

## Original Research Article

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# Study of anatomical variants at osteomeatal complex in cases of chronic maxillary sinusitis

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## ABSTRACT

**Background:** To study the contribution of anatomical variations at osteomeatal complex area in development of chronic maxillary sinusitis.

**Methods:** 60 patients with chronic maxillary sinusitis, clinically diagnosed on the criteria laid by Lanza and Kennedy and radiologically supported by X-ray PNS, were included in the study. Nasal endoscopy with different angled endoscopes done under local anaesthesia to recognize the anatomical variants at osteomeatal complex area.

**Results:** In 41.09% of cases anatomical variants like concha bullosa, paradoxical middle turbinate, large bulla ethmoidalis or medially bent uncinate process were detected, but in rest 59.91% of cases of maxillary sinusitis there was no anatomical abnormality.

**Conclusions:** Among the causative factors for development of chronic maxillary sinusitis different anatomical variants at osteomeatal area causes narrowing of the drainage pathway of maxillary sinus leading to development of chronic inflammation of the maxillary sinus.

**Keywords:** Osteomeatal complex, Infundibulum, Nasal endoscopy, Concha bullosa

## INTRODUCTION

Maxillary sinus and associated suppuration was reported by Nathaniel Highmore.<sup>1</sup> Pathophysiology of chronic rhinosinusitis remains incompletely understood but it is clear that a number of local, environmental and systemic factors play predisposing role.

Messerklinger suggests that recurrent sinusitis is often due to a focus of infection that remained in a stenotic cleft of the lateral wall and for normal sinus function the patency of the so called osteomeatal complex is critical.<sup>2</sup> Allergy, viral infection, immune deficiency and anatomical variants induce osteal obstruction leading to stasis of secretions, secondary infection, inflammatory cytokine synthesis and leukocyte recruitment. This further propagates the inflammatory process resulting in a

vicious cycle, leading to chronicity if untreated. Messerklinger noted impaired mucociliary clearance results in the development of chronic sinusitis.

The role of bacteria in the pathogenesis of chronic sinusitis is controversial although antibiotics are frequently prescribed. Most common organisms isolated include *Staphylococcus Aureus*, *Anaerobes* and *Pseudomonas Aeruginosa*.

## METHODS

**Study design:** Prospective study

**Study place and period:** KGMU, Lucknow; July 2002- July 2003.

### Medical statistics

For sampling simple random sample method was used. For tabulation simple tables are used. Simple bar charts made.

### Selection criteria

Clinical diagnosis of the sinusitis was based on set of major and minor criteria described by Lanza and Kennedy.<sup>3</sup>

**Table 1: Criteria to diagnose sinusitis.**

Facial pain/ facial pressure	Headache
Facial congestion or fullness	Fever
Nasal discharge, purulence or discoloured post nasal drip	Halitosis
Hyposmia/ anosmia	Fatigue
Purulence in nasal cavity	Dental pain
Nasal obstruction	Cough
Fever	Ear pain/ fullness

### Major criteria minor criteria

Patients having two or more major symptoms or 1 major +2 minor symptoms lasting from  $\geq 12$  weeks and x ray PNS showing haziness of maxillary sinus were included in the study.

### Procedure

In all the cases selected for study, nasal endoscopy under local anaesthesia was performed using 0°, 45° and 70° 4mm nasal telescopes.

60 patients of chronic maxillary sinusitis were taken for study. 54 patients were having unilateral and 6 were having bilateral maxillary sinusitis. Hence 66 nasal cavities underwent nasal endoscopy.

## RESULTS

Maximum number of cases (35.0%) was seen in the age group of 21-30 years followed by the age group 11-20 years (23.33%). Youngest patient in this study was of 15 years and oldest one was of 64 years. Incidence of chronic sinusitis was found lower in elderly people.

On x-ray pns of 60 patients (Table 2), 66 maxillary antrum were found hazy. Among hazy sinuses, maximum number (29) was with diminished translucency throughout the antrum. Complete opacity found in 21 maxillary antrum (31.82%), while mucosal thickening was found in 12 maxillary antrum (18.18%) and air fluid level was found in 4 maxillary antrum (6.06%).

