

Incidence of Concha Bullosa in Consecutive Radiological Paranasal Sinus Examination and its Association to Chronic Sinusitis and Deviated Nasal Septum in a Tertiary Care Centre

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Abstract

➤ *Introduction*

Concha bullosa is one of the common anatomical variant in which there is middle turbinate pneumatization. Few literatures states that one of the recognised cause of sinus disease and nasal septal deviation is enlargement of middle concha by pneumatization. Other such studies states that there are no such correlation of concha bullosa with chronic sinusitis. In this study we are evaluating the correlation of concha bullosa with septal deviation and chronic sinusitis and to find their statistical association.

➤ *Aim*

To determine the incidence of concha bullosa in 100 consecutive radiological paranasal sinus examination.

➤ *Objective*

To analyze the incidence of concha bullosa and to find out the radiological changes in paranasal sinuses in association with concha bullosa and to find its correlation with chronic sinusitis and nasal septal deviation.

➤ *Methodology*

A review of 100 paranasal sinus CT examination was done to evaluate the incidence of concha bullosa and also evaluated for presence of any chronic sinusitis and deviated nasal septum. The incidence of concha bullosa is analyzed and their association with chronic sinusitis and nasal septal deviation is analyzed using chi square test to know their statistical significance.

➤ *Results*

The incidence of concha bullosa was found to be 39%. There was a significant correlation between concha bullosa and deviated nasal septum, but there is no such statistical correlation between concha bullosa and chronic sinusitis.

I. INTRODUCTION

Concha bullosa is a normal anatomical variant in which middle concha earlier known as turbinate, is pneumatized. There are three types of concha – lamellar type (the vertical lamella of the concha is pneumatized); bulbous type (the bulbous segment is pneumatized); ,extensive concha bullosa (both the lamellar and bulbous segments are pneumatized).^{[1][6]}

Chronic sinusitis is a chronic inflammatory condition in which the lining of the sinuses are inflamed due to various causes.^[2] It is one of the most common chronic illness in the society with substantial health impact.

One of the recognised cause of sinusitis is middle concha enlargement by pneumatization. This enlargement of turbinate alters the normal airflow and drainage pathways of mucous, results in mucosal edema which obstructs the ethmoid infundibulum and osteomeatal obstruction leading to sinusitis.^[3]

Deviated nasal septum (DNS) is one of the common anatomical variant in the nasal cavity. It is known as any bending of the nasal septal contour. The direction of the nasal septal deviation is determined by the side of the convexity of the curvature.^[5]

Few literatures states that concha bullosa plays a role in etiology of the sinusitis. Other such studies states no such statistical correlation of concha bullosa with chronic sinusitis.^[4] In this study we are evaluating the correlation of concha bullosa with DNS and chronic sinusitis and to find their statistical significance.

➤ *Aim:*

To determine the incidence of concha bullosa in 100 consecutive radiological paranasal sinus examination

➤ *Objective:*

- To analyze the incidence of concha bullosa.
- To find out the radiological changes in paranasal sinuses in association with concha bullosa.
- To find the association of concha bullosa with chronic sinusitis and deviated nasal septum.

II. METHODOLOGY

➤ *Inclusion Criteria:*

Patients who had nasal symptoms significant enough to warrant a CT PNS, who have undergone paranasal sinus CT scan from January 2019 to March 2019 are included in this study.

➤ *Exclusion Criteria:*

Patients with previous history of any sinus surgeries and severe sinonasal polyposis were excluded from this study.

A total of 100 consecutive paranasal sinus CT which was conducted in last 3 months were reviewed, which were performed to evaluate a symptom which is referable to the sinonasal region. The CT PNS is analyzed for the presence of concha bullosa and if present, then the side of the concha bullosa is noted. If the concha bullosa was bilaterally present, then on comparing the sizes, the larger one was identified as dominant. In these patients, the paranasal sinus inflammatory disease were identified. If present, then it was classified as mild, moderate and severe. Maxillary, ethmoidal, frontal and sphenoid sinuses were each graded separately on both the sides. The CT is also analyzed for the presence of nasal septal deviation. If deviated nasal septum was present, then it was graded as mild, moderate, severe. The face of the convex surface of the deviated nasal septum indicates the direction of the septal deviation.

