



Multi Detector Computed Tomographical Assessment of Anatomical Variants of Paranasal Sinuses

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Multi detector computed tomography (MDCT) scan of paranasal sinuses has become mandatory for all patients undergoing functional endoscopic sinus surgery. It depicts the anatomical variations in much simpler way and acts as a roadmap for endoscopic sinus surgery. In this study the maximum of participants were in the age group of 41- 50 years (32 %). The mean age of the study participants was observed to be 43.8 ± 15.6 years. HRCT PNS results shows nasal septum was found to be the most common anatomical variant (DNS- 94%). Concha Bullosa in right side were seen in 37.5% and left side were 21.9% (total unilateral cases- 59.4%) and bilateral Concha Bullosa were seen in 40.6% of the cases. Agger nasi were found to be present in 58% of the CRS cases among which right AN was 41%, left side was 30.8%, and bilateral AN were seen in 28.2% of the cases and Paradoxical Middle Turbinate were seen in 42% of cases in our study. Medialised uncinata was seen in 22% of the cases.

Keywords: CRS; Medialised uncinata; concha bullosa.

1. INTRODUCTION

Chronic rhino sinusitis (CRS) is one of the common diseases for which consultation of

otorhinolaryngologist is pursued [1]. Lateral nasal wall of each nasal cavity provides the final common pathway of drainage of the muco-ciliary clearance of frontal, maxillary and anterior

ethmoidal air cells. The aim of endoscopic surgery for chronic rhinosinusitis is to re-establish the physiologic muco-ciliary flow. Endoscopic surgery, necessitate the surgeons to have detailed information of the anatomy of the lateral nasal wall, paranasal sinuses, several of which are noticeable only by the use of CT scan [2,3]. Another equally significant aspect of carrying out endoscopic sinus surgery is the knowledge of anatomic variations that may influence the operative safety. Computed tomography (CT) is central to the modern diagnostic option for chronic rhinosinusitis, due to its ability to delineate mucosal disease, to establish primary obstructive pathology, and to image distal structures such as the posterior ethmoid sinus, which cannot be observed with direct endoscopy. In this study, we studied the CT scans of patients with symptoms of rhinosinusitis to investigate the occurrence of those anatomic variants, which might possibly impact on paranasal sinus drainage, associating them with the presence or absence of radiologic indication of sinus mucosal disease and also their knowledge is necessary for operative safety.

2. METHODOLOGY

Patients with symptoms of paranasal sinus referred to the department of Radio- diagnosis was included in the study after a written informed consent. The study was under taken during the period of December 2018 to September 2020.

2.1 Inclusion Criteria

- Patients with rhinological symptoms with respect to para nasal sinuses.
- Patients willing to participate in this study

2.2 Exclusion Criteria

Patients who did not give consent for the study were excluded from the study.

A descriptive study was conducted among 50 patients undergoing Multi Detector Computed Tomography assessment of para nasal sinuses for various rhinological reasons. The present study was carried out in the Department of Radio diagnosis and Imaging and Department of Otorhinolaryngology, Sree Balaji Medical College, Chennai, India, in accordance with the declaration of Helsinki guidelines on good clinical practice. Majority of the referred cases were

those who have clinical features like nasal congestion, stuffiness of the nose, pain above or below the eyes, blockage of one side if the nose, post nasal drip, nosebleeds, decreased or loss of smell sensation, numbness or pain in parts of the face, in whom para nasal involvement is suspected clinically. Computed Tomographical assessment was carried out with 32 slice CT scanner. Clinical history was elicited from the patients or guardians. Clinical records was evaluated to look for any relevant investigation and for any previous operative procedure. Image acquisition was done in axial, sagittal & coronal planes.

3. RESULTS AND DISCUSSION

Maximum of the study participants were in the age group of 41- 50 years (32%). The mean age of the study participants was observed to be 43.8 ± 15.6 years. Majority of the study participants were males (52%), while the rest 48% of them were females. Concha Bullosa was found in both the sides in 40.6% of the participants while in 37.5% of the participants it was found in right side only and in 22 % of the participants it was found only on the left side. Majority of the participants had agger nasi only on right side (41%), followed by left (30.8%) and bilateral (28.2%). Maximum of the study participants had Bulla ethmoidalis on right side (46.2%) followed by left (26.9%) and bilateral (26.9%). Out of the three participants who had onodi cells two had it on their right side while one had it on left side.