66 osteomeatal areas, having hazy maxillary antrum at X-Ray PNS were examined endoscopically (Table 3 and

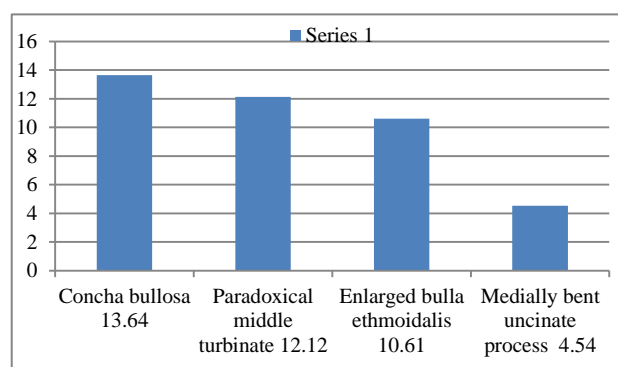
Figure 1). In 40.91% of patients, osteomeatal complex area was having anatomical variations as predisposing factor. But in 59.09% of cases there was no anatomical variation.

**Table 2: Radiological findings on x-ray PNS (n= 66 maxillary antrum).**

Signs	No. of maxillary antrum	%
Mucosal thickening including polypoidal projection	12	18.18
Diminished translucency throughout the whole antrum	29	43.94
Complete opacity	21	31.82
Air fluid level	4	6.06

**Table 3: Anatomical variants detected at osteomeatal area of diseased sinuses by endoscopy (n=66).**

SN.	Anatomical variants	Osteomeatal area No.	%
1	Concha bullosa	9	13.64
2	Enlarged bulla	7	10.61
3	Medially bent uncinate process	3	4.54
4	Paradoxical middle turbinate	8	12.12
5	No anatomical variation	39	59.09



**Figure 1: Percentage of anatomical variants detected at osteomeatal area of diseased sinuses by endoscopy.**

## DISCUSSION

In present study age of patients ranged from 15 to 64 years. In study maximum number of patients were younger age group. Maximum number of were seen in the age group of 21-30 years (35%) followed by age group 11-20 years (23.3%). Sanda De Sa studied 20 patients and observed maximum incidence of chronic maxillary sinusitis in age group 20-40 years.<sup>4</sup> Our observation are in accordance with that of Vuorinen.<sup>5</sup> They studied 190 cases and recorded that majority of

cases were in the age group of 20-29 years followed by the age group 10-19 years.

In present study x-ray diagnosis of sinus infection was confirmed by proof puncture in 81.97% cases.

Messerklinger suggest that for normal sinus function patency of osteomeatal complex is critical.<sup>2</sup>

Anatomical abnormalities of sinonasal cavity have long been recognized as major contributors to chronic sinusitis. All paranasal sinus require patent out flow tracts for adequate mucociliary function which will lead to clearance of inhaled pathogens.

A study by Krzeski et al examined the incidence of anatomical variations of lateral nasal wall in a group of 157 patients and observed different anatomical variations in each patient.<sup>6</sup> Although rates in other studies varied from 20-45%.

In present study 66 osteomeatal complex areas were inspected with nasal endoscopy and in 40.91% of cases anatomical variants were detected at osteomeatal complex. Concha bullosa was most common anatomical variant (13.64%) followed by paradoxical middle turbinate (12.12%) and enlarged bulla ethmoidalis (10.61%) and medially bent uncinate process (4.54%).

These findings are in accordance with Kazi who reported anatomical variants at 40.5% osteomeatal complex with chronic maxillary sinusitis.<sup>7</sup> Kazi reported concha bullosa at 13%, paradoxical middle turbinate at 13%, enlarged bulla at 10.5% and medially bent uncinate process at 4% of osteomeatal areas of diseased sinuses.<sup>7</sup>

## CONCLUSION

Our study attempted to recognize anatomical variants at osteomeatal complex area in patients with chronic maxillary sinusitis as etiologic factor. In 40.91% cases

anatomical variants were present but in 59.01% cases there were no variants. Chronic maxillary sinusitis is often accompanied by the presence of infectious process of viral, fungal or bacterial origin. These and other environmental influences combine with host factors to produce persistent sinonasal inflammation.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

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