

## ORIGINAL RESEARCH

### Prospective Analysis to Evaluate the Role of Concha Bullosa in Chronic Rhinosinusitis: An Institutional Based Study

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#### ABSTRACT

**Introduction:** Chronic rhinosinusitis is an inflammatory condition affected the majority of the patients in the age group ranged between 21 – 30 years. The major clinical picture of chronic rhinosinusitis is reported to be nasal blockade, headache, purulent nasal discharge, facial pressure and halitosis.

**Materials and Methodology:** Those patients with the history of previous nasal surgery, history of nasal fracture/ trauma, patients with tumours (cancer) of the nose and paranasal sinuses, pregnant women, those patients who are unfit for CT scan and patients with allergy to xylocaine anaesthesia are excluded before the start of the study. After explaining about the study and after getting an informed written consent, 110 patients above the age of 10 years who are clinically diagnosed to have chronic rhinosinusitis according to the criteria of task force on rhinosinusitis were taken into account for the present study. Topical 4% xylocaine as anaesthesia and decongestant using 1 ml topical adrenaline was administered, DNE was done in order to study the presence of concha bullosa. All the patients underwent a CT scan to study the presence of concha bullosa radiologically. All the data were collected and tabulated in an Microsoft excel sheet. The results are presented in the form of proportions and percentages. Chi square test was applied for qualitative data. A p value < 0.05 was considered statistically significant.

**Results:** Of the 110 patients in our study, 45 were males and 65 were females with a male to female ratio of 2:3. Of these 45 male patients 19 showed concha bullosa and of the 60 female patients 31 showed concha bullosa on CT Nose and PNS and DNE. The most common age group showing concha bullosa was 21-30 years (26 cases). The most common symptom found in our study was headache in 94 cases (85.4%). The next commonly occurring symptom was nasal block (80%) followed by nasal discharge or nasal purulence (74.5%).

**Conclusion:** To conclude, chronic rhino sinusitis (CRS) has observed to be a frequently common condition which could possibly affect the age group between 21 and 30 years most commonly. When combining the two modalities such as CT scan PNS and fibre optic diagnostic nasal endoscopy has proved to be effective and more precise in the evaluation of nasal cavity. Concha bullosa and deviated nasal septum are the two most frequently reported anatomical variations that is mostly observed in patients with

**chronic rhinosinusitis. Hence the role of concha bullosa has been effectively plays a major role in the development of chronic rhinosinusitis.**

**Keywords: Rhinosinusitis, Chronic, Concha Bullosa.**

## **INTRODUCTION**

Chronic rhinosinusitis is an inflammatory condition of the paranasal sinus lasting for a period of consecutive 12 weeks and may increase the chances of morbidity. The major symptoms of chronic rhinosinusitis are nasal block, headache, discharge from nose, facial pressure and halitosis<sup>1</sup>. Severe headache the most common symptoms which causes distress to the patient as well as to the physician. Chronic rhinosinusitis can be investigated with the help of physical examination through endoscopy or by radiography such as X-ray, Computed tomography of nose and paranasal sinuses.<sup>2</sup> Mucosal inflammation is easily identified through CT scans thus making this technique a more standard for evaluating the paranasal sinuses and nasal cavity.

The pathophysiology of this condition varies between adults and children hence the treatment through surgical approach has a significant difference between adults and children.<sup>3</sup> On either side of the nasal cavity a superior, middle and inferior concha is present. Any obstruction in the osteomeatal region may hinder the ventilation and mucociliary clearance of the sinuses thus leading to the development of sinus disease.<sup>4</sup> Anatomical variations which are associated with the lateral wall of the nose are nasal septal deviation, concha bullosa, oversized bulla, uncinat process variations and paradoxically curved middle turbinate.<sup>5</sup> Concha bullosa are radiolucent air space in the center of the middle turbinate which contains a single air cell and has been surrounded by an ovoid bony rim. A deviated septum or pneumatization of the conchae a major contributor to the development of sinusitis.<sup>6</sup> It's been found that there is a strong correlation between the inflammation of the concha bullosa which had higher incidence of chronic rhinosinusitis. Whereas another study by Yousem et al found that there is no greater prevalence of chronic rhinosinusitis in the presence of concha bullosa.<sup>7</sup> The prevalence rate of Chronic rhinosinusitis is estimated to be around 14% of the population.<sup>8</sup> But there are no conclusive prevalence studies is available about chronic rhinosinusitis in India. Hence this study is to evaluate the correlation between concha bullosa in patients suffering from chronic rhinosinusitis.

