DEVIATED NASAL SEPTUM IN A POPULATION OF EASTERN INDIA PRESENTING WITH SINONASAL COMPLAINTS - A RADIOLOGICAL STUDY

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ABSTRACT

BACKGROUND

Sinonasal problems are a group of common conditions faced by otorhinolaryngologists in clinical practice. Much of these troubles have been attributed to a deviated nasal septum (DNS). It is presumed that these deviations lead to nasal blockage, imperfect aeration and obstructive and inflammatory pathology in the paranasal sinuses. The present descriptive radiological study attempts to detect the number of patients with a DNS in cases of sinonasal problems by studying coronal sections of the head and neck using computerised axial tomography scan (CAT scan or CT scan).

MATERIALS AND METHODS

150 patients attending the radiology clinic and referred by the ENT department were selected for the study. A series of coronal section images were done using the CT scan. The number of cases with DNS were assessed and compared with the studies of other workers.

RESULTS

52% of the patients enrolled in the present study were found to have a nasal septal deviation. The distribution was almost equal in males and females. Occasionally a concha bullosa was found to be responsible for the condition.

CONCLUSION

DNS is a common feature in patients with sinonasal disease. The causality of the DNS in the disease process is not easily determined. Therefore, surgical correction of the DNS in the hope of a cure for the sinonasal problems has to be taken after carefully weighing up the pros and cons of nasal septal surgery.

KEYWORDS

Deviated nasal septum, paranasal sinus, computerised axial tomography, sinonasal disease.

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BACKGROUND

The nasal cavity serves as a conduit for passage of air for breathing as well as a sense organ for olfaction. It is exposed to the atmosphere at the external nares and transmits conditioned, humidified and filtered air at the choanae (internal nares). The paranasal air sinuses (PNS) are pneumatic cavities within the cranial bones, particularly the bones of the facial skeleton. These cavities help to lighten the skull around the reinforced bony buttresses passing through the frontal column through the nasal superstructure, the zygomatic column and the occipital columns. The stiff bony columns transmit the forces of mastication and the traction of the spinal and paraspinal muscles on the skull. The paranasal sinuses also help in humidification of inspired air and add volume and resonance to the voice. The continuity between the lining mucosa of the nasal cavity and the PNS allows the sinuses to share the pathology of the nasal cavity and respond with inflammation, thickening, ostial blockage and exuberant polypoid growth.

Sinonasal complaints are a constellation of maladies affecting the nasal cavity and paranasal sinuses. Most of us face these afflictions at different points of our life. The troubles range from a "blocked nose" and "running nose" in seasonal or perennial nasal allergies, nosebleeds, crusts, polyps, infections and others. The features of paranasal sinusitis range from nasal discharge, nasal obstruction, headache, facial pain and other constitutional symptoms. The problems are more acute in the paediatric age group. Chronic nasal allergy and obstruction leads to epistaxis, mouth breathing, disorders of speech and growth as well as middle ear infections due to continuity between the nasopharynx and tympanic cavity through the Eustachian tube.

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The nasal cavities are partitioned by a septum which is party bony and partly cartilaginous (Figure 1). The junctions between the bony and cartilaginous parts form a complex mosaic which frequently deviates to one side or the other. Many of the sinonasal problems are thought to arise from a deviated nasal septum (DNS). Different authorities have found different percentages of people with DNS in their studies. This is to the extent that at times it becomes difficult to determine if the patients' problems are due to the accompanying DNS and whether the correction of the deviated septum by a submucosal resection or septoplasty will solve the patients' problems or simply burden the patient with unnecessary surgery.[1] Knowledge of the variations of the nasal septum is therefore a prerequisite for effective surgery.[2]

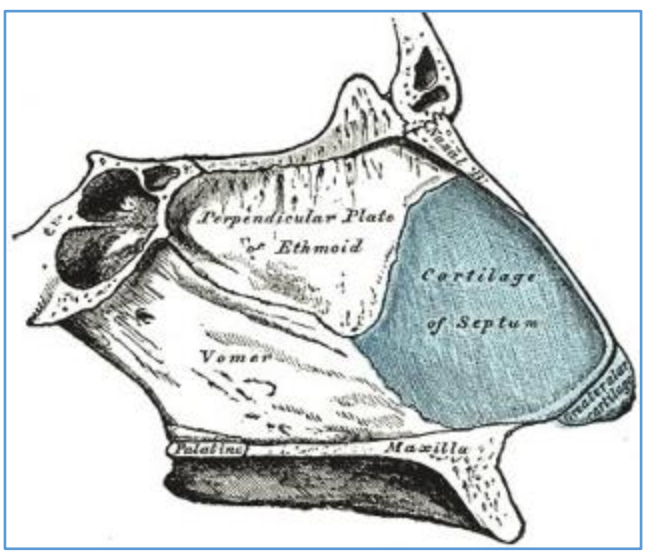

Figure 1.Ŧ* Nasal Septum (Right Side)

ŦFrom, Henry Vandyke Carter-Henry Gray (1918). Anatomy of the Human Body. Bartleby.com: Gray's Anatomy. Plate 854.

