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Original Article

CT Evaluation of Anatomical Variations in Osteomeatal Complex in Patients with Deviated Nasal Septum

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Abstract

Background:The presence of septal deviation has been positively associated with sinus disease, especially osteomeatal complex disease and anterior and posterior ethmoid disease.Computerized tomographic imaging (CT) of the paranasal sinuses has become a widely accepted tool for assessing the paranasal sinuses (PNS) and providing a detailed anatomy of the lateral nasal wall.

Objective:The objective of the study was to identify the anatomical variations of lateral nasal wall and paranasal sinuses in patients with Deviated nasal septum.

Methods:Computerized tomographic (CT) examination was carried out using the bone algorithm in the coronal plane in 40 patients who met the inclusion criteriain the Postgraduate Department of Otorhinolaryngology and Head and Neck Surgery, SMHS Hospital an associated Hospital of Government Medical College, Srinagar from March 2011 to May 2012.

Results:In our study, CT Nose and PNS revealed Deviated nasal septum in 40 (100%) patients, Hypertrophied Inferior turbinate in 11 (27.50%) patients, Concha bullosa in 5 (12.50%) patients, Paradoxical Middle turbinate in 8 (20%) patients, Everted Hypertrophied Uncinate in 2 (5%) patients, Aggernasi cells in 4 (10%) patients, Haller cells in 3 (7.50%) patients and Onodi cells in 2 (5%) patients.

Conclusion:The most common anatomical variation associated with deviated nasal septum was Hypertrophied Inferior turbinate and the least encountered variation was Everted Hypertrophied Uncinate and Onodi cells. The CT scan provides supplementary clinical data to the history and endoscopic examination and assists in directing surgical treatment to the affected areas.

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Introduction

Each of the nasal structures has its specific function.[1,2] The presence of septal deviation has been positively associated with sinus disease, especially osteomeatal complex disease and anterior and posterior ethmoid disease.[3,4]With the increased use of

endoscopy for the evaluation and surgical treatment of nasal and paranasal sinus diseases attention is now directed toward the analysis of the lateral nasal wall and paranasal sinus anatomy. Computerized tomographic imaging (CT) of the paranasal sinuses has become a widely accepted tool for assessing the paranasal sinuses (PNS) and providing a detailed anatomy of the lateral nasal wall.[5,6,7,8,9,10] Computerized tomographic imaging (CT) examination of the paranasal sinuses provides an anatomic road map of the paranasal sinuses to identify the presence of significant anatomic abnormalities, the location and severity of the disease and exact location of the obstruction.

Methods

The present prospective study was conducted in the Postgraduate Department of Otorhinolaryngology and Head and Neck Surgery, SMHS Hospital an associated Hospital of Government Medical College, Srinagar from March 2011 to May 2012.

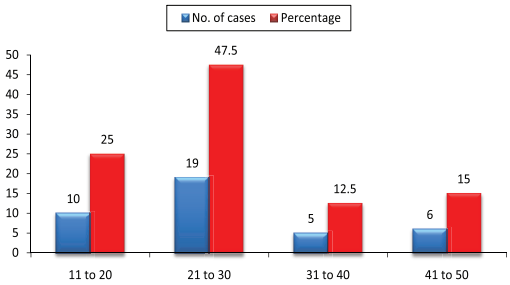
Inclusion Criteria:Adult patients who presented with signs and symptoms attributed to nasal septal deviation after clinical and endoscopic examinations were subjected to radiological investigation.

Exclusion Criteria: Patients with congenital deformities, granulomatous diseases, previous surgery, trauma or malignancy of the nose, paranasal sinuses or maxillofacial region were excluded from the study.