Among the CT findings DNS (94%) was the most common finding among the study participants followed by Aggar Nasi (78%) and Concha bullosa (64%). Among the study participants maximum of the females (45.8%) were in the age group of 41 – 50 years and maximum of the males were found in the age group 31 – 40 years. The association was not found to be statistically significant. (p- value- 0.112). Both male (60%) and female (60%) had paradoxical middle turbinate predominantly on their right side. The association was not found to be statistically significant (p value -0.766). Both male (57%) and female (756%) had Medialised uncinated process predominantly on their right side. The association was not found to be statistically significant (p value -0.701).

Nikita frinadya et al. [4] observed in their study that chronic rhinosinusitis is most prevalent in the 16 – 30 years old age group (37.5%). Pragadeeswaran k et al [7] conducted a similar

study where the minimum age was 18 years and maximum were 50 years, the mean age being 30 years. Similar results are seen in

studies done by Rajashree et al, Narendrakumar V et al, S.A.R. Nouraei et al and Xavier Pruna et al. [5].

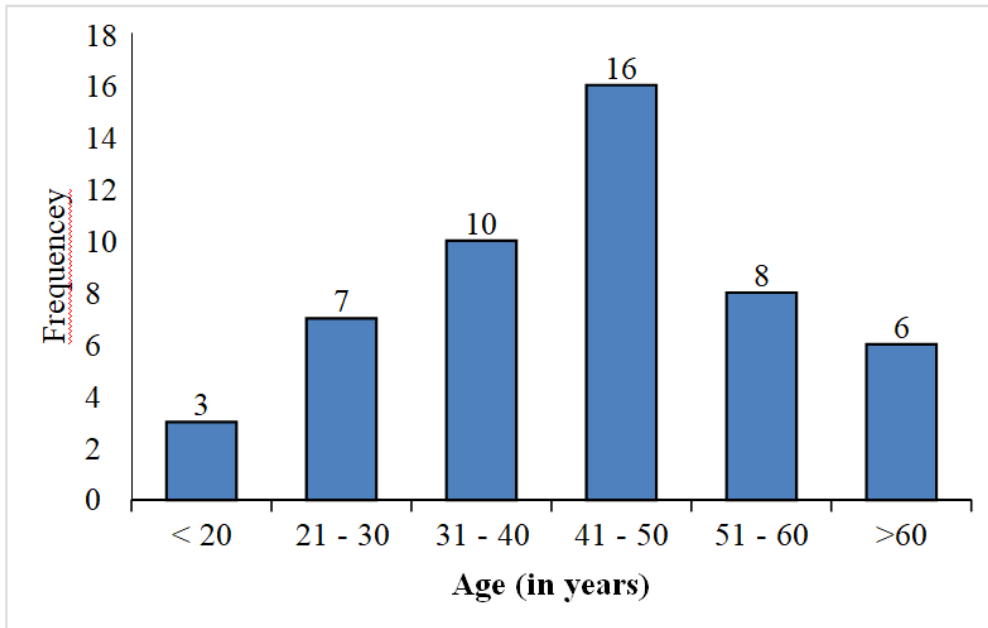


Fig. 1. Distribution of study participants based on age (n=50)

