate process, paradoxical middle turbinate, pneumatization of ethmoidal bulla, Agger nasi cells, Haller cells, Onodi cells.

Deviated nasal septum

Severe deviation is found to be associated with chronic sinusitis. In our study, 44.4% of patients had DNS which is the major anatomical variation found in most of the chronic sinusitis patient. However some studies did not demonstrated a causal relationship between DNS and sinusitis.

Figure 1- DNS One DNE**Figure 2- DNS On CT PNS**

Concha bullosa

Pneumatization of the middle turbinate and less commonly, of the superior turbinate can be clinically significant and is known as concha bullosa. Usually it is bilateral; however its degree of pneumatization can change from one patient to another and also from one side to another side in the same patient.² Concha bullosa is found to be one of the underlying causes for recurrent chronic sinusitis. The size of concha bullosa is also an important factor for the contribution for chronic sinusitis. In our study, 23.3% of patients had concha bullosa, out of which 85.7% patients had bilateral concha bullosa and 14.2% patients had unilateral concha bullosa.

Figure 3- Concha Bullosa On CTPNS

Medialized uncinate process

The most common and pathologically significant variation of the uncinate process is a marked medial curvature or bend of the uncinate process. It is one of the most frequent pathologic findings in patients of sinusitis had medialized uncinate process.

In the paradoxical middle turbinate, the turbinate is curved laterally; that is the concavity of the turbinate points towards the septum and its convexity towards the lateral wall.² It is usually bilateral finding. By itself it is not a pathological finding, although in some cases the paradoxical curvature may be quite significant and thereby cause significant narrowing of the entrance to the middle meatus thus causing sinusitis. In our study 6.67% of the patients had paradoxically bent middle turbinate.

Pneumatization of ethmoidal bulla

An excessively pneumatized ethmoidal bulla may expand anteriorly coming in close contact with posterior free margin of the uncinate process, thereby narrowing or partially blocking hiatus semilunaris resulting in chronic sinusitis ultimately. In our study 5.56% of the patients showed pneumatization of ethmoidal bulla

Agger nasi

A pneumatized agger nasi is an anatomic variant that appears as an elevation of the lateral wall of the nose just anterior to the attachment of middle turbinate. When there is extensive pneumatization or the cell is very large or it extends posteriorly, it may displace the attachment of middle turbinate medially and superiorly and mechanically constrict the frontal recess; thus affecting the drainage pathway and resulting in accumulation of secretions and ultimately chronic sinusitis.⁴ In our study on DNE and CT, agger nasi cells were seen in 4.4% of the total patients analysed. 50% patients had unilateral agger nasi cell and 50% had bilateral.

Figure 4- Agger Nasi Cell On CTPNS

Haller cell

In our study prevalence of Haller cell, that is anterior ethmoidal air cell located beneath the floor of the orbit was 3.3%. 2 out of 3 patients had unilateral presentation.

Onodi cells

Onodi cell is the posterior most ethmoidal air cell which extends posteriorly and laterally over sphenoid sinus. Presence of onodi cell increases the chance of injury to internal carotid artery and optic nerve while doing FESS if not identified preoperatively. In our study , we observed onodi cells in 2.2% of the total patients.

Figure 5- On ODI Cell On CTPNS



Table 4-comparison Of Anatomical Variations On Dne And Ct With Studies Of Pragadeeswaran Kumarasekaran Et Al. And SaudA EtAl.⁴

VARIATIONS	OUR STUDY	PRAGADEESWARAN KUMARASEKARAN ET AL.
DEVIATE D NASAL SEPTUM	44.4%	81.11%
CONCHA BULLOSA	23.3%	32.2%
MEDIALIZED UNCINATE PROCESS	10%	21.1%
PARADOXICAL MIDDLE TURBINATE	6.67%	14.4%
AGGER NASI CELLS	4.4%	6.6%
HALLER CELLS	3.3%	3.3%
ONODI CELLS	2.2%	7.7%

CONCLUSION

In our study we conclude that presence of anatomical variations is common in patients with chronic sinusitis. The results of this study highlights that Diagnostic nasal endoscopy and CT scan are complimentary in diagnosis of anatomical variations of nose and paranasal sinuses. DNS is the most common anatomical variation in our study followed by concha bullosa, medialized uncinate process.

CT scan and DNE both help in identifying the anatomical variations which are important in patients undergoing Endoscopic sinus surgery and also helps in preventing major complication during ESS.

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