

A STUDY OF ANATOMICAL VARIATIONS OF NOSE AND PARANASAL SINUSES IN PATIENTS WITH CHRONIC RHINOSINUSITIS

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ABSTRACT

BACKGROUND: Chronic rhinosinusitis (CRS) is a collection of conditions marked by inflammation of the mucosal lining of the nasal cavity and paranasal sinuses. This study aimed to ascertain the incidence of sinonasal anatomical changes contributing to chronic sinusitis by analyzing the computed tomography (CT) scans of patients with chronic rhinosinusitis at a tertiary care hospital.

MATERIALS AND METHODS: The present cross-sectional study was conducted in the Dept. of ENT for a period of one year. The study comprised 50 patients diagnosed with chronic rhino sinusitis. Data about age, gender, chief complaints, sinus involvement and anatomical variations observed in the CT scan was collected from the patients

RESULTS: The majority of respondents were between 20 and 30 years old. There were 31 male and 19 female patients. Nasal obstruction was the most common symptom (80%), followed by Nasal discharge (78%). Maxillary rhinosinusitis was the most common (74%) type of sinus involved followed by ethmoid rhinosinusitis(64%). Deviated nasal septum (82%), Chonchabullosa (36%), Frontoethmoidal cells (34%), uncinata attached to middle turbinate (12%), Onodi cells (4%) & Haller cells (2%) are the anatomical variations in CRS patients

CONCLUSION: Anatomical differences in paranasal sinus structures may predispose individuals to chronic rhinosinusitis, with a deviated nasal septum identified as the most prevalent variant. Accurate understanding of anatomical differences of the paranasal sinuses is crucial in chronic rhinosinusitis to avert potential difficulties during surgical procedures. Computed tomography is the preferred method for assessing paranasal sinuses and surrounding tissues.

KEYWORDS: Paranasal sinuses, anatomical variations, chronic rhinosinutits, CT scan.

INTRODUCTION

Chronic rhinosinusitis is characterized by inflammation of the nasal cavity and paranasal sinuses, lasting a minimum of 8-12 weeks and presenting with at least two symptoms, such as nasal obstruction, nasal discharge (anterior or posterior), facial pain or pressure, and/or diminished or absent olfaction, along with either endoscopic evidence of disease or pertinent alterations on a CT scan. Objective confirmation of sinus illness is necessary due to the general nature of symptoms, which may be replicated by several conditions (e.g., upper respiratory tract infection, allergic rhinitis, migraine). Conversely, in the absence of symptoms, diagnosing CRS only by radiology is inappropriate due to the high prevalence of radiological abnormalities on CT scans in healthy persons. Consequently, the existence of symptoms in conjunction with an objective finding is essential. [1] The use of nasal endoscopy into symptom evaluation significantly enhanced diagnostic precision in verifying the existence of chronic rhinosinusitis, using sinus CT as the benchmark standard.[2]

Comprehensive understanding of nasal and paranasal sinus architecture, together with its variations, is crucial for optimizing surgical outcomes and minimizing complications. Computed tomography is now the preferred method for assessing the paranasal sinuses and surrounding tissues. Its capacity to effectively see bone, soft tissue, and air enables precise representation of anatomy and disease extent in the paranasal sinus area. [3] Anatomical delineation of the paranasal sinus on a CT scan is a prerequisite for surgical intervention. A CT scan is an effective modality for assessing anatomical structures, as it provides clear visualization of the nose and paranasal sinuses, including conditions of the ostiomeatal complex, anatomical anomalies, and the presence or absence of pathological tissue within the sinuses and its expansion. A CT scan may provide a comprehensive picture of the anatomical structures in regions not accessible by endoscopy. This examination effectively demonstrates the anterior ethmoid cells, two-thirds of the nasal cavity, and the frontal recess. The CT scan in this region may reveal the location of the etiologies of chronic sinusitis, namely the osteomeatal complex. [4]

Understanding the anatomical differences of the nose and paranasal sinuses in chronic rhinosinusitis is crucial, as it serves as a reference for appropriate management in the treatment of chronic rhinosinusitis. The current study was done to ascertain the incidence of sinonasal anatomical changes contributing to chronic sinusitis by analyzing the computed tomography (CT) scans of patients with chronic rhinosinusitis at a tertiary care hospital.