* (this figure is now in the public domain)

The present study explores the prevalence and sexual dimorphism of deviated nasal septum (DNS) in a population of patients reporting to a tertiary care medical college in Kolkata. The aim of the study is to add to the growing database of the proportion of patents with sinonasal complaints who have a DNS. In the course of the study additional anomalies of the sinonasal region will come to light.

There have been a number of studies regarding the anatomical variations of nasal cavity and PNS in different parts of the world. There are some studies in the different regions of our country, but few have been found involving the population of Eastern India.

The present study is radiological with the help of CT scans. The study will enable ENT, head-neck and maxillofacial surgeons to be aware of the variations in the anatomy of this region, allowing them to take better informed decisions regarding the type of intervention required in such cases.[3]

MATERIALS AND METHODS

The anatomy of the nasal septum can be studied by high resolution CT scan. The nasal septum is best visualized by serial coronal views. Coronal views are obtained with the head in hyperextension. Septal deviations may occur within the bony part or as sharp septal spurs at the junctions of cartilage with the vomer and deviations may compromise key areas like the osteomeatal unit leading to impaired drainage of the sinuses. CT has also become the modality of choice for inflammatory disease of the nasal cavity, sinuses and the osteomeatal complex. It also provides various anatomical landmarks at the skull base.

The development and refinement of CT scans has allowed extensive assessment of the nose and paranasal sinuses, thus providing a guide map for surgeons to perform endoscopic nasal surgery.[4] During surgery, straying beyond the surgical field may lead to serious complications such as CSF leak, meningitis or blindness. So, a detailed knowledge of the possible anatomical variations is essential.

In the present study, a total of 150 patients were selected from those attending the Department of Radiology, Bangur Institute of Neurosciences (BIN), Kolkata after being referred from the ENT department of the Institute of Post Graduate Medical Education & Research (IPGME&R), Kolkata for imaging studies. Being a descriptive study formal sample size calculation was not done. The patients' medical records were studied for signs and symptoms of sinonasal diseases. The CT scans of these patients were then studied for the presence of DNS.

Inclusion Criteria

Patients with sinonasal symptoms who underwent CT scan.

Exclusion Criteria

New patients whose CT scans revealed polyps, nasopharyngeal tumors, previous surgery involving the nasal cavity and paranasal sinuses, history of trauma or injury.

RESULTS

A total of 150 subjects were included in the study. Deviated nasal septum (DNS) was noted in 78 cases, out of which 40 were males and 38 were females. Of these patients, concha bullosa was noted in 48 cases; 21 in males and 27 in females. The figures are displayed in the following table (Table 1).

			DNS Present or Absent		Total
			Present	Absent	
Sex	Female	**Count**	**38**	**33**	**71**
		% within Sex	53.5%	46.5%	100.0%
	Male	Count	40	39	79
		% within Sex	50.6%	49.4%	100.0%
Total		Count	78	72	150
		% within Sex	52.0%	48.0%	100.0%

Table 1. Cases with and without DNS

From the above table we had calculated following statistical parameters: Chi Square value = 0.125; degree of freedom (df) = 1; p value = 0.724. Values were not statistically significant (software used – SPSS version 20).