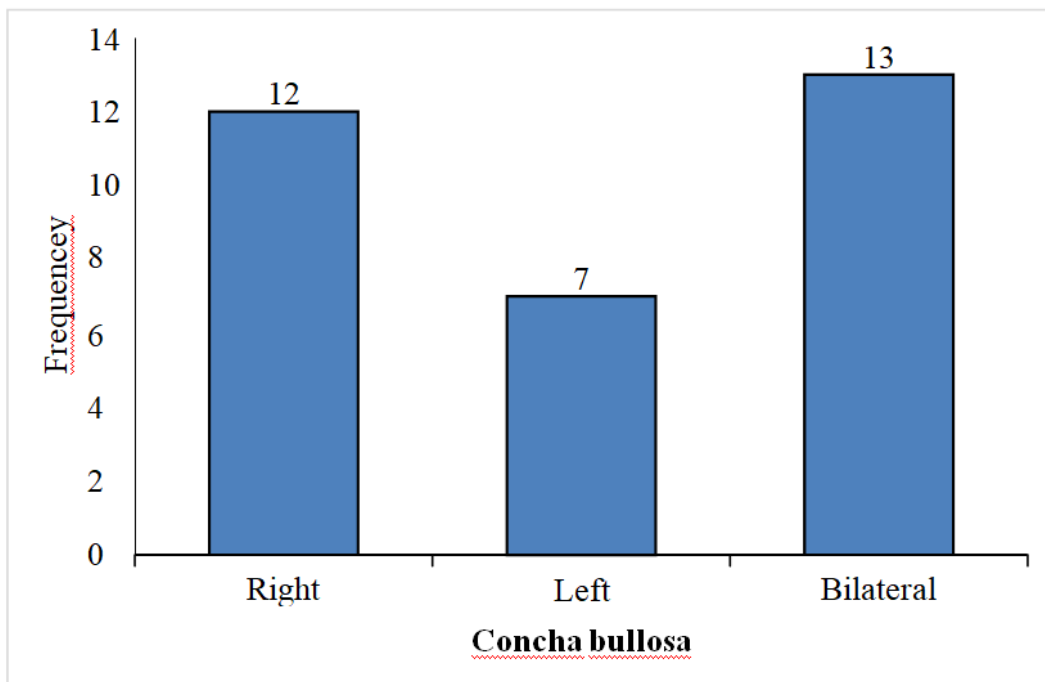


Fig. 2. Distribution of study participants based on Concha Bullosa (n=32)