MATERIALS AND METHODS

The present cross-sectional study was conducted in the Dept. of ENT at Viswabharathi Medical College for a period of 1 year after getting clearance from institutional ethical committee. The study comprised 50 patients diagnosed with chronic rhino sinusitis. Written informed consent was obtained from all patients prior to the study procedure.

INCLUSION CRITERIA; Adult patients presenting with a history of nasal obstruction, nasal discharge, postnasal discharge and headache, clinically diagnosed to have chronic rhino sinusitis (symptoms for a period of 12-week or more despite adequate medical treatment). Patients with age group from 20 years and both sex

EXCLUSION CRITERIA; Patients with rhino sinusitis less than 12 weeks. Patients with allergic rhinitis. Patients with previous history of sinonasal surgery. Patients with extensive nasal polyposis. Patients with craniofacial anomalies, facial and head trauma, nasal or facial neoplasms, immunodeficiency or cystic fibrosis. Patients younger than 17 years of age.

After clinical diagnosis, all the 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 and they were analyzed for anatomical variations. Data about age, gender, chief complaints, sinus involvement and anatomical variations observed in the CT scan was collected from the patients.

Statistical analyses were performed using SPSS version 20. Data was represented in form of frequency & percentages.

RESULT

Total of 50 patients with chronic rhinosinusitis (CRS) were included in this study. The majority of patients were between 20 and 30 years old (52%), followed by those aged 31–40 years (16%) as shown in Table 1

TABLE 1; AGE INCIDENCE OF PATIENTS

Age	Frequency (n=50)	Percentage
20-30	26	52 %
31-40	8	16 %
41-50	6	12 %
51-60	7	14 %
>60	3	6 %

There were 31 male and 19 female patients as shown in Table 2 & Fig.1

TABLE 2; SEX DISTRIBUTION

Sex	Frequency (n=50)	percentage
Male	31	62 %
Female	19	38 %

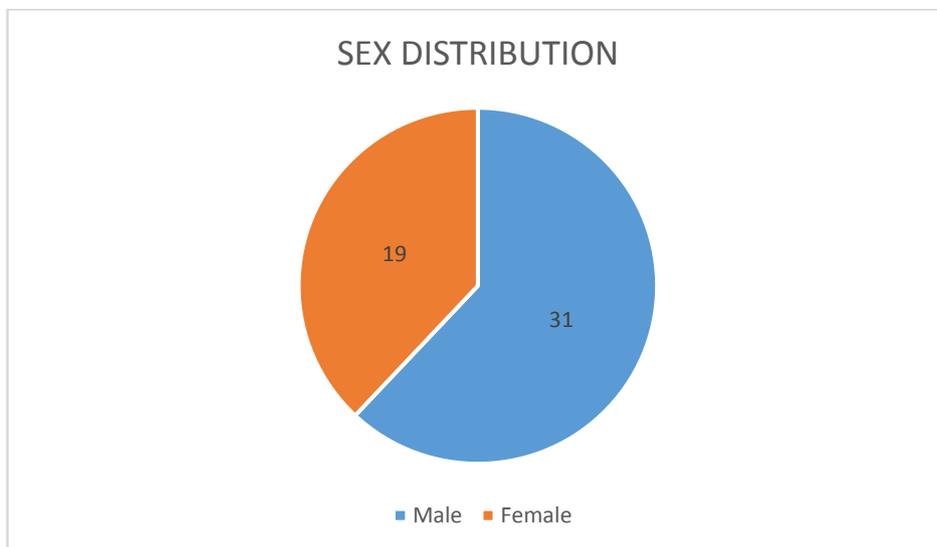


Fig.1: SEX DISTRIBUTION

Nasal obstruction was the most common symptom (80%), followed by Nasal discharge (78%), Headache (54%), Facial pain (52%), Sneezing (16%) and Anosmia (10%) as shown in Table 3