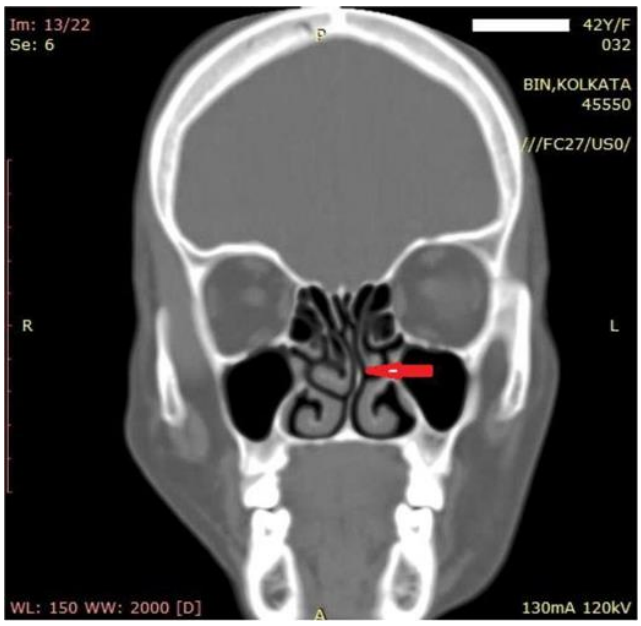

Figure 2. Coronal View CT Scan Showing Deviated Nasal Septum to the Left Side

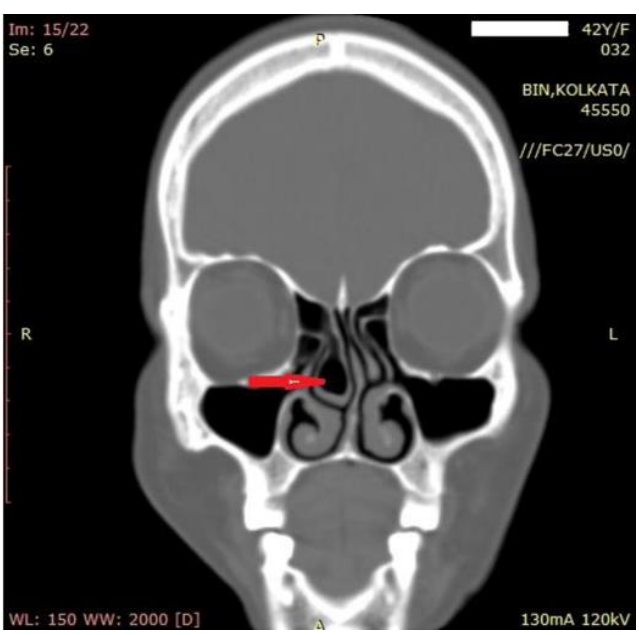

Figure 3. Coronal View CT Scan Showing Concha Bullosa on the Right Side with Deviated Nasal Septum to the Left Side

DISCUSSION

Conventional radiology does not permit a detailed study of the nasal cavity and paranasal sinuses and has now been largely replaced by CT imaging. This gives a well-defined sectional view of the region and the anatomical variants that are very often found. Llyod et al in 1991 reported the usefulness of CT scan in preoperative evaluation before Functional Endoscopic Sinus Surgery (FESS).[5] Many studies have previously demonstrated the variations in different parts of the nasal cavity and PNS.

Takahashi in 1987 demonstrated the deviation of nasal septum due to non-alignment of the 3 components of the septum (septal cartilage, perpendicular ethmoidal lamina & vomer).[6] According to Blaugrund (1989), non-traumatic septal deviation is observed in about 20% population.[7] The proportion increased to 44% in the series studied by Earwaker (1993).[8] Calhoun et al (1991) studied 100 CTs carried out to evaluate sinus disease. The existence of septal deviation was frequent and some of these cases were associated with concha bullosa, an unusual prominence of the middle turbinate due to its pneumatization.[9] A few such cases were also found in the present study.

It was observed that DNS was such an anatomical variation which was observed from 12% to 98% of the cases in different studies of different geographical regions and ethnicities. In the present study, DNS was noted in 52% of the CT scans studied in 150 patients.

Perez-Pinas et al conducted a study on a population of Spain and found DNS in 58% of the cases.[1] Kayalioglu G et al noted DNS in only 12% of the cases in a population of Turkey.[10]

Mohammad Adeel et al who conducted their study from a population of Karachi, Pakistan observed it in 26%.[11] K Dua et al conducted a study in a population of Ludhiana and observed DNS in 44% cases.[12] Nitin V Deosthale et al who took their study population from Nagpur, Maharashtra noted it in 50.81%.[13] Chaitanya et al also noted it in 52% cases in a study population of Andhra Pradesh.[14] According to Ahmed W et al, it was observed in 53% cases in a population of Dinajpur, Bangladesh[2] and Maru YK et al recorded DNS in 55.7% cases in a population of Indore.[15]

H Mamatha et al noted it in 65% cases from Karnataka[16] and another study conducted in a population of Bhopal by Chandel NS et al, DNS was observed in 75%.[17] Chakraborty P et al noted it in 92.68% cases in a population of Varanasi.[18] Shpilberg KA et al conducted a study in a population of New York and observed it in 98.4% cases.[19]

In the present study 52% of the subjects had some degree of nasal septal deviation. The level of septal deviation required for it to be named as abnormal is not strictly defined. DNS is one of the factors responsible for nasal blockage. It occurs with equal frequency in either sex[20] as is borne out by the results of the present study. The severity of symptoms does not always correspond to the degree of nasal blockade. However, in cases of recurrent sinus infections, nasal allergy and hyper secretion, it is presumed that DNS may play a part. The wide range of subjects with DNS in different studies suggests that there is a wide range of asymptomatic DNS in all population groups. In cases where the deviation of the nasal septum is thought to be causative of the sinonasal pathology, surgical correction may be undertaken with the risks of septal perforation and alteration of the shape of the nose as a result of alteration of the nasal superstructure.

CONCLUSION

The present study of the nasal septum of a population of subjects with sinonasal problems by coronal CT scan had shown that around half of the test population (52%) had a deviated nasal septum. In some of these cases, the existence of a concha bullosa was responsible for the condition. How far this association may be causative has to be judged on individual basis. However, it is obvious by comparing the data with other studies that DNS is quite a frequent condition and attempts at surgical correction of DNS in the expectation of a cure for sinonasal problems should be taken with caution.

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