SINONASAL ANATOMICAL VARIATIONS IN PATIENTS WITH CHRONIC RHINOSINUSITIS

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ABSTRACT

Objective: The nose and paranasal sinuses have a wide range of structural changes that are best diagnosed with computed tomography (CT). Anatomical variations are minor anatomical defects that occur around the osteomeatal complex that can block paranasal sinus drainage and ventilation. The purpose of this study was to determine the prevalence of structural abnormalities of the nose and paranasal sinuses in chronic rhinosinusitis (CRS) patients.

Methods: This cross-sectional study included 100 patients with CRS who visited the ENT outpatient department and had been suffering from the condition for more than 3 months without responding to medical treatment. CT PNS scans were used to determine the prevalence of anatomical abnormalities in these patients.

Results: The majority of the patients were between the ages of 31 and 40 years. The most common presenting symptom was nasal obstruction (86%), followed by headache (60%). The most prevalent anatomical abnormality encountered in our study was a deviated nasal septum (70%) and concha bullosa occurring in 35% of cases.

Conclusion: In our study, the most frequent anatomical variation was a deviated nasal septum. Patients with prolonged symptoms who are not improving with appropriate medical care are advised to get a CT scan to find any structural changes.

Keywords: Chronic rhinosinusitis, Deviated nasal septum, Sinonasal anatomical variants.

INTRODUCTION

Chronic rhinosinusitis (CRS) is a group of inflammatory and infectious disorders that affect the nose and paranasal sinuses for more than 12 weeks [1]. The osteomeatal complex, which drains the anterior sinuses, is a crucial location in the etiology of CRS [2,3]. If an anatomical variance further narrows this important area, the patient may be predisposed to infection and its likely recurrence, as well as persistent inflammatory alterations in the mucosa [3]. CRS degrades quality of life, reduces job productivity, and incurs significant costs due to its chronic nature and debilitating symptoms.

Computed tomography (CT) scans are currently the most extensively utilized imaging tool for diagnosing sinonasal diseases, including rhinosinusitis. According to Stammberger and Hawke [4], CT scan of the paranasal sinuses will offer a surgical road map of the nose and paranasal sinuses to determine the existence of substantial anatomic anomalies - which may predispose the patient to chronic or recurring acute rhinosinusitis attacks.

Some anatomical variations are surgically risky and can predispose neurovascular structures associated with the paranasal sinuses, such as the optic nerve and the internal carotid artery, to a fatal injury during endoscopic sinus surgery [5]. Understanding these anatomical variances is therefore critical in designing endoscopic sinus and endoscopic skull base procedures. A CT scan is required to comprehend the specifics of the structural changes and to evaluate the extent of disease within the paranasal sinuses. CT scan is the most often used imaging modality for correctly displaying paranasal sinus anatomy. It also has the advantage of displaying details of bone and soft-tissue pathologies impacting the sinonasal area [6,7]. CT scans also help to delineate anatomical landmarks and give the majority of the information needed to plan endoscopic sinus and skull base treatments [8].

Table 1: Age distribution of patients

Age in years	Frequency (n=100)
11–20	30
21–30	20
31–40	39
41–50	6
>50	5

Table 2: Sex distribution of patients

Sex	Frequency (n=100)
Male	58
Female	42

Table 3: Incidence of symptoms

Symptoms	Frequency (n=100)
Nasal obstruction	86
Headache	60
Nasal discharge	50
Irritation in throat	36
Facial pain	26
Post-nasal discharge	20
Aural problems	12
Disturbance of smell	11
Nasal bleeding	10
Sneezing	9
Fetid smell from mouth	8

As a result, the present study was designed to assess the prevalence of structural changes of the nose and paranasal sinuses in CRS patients.