TABLE 3: INCIDENCE OF SYMPTOMS

symptoms	Frequency (n=50)	percentage
Nasal obstruction	40	80 %
Nasal discharge	39	78 %
Headache	27	54 %
Facial pain	26	52 %
Sneezing	8	16 %
Anosmia	5	10 %

Maxillary rhinosinusitis was the most common (74%) type of sinus involved followed by ethmoid rhinosinusitis(64%) as shown in Table 4

Table 4: TYPE OF SINUSES INVOLVED

Anatomic variations	Frequency (n=50)	percentage
Maxillary	37	74 %
Ethmoid	32	64 %
Sphenoid	17	34 %
Frontal	14	28 %

Deviated nasal septum (82%), Chonchabullosa (36%), Frontoethmoidal cells (34%), uncinata attached to middle turbinate (12%), Onodi cells (4%) & Haller cells (2%) are the anaotomical variations in CRS patients as shown in Table 5

Table 5: ANATOMICAL VARIATIONS IN CRS PATIENTS

Anatomical variations	Frequency (n=50)	percentage
DNS	41	82 %
Chonchabullosa	18	36 %
Frontoethmoidal cells	17	34%
Uncinateattached to middle turbinate	6	12 %
Onodi cells	2	4 %
Haller cells	1	2 %

DISCUSSION

In our study, the most prevalent age incidence for CRS was 20–30 years, which was comparable to the study of Uday Srikar and Harini RM, which found that the most common age group afflicted by CRS was 21–30 years.[5]. There were 31 men and 19 women in our study, a 1.63:1 ratio. The male to female ratio in the research by Sachdeva P et al. [6] was 1.7:1, but in the study by Uday Srikar Harini, there were 56.07% men and 43.93% women.[5]

The most frequent presenting symptom was nasal obstruction (80%), which was followed by headache (54%), and nasal obstruction (78%). In UdaySrikar's research M. Harini, [5] Nasal obstruction (85%), headache (71%), nasal discharge (36%), and sneezing (29%), were the main presenting symptoms. However, in the Sachdeva P et al. study, headache was the most prevalent symptom (85%), followed by post-nasal drip (80%).[6]

The maxillary sinus was the most often infected or inflamed sinus in the current research (65%). This result is consistent with research by Clement et al. [7] (73%) and Lloyd et al. [8] (83%), whereas Bolger et al. [9] (78.2%), Calhoun et al. [10] (84.3%), and Kennedy et al. [11] (78%) found that the anterior ethmoid sinus was the most often afflicted sinus.

According to the current research, the most prevalent structural variation among chronic rhino sinusitis patients was a deviated nasal septum (82%) followed by concha bullosa (36%). Nasal septal deviation was the most frequent anatomic abnormality seen on CT scans in the research by Aramani and Karadi [12], with 58.5% of patients exhibiting it. The second most prevalent variation, concha bullosa of the middle turbinate, was seen in 49.3% of cases and was mostly found on one side of the nasal wall (30.7%). Hypertrophic ethmoid bulla was seen in 32.8% of patients, whereas aggernasi cells were seen in 24.3% of patients.

According to the research by Ahmet Kaygusuz, Mehmet Haksever, et al., septal deviation was the most prevalent anatomical variation in all patients (study + control group), accounting for 72.7% of the total.[13]

CONCLUSION

Anatomical differences in paranasal sinus structures may predispose individuals to chronic rhinosinusitis, with a deviated nasal septum identified as the most prevalent variant. Accurate understanding of anatomical differences of the paranasal sinuses is crucial in chronic rhinosinusitis to avert potential difficulties during surgical procedures. Computed tomography is the preferred method for assessing paranasal sinuses and surrounding tissues.

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