## **MATERIALS AND METHODOLOGY**

This is a prospective one-year follow up study done in hospital which was conducted at the OPD (outpatient department) of ENT, UPUMS, Saifai, Uttar Pradesh (India). The sample size for this study were 110 patients.

Inclusion criteria for this study, only those patients willing to undergo Computed Tomography scan of nose and paranasal sinuses and nasal endoscopy, patients accepting the clinical inclusion criteria by the task force on rhinosinusitis and patients above the age of 10 years old.

Those patients with the history of previous nasal surgery, history of nasal fracture/ trauma, patients with tumours (cancer) of the nose and paranasal sinuses, pregnant women, patients those who are unfit for CT scan and patients with allergy to xylocaine anaesthesia are excluded before the start of the study. After explaining about the study and after getting an informed written consent, 110 patients above the age of 10 years who are clinically diagnosed to have chronic rhinosinusitis according to the criteria of task force on rhinosinusitis were taken into account for the present study. Topical 4% xylocaine as local anaesthesia and using 1 ml topical adrenaline decongestant was administered, DNE was done in order to study the presence of concha bullosa. All the patients underwent a CT scan to study the presence of concha bullosa radiologically. All the data were collected and tabulated in an Microsoft excel

sheet. The results are presented in the form of proportions and percentages. Chi square test was applied for qualitative data. A p value <0.05 was considered statistically significant.

## RESULTS

Of the 110 patients in our study, 45 were males and 65 were females with a male to female ratio of 2:3. Of these 45 male patients 19 showed concha bullosa and of the 60 female patients 31 showed concha bullosa on CT Nose and PNS and DNE. The most common age group showing concha bullosa was 21-30 years (26 cases) as tabulated in table - 1. The most common symptom found in our study was headache in 94 cases (85.4%). The next commonly occurring symptom was nasal block (80%) followed by nasal discharge or nasal purulence (74.5%) (Table 2).

DNE and CT scan of nose and paranasal sinuses (coronal and axial) were studied for the evaluation of concha bullosa in our patients of CRS. Concha bullosa was noted in 50 (45.4%) patients having unilateral and bilateral presentations. The concha bullosa was noted more commonly on the right side as seen on nasal endoscopy and computed tomography. Suitable statistical analysis was applied and the association between the presence of concha bullosa and occurrence of chronic rhinosinusitis was determined. A statistically significant correlation was noted between presence of concha bullosa and chronic maxillary sinusitis (i.e., p value <0.05) as shown in table-3. No statistical significance was noted between presence of concha bullosa and chronic frontal and ethmoid sinusitis (Table 4 and 5).

**Table 1: Age distribution of patients with concha bullosa**

Age (in years)	Number of patients
11 – 20	6
21 – 30	26
31 – 40	12
41 – 50	4
>50	2
<b>Total</b>	<b>50</b>

**Table 2: Symptomatology of patients**

Clinical symptoms	Number of patients
<b>Headache</b>	94
<b>Nasal blockade</b>	88
<b>Nasal discharge</b>	82
<b>Facial fullness</b>	30
<b>Cough</b>	22
<b>Halitosis</b>	16

**Table 3: Association between concha bullosa and chronic maxillary sinusitis**

Variables	CMS present	CMS absent	Total
<b>Concha bullosa present</b>	41	20	61
<b>Concha bullosa absent</b>	45	4	49
<b>Total</b>	<b>86</b>	<b>24</b>	<b>110</b>

**Table 4: Association between concha bullosa and chronic frontal sinusitis**

Variables	Chronic frontal sinusitis present	Chronic frontal sinusitis absent	Total
<b>Concha bullosa present</b>	37	12	49
<b>Concha bullosa absent</b>	39	22	61