Table 4: CT evaluation

Variations	Unilateral (n)	Bilateral (n)	Total no. of patients (n=100)
Deviated nasal septum			70
Concha bullosa	21	14	35
Paradoxical middle turbinate	7	6	13
Uncinate attached to the lamina	6	62	68
Uncinate attached to middle turbinate	5	22	27
Frontal recess narrowing	13	7	20
Maxillary sinus hypoplastic	5	10	15
Agar nasi cell	18	4	22
Haller cell	6	7	13
Onodi cell	5	3	8

METHODS

From June 2020 to May 2022, the present study was carried out at the Department of ENT, Viswabharathi Medical College and General Hospital, Kurnool. The study included 100 patients with CRS (as defined by the criteria for diagnosis) who visited the OPD.

Inclusion criteria

Patients of both sexes, >10 years old, with established paranasal sinuses and CRS duration of more than 12 weeks who gave informed consent were included in the study.

Exclusion criteria

Patients suffering from acute rhinosinusitis, fungal rhinosinusitis, pregnant woman, and those who have had nasal surgery were excluded from the study.

The study was approved by the Institutional Ethical Committee. Before enrolling participants in the trial, written informed permission was obtained. The cases chosen for the study underwent a thorough history-taking and clinical assessment. Routine blood and urine tests were performed, as well as bleeding time and clotting time before the patient had CT of the nose and paranasal sinuses. Demographic information, clinical presentation, and CT scans of the nose and paranasal sinuses with 3-mm slices in the axial, coronal, and sagittal planes were collected and analyzed. The presence of structural anomalies was documented.

Statistical analysis

The acquired data was produced in Microsoft Excel and analyzed in SPSS-22.

RESULTS

The present study included 100 CRS patients who were evaluated for the presence of various structural alterations. Out of 100 patients, 38 were between the ages of 31 and 40 years, with the remaining 28 being between the ages of 11 and 20 years. There were 58 men and 42 women (Tables 1 and 2).

Mostly patients complained of nasal obstruction, headache, and nasal discharge (Table 3).

A detailed analysis of CT scans showed deviated nasal septum in 70% cases, uncinate attached to lamina in 68% of cases, and concha bullosa was found in 35%, (Table 4).

DISCUSSION

CRS has been found to be more frequent in men in this investigation. This is consistent with prior studies conducted in our setting [6,9]. However, some other studies revealed a female predominance [10,11].

In our study, the most common age group for CRS was 31–40 years, followed by 10–20 years. Aramani *et al.* discovered a similar age occurrence [12]. CRS was shown to be more common in people aged 15–34 in an Asian study [13].

The most common presenting symptom was nasal blockage (86%), followed by headache (60%), and nasal discharge (50%). The most common presenting symptoms in the study of Srikar and Harini [14] were nasal blockage (85%), headache (71%), nasal discharge (36%), and sneezing (29%). However, in the study of Sachdeva *et al.* [15], headache was the most common symptom (85%), followed by post-nasal drip (80%).

DNS was the most prevalent anatomical abnormality identified in 70% of the individuals in our investigation. Similar research by Kaygusuz *et al.* [16] revealed 72.7% of DNS, while another study by Pérez-Piñas *et al.* [17] revealed 77.7% of DNS. DNS affects 20–31% of the general population, and significant septal deviation has been identified as a risk factor for sinusitis [18].

Concha bullosa was found in 35% of the cases. This was similar to Wani *et al.*'s study, which found concha bullosa in 30% of patients [19]. However, Gouripur *et al.* [20] found concha bullosa in 12% of cases while Mathuram *et al.* [21] found it in 43.5% of cases.

In our study, Haller's cell was found in 13% of the patients. Kaygusuz *et al.* [16] reported the presence of Haller's cell in 16% of the overall patients. Gouripur *et al.* [20], in their study. found Haller's cells in 14% of patients.

CONCLUSION

In our study, the most frequent anatomical variation was a deviated nasal septum. Patients with prolonged symptoms who are not improving with appropriate medical care are advised to get a CT scan to find any structural changes.

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