The incidences of concha bullosa is analyzed and its association with sinusitis and nasal septal deviation is evaluated. The statistical analysis is done by using Chi square test.

III. RESULT

Among 100 patients who were included in the study, 50 of them were males and 50 were females. A total of 39 patients had concha bullosa, out of which 15 were located at the right side, 16 at the left side and 8 were bilateral. A total of 68 patients had chronic sinusitis. Among the patients who had concha bullosa, 25 of them had chronic sinusitis and 14 of them did not have chronic sinusitis. Of the 25 people who have chronic sinusitis, 25 people had maxillary sinusitis, 14 of the patients had ethmoidal sinusitis, 7 patients had frontal sinusitis and 4 of them had sphenoid sinusitis. Out of 100 patients 72 of them had deviated nasal septum. Among the 39 patients who had concha bullosa 33 patients had deviated nasal septum and 6 patients didnot have deviated nasal septum.

On statistical analysis, the *P* value of >0.05 is obtained which implies that there is no significant correlation between concha bullosa and chronic sinusitis. But a significant correlation was found between concha bullosa and deviated nasal septum, where the *P* value is <0.05.

Concha Bullosa		Sinusitis		DNS	
		Present	Absent	Present	Absent
Present	39	25	14	33	6
Absent	61	43	18	39	22

