ORIGINAL ARTICLE

Incidence of Concha Bullosa in CT scans of patients presenting in a hospital in Lahore, Pakistan.

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ABSTRACT

Aim: To determine the incidence of concha bullosa in the CT scans ordered in the hospital in a certain period.
Study design: This was a cross sectional study.
Place and duration of study: the study was conducted in the out patients' department of the Doctors Hospital, Lahore.
The study was conducted from March 2019 till May 2019.
Methods: Patients presenting in the ENT out patients department in the prescribed period and who were ordered a CT scan of the paranasal sinuses had the concha bullosa recorded as present or not and if it was one sided or was present on both sides.
Results: A total of 33 CT scans were thus examined. The age ranged from 12 years to 75 years old patient. There were 19(57.5%) female patients and 14 (42.4%) male patients who had their CT scans recorded for concha bullosa. The incidence of a Concha Bullosa present out of the total CT scans performed was 18.18% whereas, the incidence in females was higher at 28.57% whereas it was 10.52% in the males.
Out of the total CT scans with identifiable concha bullosa 16.6% were bilaterally present and the concha was unilaterally present in the majority of the CT scans examined (83.3%).
Conclusion: There is enormous variation in the incidence of concha bullosa as is evident from data from various countries. There is variation from a single country even. Further studies may be able to determine the cause of this anatomical variation.
Keywords: Nose, Nasal Concha, Turbinates

INTRODUCTION

The middle turbinate is part of the lateral mass of the ethmoid bone and is a normal structure inside the nasal cavity and is found medial to the middle meatus where the all-important osteomeatal complex lies.

The middle turbinate normally does not cause problems to the patient but if gets abnormally enlarged it may obstruct the normal route of flow of the mucous. It is also alleged to potentially lead to sinusitis of the related sinuses but is contested amongst researchers and clinicians. Even lateralization of the middle turbinate does not lead to acute and chronic sinusitis[1].

Such an enlargement may be due to an air cell which might have developed in the middle turbinate resulting in an air filled cavity with a lateral and medical lamellae. This cavity may be of a variable size and if large it may result in nasal obstruction but shows variable reports regarding a role in causation of sinusitis.

Researchers have endevoured to measure the size of the middle turbinate and classify them accordingly. Such a group in Korea did the same in 101 cadaveric heads. They classified the middle turbinate into three types, as type 1, 2 and 3 according to the direction the anterior border of the middle turbinate coursed which was either directly postero-inferiorly or took an intermediate route before going in a postero-inferior direction[2].

The middle turbinate is an important landmark in endoscopic sinus surgery. A complete resection of the middle turbinate is regarded undesirable. This is for the reason that it is an important surgical landmark and also is believed to assist in olfaction[3].

However, authors suggest no adverse effects of resection of the middle turbinate[4], and no increase in incidence of frontal sinusitis postoperatively[5,6,7].

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MATERIAL AND METHODS

The CT scans which were needed in order to further assess the patients' nasal problems were ordered in the out patients' department of the ENT department during the months of March to May in 2019. This amounted to 33 CT scans for chronic rhinosinusitis or nasal polyps. No selection bias was in place regarding gender or age of the patients whose CT scans were to be included in the study.

RESULTS

All CT scans of the paranasal sinuses of rhinologically symptomatic patients which were ordered by the senior ENT staff at a private hospital were included. This was in the duration from March 2019 till May 2019. A total of 33 CT scans of the paranasal sinuses were ordered in this

prescribed period. Out of these 19 (57.5%) were female patients and 14(42.4%) were male patients. The age ranged from 12 years to 75 years.

The incidence of a Concha Bullosa present out of the total CT scans performed was 18.18% whereas the incidence in females was higher at 28.57% whereas it was 10.52% in the males. Out of the total CT scans with identifiable concha bullosa 16.6% were bilaterally present and the concha was unilaterally present in the majority of the CT scans examined (83.3%).

Table 1: Age distribution of the patients

Age range in years	Number of CT scans examined
1-20	4
21-30	13
31-40	4
41-50	4
51-60	5
61-70	2
71-80	1
Total	33

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DISCUSSION

Concha Bullosa is a common anatomic variation. This comes about when the middle turbinate gets pneumatized. More uncommonly, the inferior and the superior turbinates can also be pneumatized. The middle turbinate can get pneumatized to a variable degree. Studies have been conducted indicating the size of the pneumatized middle turbinate and the association with a deflected nasal septum and sinusitis. Different studies from various parts of the world mention different incidence rates of Concha Bullosa in a CT scan of the paranasal sinuses.