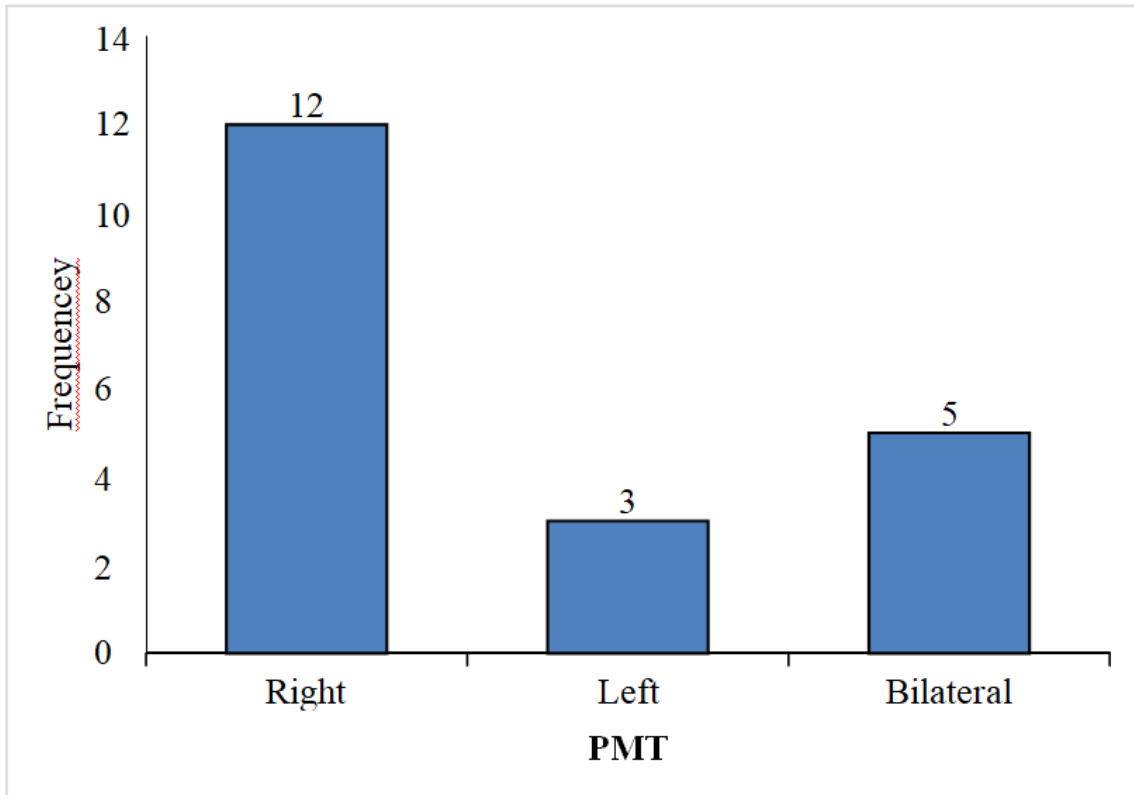


Fig. 3. Distribution of study participants based on paradoxical middle turbinate

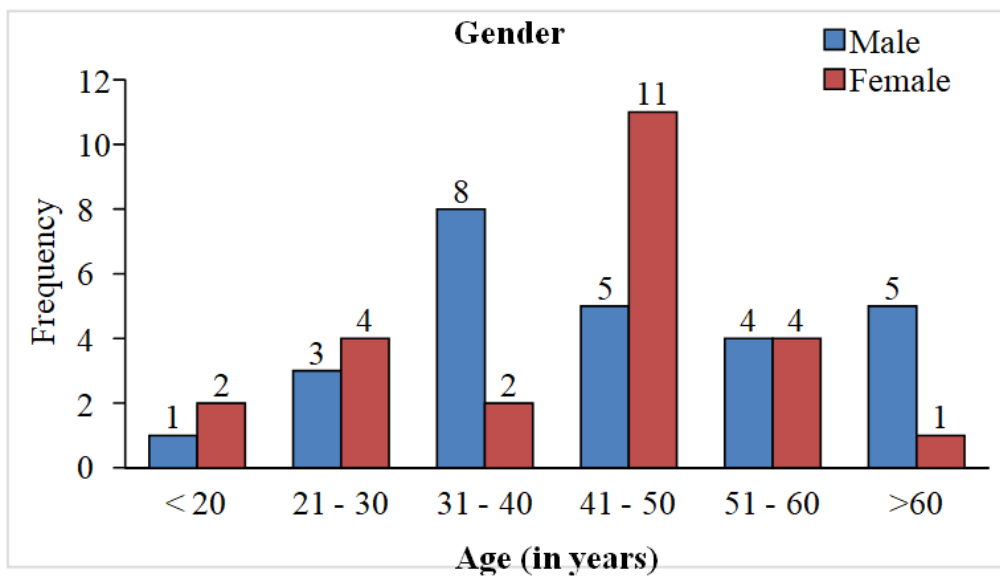


Fig. 4. Distribution of age based on gender (n = 50)

In contrast to our result in a study done by Parul Sachdeva et al, the age group affected in CRS were much younger (18-24 years). In our study HRCT PNS Findings are similar to studies done by Pragadeeswaran K et al (88%), Armani A et al (74%). In contrast to these authors some studies suggested DNS to be one of the major anatomical variants but the prevalence being much less as seen by Vaibhavi Vyas et al (44%), Nikita Frinadya et al [6] (45%), D S Grewal et al (63%). Mundra et al conducted a study which shows the prevalence of concha bullosa to be 49.18% in patients with CRS. Whereas a study done by Bolger et al. [7] the second most common anatomical variant was concha bullosa (53.6%). Jayant Sonone et al. noticed bilateral concha bullosa 10.53% among which the right concha bullosa was seen in 35.26% patients. This is much lesser than our study findings. Paradoxical Middle Turbinate were seen in 42% of cases in our study. Distribution of the study participants based on Paradoxical middle turbinate is as follows: Right 60%, Left 15%, and bilateral 25%. D S Grewal et al [9] (20%), Parul Sachdeva et al (18%), and Pragadeeswaran K et al (14%) also found higher prevalence.

Jayant Sonone et al (7.02%), Nikita Frinadya et al (5%) [8], Vaibhavi Vyas et al (7%) found much lesser cases with PMT. In the present study medialised uncinata was seen in 22% of the cases. Similar results were seen in a study done by Pragadeeswaran K et al (21%). In the present study, Agger nasi were found to be present in 58% of the CRS cases among which right AN was 41%, left side was 30.8%, and bilateral AN were seen in 28.2% of the cases. Similar results are seen in studies done by Parul Sachdeva et al (73%), Jayant Sonone et al (91.3%) [8-10].

4. CONCLUSION

In patients with chronic or recurrent sinusitis, a thorough inspection of MSCT scans must be achieved in order to sort reasons of sinus drainage obstruction. MDCT of the paranasal sinuses has improved the visualization of paranasal sinus anatomy and has allowed greater accuracy in evaluating paranasal sinus disease.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline, patient's consent and ethical approval have been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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