Table 1

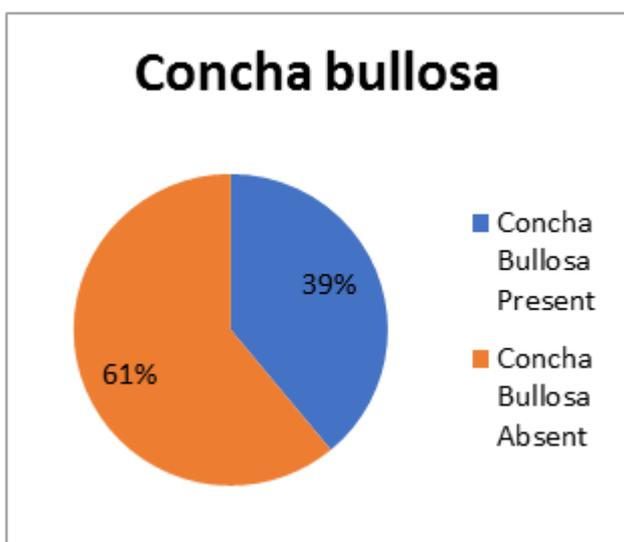


Fig 1

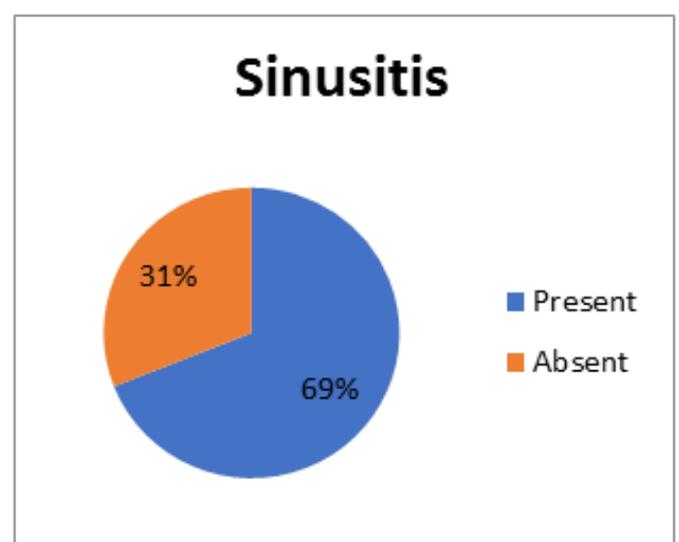


Fig 2

IV. DISCUSSION

Concha bullosa is the pneumatization of the middle concha and it is one of the most common variant of the sinonasal anatomy. [7] It is rarely found in inferior and superior turbinate. Based on the pneumatization of the middle turbinate Bolger et al. have divided concha bullosa into three types: lamellar type, bulbous type and extensive type.[6] The medial part of the ethmoid bone forms the middle turbinate. As it elongates in the nasal cavity, the cribriform plate provides the anterior-superior stabilization, lamina papyracea gives the posterior and lateral stabilization. Basal lamella is the bony structure which allows the attachment to lamina papyracea. The ethmoid air cells are divided into the anterior and posterior groups by the basal lamella. The pneumatization of the middle turbinate is an extension of the normal pneumatization of the ethmoid air cells. [6-8]

Stalman et al. reported that the incidence of concha bullosa was upto 44%.[5] In our study, it is found that the incidence of concha bullosa was 39%. In this study, 68% of them had chronic sinusitis and 72% of them had deviated nasal septum. Among them who had concha bullosa 38.46% of them had right sided concha, 41.026% of them had left sided concha and 20.51% had bilateral concha bullosa. Among the patients who had concha bullosa 84.62% had chronic sinusitis and 64.10% had deviated nasal septum.

Stalman et al. conducted a retrospective study by evaluation of clinical symptoms of chronic sinusitis and its relationship to concha bullosa and contralateral nasal septal deviation in 1095 CT-scans. There were no statistical relationship between either unilateral concha bullosa or deviated septum with any sinus disease. However, there was a strong relationship between the presence of a unilateral concha bullosa and its contralateral deviated septum. It was hypothesized that deviation of septum is not due to direct result of pressure effect from concha bullosa because the air channel between concha bullosa and nasal septum was preserved.[5]

Similarly in this study, it is found that there were no statistically significant association (P value>0.05) between concha bullosa and chronic sinusitis. But, however there was a correlation between incidence of concha bullosa and deviated nasal septum, P value <0.05.

V. CONCLUSION

One of the most common anatomical variant found in the sinonasal region is Concha bullosa.

The incidence of Concha bullosa in association with deviated nasal septum to the opposite side is a common finding noted in CT paranasal sinus examination. However the association of concha bullosa with sinusitis is not evident.