The present study gives a percentage of 18.18% regarding the presence of a concha bullosa, whereas it is generally held that the incidence of concha bullosa is varied between 14% to 53%[8].

Other studies from different Countries of the world give varied results. Taking into consideration 30 relevant studies in a PubMed search revealed the enormity of variation that this anatomical structure presents in. Some European studies reveal percentages which are fairly consistent amongst themselves but not so with the present study.

Poland[9], Switzerland[10], Spain[11] and the UK[12] present values of 42.1%, 35%, 28.06% and 32% respectively. Even amongst these four European countries there is almost a 14% difference between the highest and the lowest rates of incidences.

Some Asian countries such as Malaysia[13] and the Philippines[14] were able to determine a concha bullosa in 25.5% and 11.7% of the CT scans examined. These values are fairly close to the values obtained in Pakistan by the present study.

Other studies within the same country present varying results as is evident from the data below.

The problem of enormity of variation amongst the studies regarding the incidence is once again apparent in a single country such as Turkey. Four Turkish studies present values of 67.5%[15], 45%[16], 31.52%[17] and 35%[18]. Once again the difference in presentation of a concha bullosa in a CT scan of the paranasal sinuses was almost 36% between two studies originating out of Turkey.

If one considers countries around Pakistan, then one finds values in the range of 31% (China)[19], 49% (Oman)[20], 19.7% (Nepal)[21], 55.4% (Saudi Arabia)[22] and 11.8% (Iran)[23].

The values presented by different studies within India vary greatly as well. This makes drawing a logical conclusion about the values of incidence of concha bullosa difficult. In India, where the values as low as 12%[24], stand against a large value of 76.6%[25]. Other Indian values cited are 31.7%[26] and 41.3%[27].

The authors of the present study were able to find four studies regarding the incidence of concha bullosa in Pakistan. All four Pakistani studies found were from Karachi. Their incidence rates were 18.2%[28], 33.1%[29], 46%[30] and 18.9%[31]. The range of the values in the Pakistani studies were from 18.2% to 46%, an almost two and a half times difference between the two. Two of the studies presented values consistent with those of the present study while the other two had their values close to the values from countries other than Pakistan.

The middle turbinate is an important nasal structure as pointed out earlier and CT scans of the paranasal sinuses are requested as a preoperative assessment tool and helps delineates the important anatomical landmarks during endoscopic sinus surgery[32].

The middle concha plays a role in the sense of smell, air humidification and airflow regulation[33]. It is held that the middle turbinate assists pathways of smell molecules up to the olfactory cleft and that resection of the middle turbinate might jeopardize olfaction. Researchers have found no such effect[34,35,36].

On the contrary a partial resection may improve olfaction in patients with nasal polyps postoperatively[37]. Researchers in a large (n=202) radiological study observed the incidence of concha bullosa in 31.7% and also found sinusitis on the same side of the concha bullosa in 40.4% of the patients[38]. On the contrary, a group of Spanish researchers found no relationship between the presence of the concha bullosa and chronic rhinosinusitis[39,40]. Similarly, a Turkish study found no relationship between the presence of a concha bullosa and sinusitis[41]..

An enlarged middle turbinate whether due to a severe mucosal swelling or due to a concha Bullosa can result in irritation of the anterior ethmoidal nerve filaments innervating the area and result in the middle turbinate headache syndrome. The pain thus caused will be felt in the middle canthus area of the supraorbital region[42]. The incidence of concha bullosa in patients with symptomatic sinus disease as determined also on the paranasal CT scans was found to be 34%[43].

CONCLUSIONS

The enormity of variation in the incidence of concha bullosa is evident from the data collected by this study and studies from different countries. The values emerging from the same country at times has a great variation in the values. One conclusion that can logically be drawn is that the emergence of the concha bullosa of the middle turbinate is a random process. It needs to be ascertained by future studies if the appearance of the concha bullosa is determined by genetics or does it merely appear due to external environmental factors or is it only due to a random process.

Conflicts of interest: Nil

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