<b>Total</b>	<b>76</b>	<b>34</b>	<b>110</b>
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**Table 5: Association between concha bullosa and chronic ethmoid sinusitis**

<b>Variables</b>	<b>Chronic ethmoid sinusitis present</b>	<b>Chronic ethmoid sinusitis absent</b>	<b>Total</b>
<b>Concha bullosa present</b>	27	16	43
<b>Concha bullosa absent</b>	45	22	67
<b>Total</b>	<b>72</b>	<b>38</b>	<b>110</b>

**DISCUSSION**

In the evaluation of patients affected with chronic sinusitis, computerized tomographic imaging of sino-nasal area has determined to be the gold standard protocol. Computerised tomography of Nose & PNS in its association with nasal endoscopy has already established that provides a more specific and precise approach to sino-nasal deformities. 80 – 95% of success rate was documented in treating CRS observed by various researchers.<sup>9,10</sup> Such high percentage rates are only possible through meticulous preoperative localization of the disease. It is always advisable to combine both these technologies in the preoperative evaluation and ascertaining the anatomical deformation of lateral wall of nose which contributes for the sino-nasal disease.

In our study which reported with 110 patients affected with chronic rhinosinusitis, the ratio of female patients was observed to be 60% higher than male patients. An identical pattern was observed in various other studies with respect to different authors.<sup>4,5,11,12,13</sup> Reportedly a same pattern of gender distribution has been recorded in the above-mentioned studies which observed to have no specific reason.

The most common age group in our study was 21-30 years which included 26 patients. In a similar study conducted by Tuli et al conducted in 50 patients, the most commonly affected age group was between 21-35 years 30%.

In our study, the most common clinical symptoms were observed to be headache which contributed 85.4% followed by nasal block 80%. The next frequently occurring complaint was nasal discharge or nasal purulence present in 74.5% cases as tabulated in table-2. In a study by Wani et al, headache was the most common complaint seen in 90% of the patients, followed by nasal discharge 86.6% and nasal obstruction 85.33%.<sup>15</sup> These results were in concordance with the results obtained in our present study. Concha bullosa was seen in 50 of our patients showing unilateral and bilateral presentations. Our study reported with a higher incidence of concha bullosa in the age group of 21 to 30 years. In a study done by Hatipoglu et al the mean age of patients was 30 years.<sup>16</sup> Our study has demonstrated a statistically significant association between presence of concha bullosa and maxillary sinusitis with a p value observed to be at <0.05 (Table 3). This could be due to the blocking of osteo-meatal unit which results in the obstruction to the outflow of maxillary sinus. No significant association was noted between presence of concha bullosa and chronic frontal and ethmoid sinusitis as shown in tables 4 and 5. Stammberger et al quoted that the pneumatization process could relatively starts in the middle age in some patients where there may be a renewed spurt of the growth activity.<sup>17</sup> Reda et al in his study recorded inflammatory disease of the sinuses in 71.7% patients observed with concha bullosa and 57.7% patients without concha bullosa.<sup>18</sup> Maru et al demonstrated an association between sinusitis and concha bullosa in their studies particularly with pneumatization involving anterior end of the middle turbinate.<sup>19</sup> In a study done conducted by Prinja et al has reported a significant association between the presence of concha bullosa and the occurrence of chronic maxillary sinusitis in their study participants.<sup>20</sup> Our results were in similarity with these studies which

demonstrated a statistical significance between presence of concha bullosa and the chronic maxillary sinusitis.

## CONCLUSION

To conclude, chronic rhino sinusitis (CRS) has observed to be a frequently common condition which could possibly affect the age group between 21 and 30 years most commonly. When combining the two modalities such as CT scan Nose and PNS and fibre optic diagnostic nasal endoscopy has proved to be effective and more precise in the evaluation of nasal cavity. Concha bullosa and deviated nasal septum are the two most frequently reported anatomical variations that is mostly observed in patients with chronic rhinosinusitis. Hence the role of concha bullosa has been effectively plays a major role in the development of chronic rhinosinusitis.

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