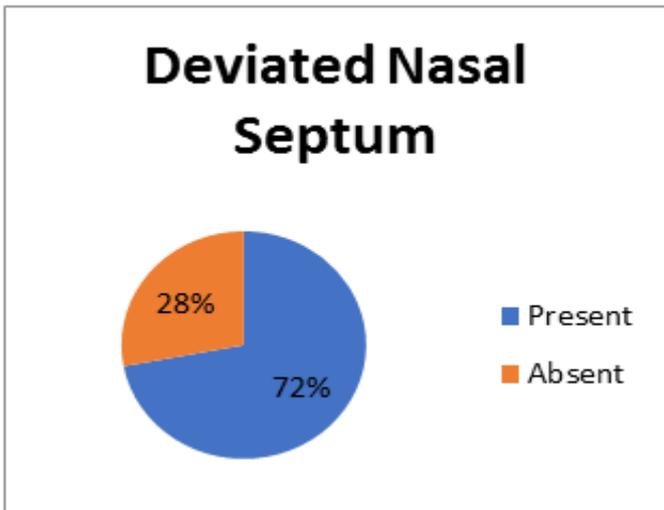


Fig 3

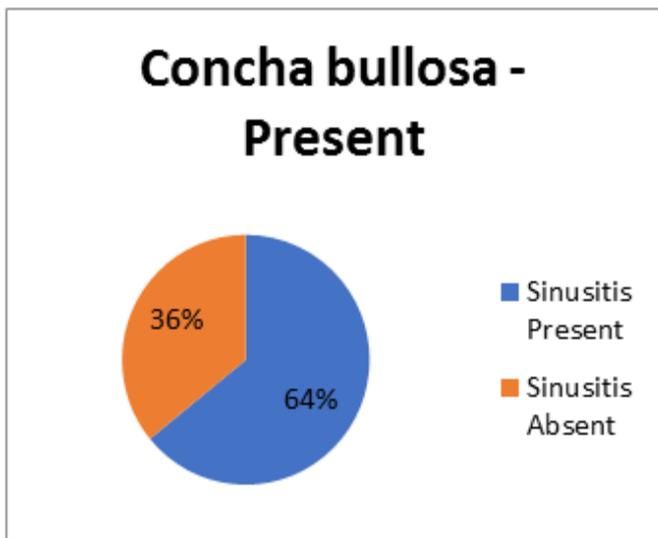


Fig 4

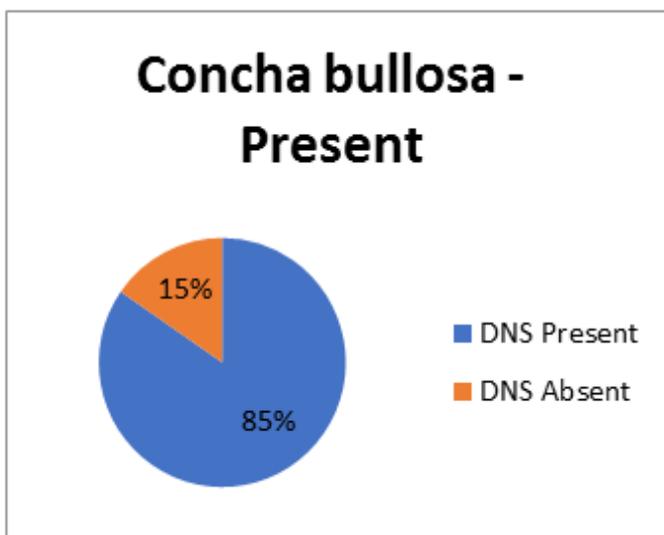


Fig 5

REFERENCES

- [1]. Hatipoglu HG, Cetin MA, Yüksel E. Concha bullosa types: their relationship with sinusitis, ostiomeatal and frontal recess disease. *Diagnostic and interventional radiology*. 2005 Sep 1;11(3):145.
- [2]. Hamilos DL. Chronic sinusitis. *Journal of Allergy and Clinical Immunology*. 2000 Aug 1;106(2):213-27.
- [3]. Richtsmeier WJ, Cannon CR. Endoscopic management of concha bullosa. *Otolaryngology—Head and Neck Surgery*. 1994 Apr;110(4):449-54.
- [4]. Lam WW, Liang EY, Woo JK, Van Hasselt A, Metreweli C. The etiological role of concha bullosa in chronic sinusitis. *European radiology*. 1996 Aug 1;6(4):550-2.
- [5]. Stallman JS, Lobo JN, Som PM. The incidence of concha bullosa and its relationship to nasal septal deviation and paranasal sinus disease. *American Journal of Neuroradiology*. 2004 Oct 1;25(9):1613-8.
- [6]. Bolger WE, Butzin CA, Parsons DS. Paranasal sinus bony anatomic variations and mucosal abnormalities: CT analysis for endoscopic sinus surgery. *Laryngoscope* 1991; 101:56-64.
- [7]. Zinreich S, Albayram S, Benson M, Oliverio P. The ostiomeatal complex and functional endoscopic surgery. In: Som P, ed. *Head and Neck Imaging*. 4th ed. St Louis: Mosby, 2003; 149-173.
- [8]. Stammemberger H. *Functional Endoscopic Sinus Surgery*. Philadelphia: B. C. Decker, 1991; 161-169.