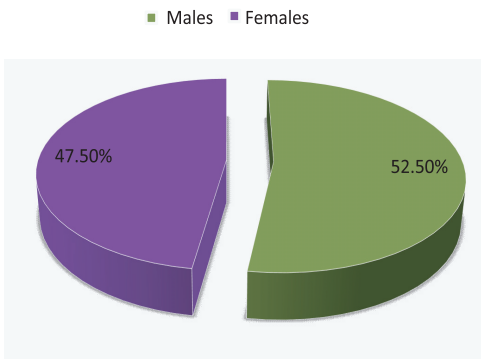
40 patients met the inclusion criteria and were included in this study. Computerized tomographic (CT) examination was carried out using the bone algorithm in the coronal plane with 5 mm slice thickness. The scans were analyzed for the anatomical variations.

Results

In our study of 40 patients, majority of patients i.e. 29 (72.50%) were aged between 10-30 years. The youngest patient was 18 years old and the eldest patient was 50 years of age. The mean age of presentation was 28.45 with a standard deviation of 10.45. 21 patients (52.50%) were males and 19 patients (47.50%) were females with male to female ratio of 1.1: 1. In our study, CT Nose and PNS revealed Deviated nasal septum in 40 (100%) patients, Hypertrophied Inferior turbinate in 11 (27.50%) patients, Concha bullosa in 5 (12.50%) patients, Paradoxical Middle turbinate in 8 (20%) patients, Everted Hypertrophied Uncinate in 2 (5%) patients, Aggernasi cells in 4 (10%) patients, Haller cells in 3 (7.50%) patients and Onodi cells in 2 (5%) patients.



Age Distribution (n=40)



Sex Distribution (n=40)

Table-I

Pre-Operative Associated Lateral Wall Pathology/Abnormality on NCCT Nose & PNS (n=40)

Lateral wall pathology/Abnormality	No. of cases	Percentage (%)
Hypertrophied Inferior Turbinate	11	27.50
Concha Bullosa	5	12.50
Paradoxical Middle Turbinate	8	20.00
Everted Hypertrophied Uncinate	2	5.00
Haller cells	3	7.50
AggerNasi cells	4	10.00
Onodi cells	2	5.00

In Some Patients More Than 1 Lateral Wall Abnormality Was Noted

Discussion

The incidence of Hypertrophied Inferior turbinate was 27.50% in our study. Leena Jain et al (2011)[12] in their study observed that among the incidence of lateral nasal wall pathology associated with deviated nasal septum, the commonest was Inferior turbinate hypertrophy in 75% of patients. This incidence is much higher than that observed in our study which may be because number of patients in above mentioned study were more than that in our study.

The incidence of Concha Bullosa in our study was 12.50% which correlates with the earlier study by Llyod as 14% as quoted by H Mamatha et al (2010)[13]

The incidence of Paradoxical Middle turbinate in our study was 20%. Leena Jain et al (2011)[12] in their study observed that among the incidence of lateral nasal wall pathology associated with deviated nasal septum, Paradoxical Middle turbinate was present in 25% of patients. The incidence observed in our study is more or less comparable to that observed by above author.

The incidence of Hypertrophied Everted Uncinate in our study was 5%. Pinas IP et al (2000) reported incidence of 4.5% as quoted by H Mamatha et al (2011).[13] Our observations concerning the incidence of everteduncinate is in accordance to that observed by above mentioned author.

The incidence of AggerNasi cells was 10% in our study. Lloyd (1990) reported 3% incidence of AggerNasi cells as quoted by H Mamatha et al (2010).[13] H Mamatha et al (2010)53 found AggerNasi cells in 50% of patients in their study of variations of Osteomeatal complex and its applied anatomy. Our observations concerning the incidence of AggerNasicells is quite comparable to that observed by above mentioned authors.

The incidence of Haller cells was 7.50% in our study. Pinas IP et al as quoted in H Mamatha et al (2010)53 and H Mamatha et al (2010)53 reported 3% and 17.5% incidence of Haller cells in their studies respectively. Our observations concerning the incidence of Haller cellsis quite comparable to that observed by above mentioned authors.

The incidence of Onodi cells was 5% in our study. BenjapornNitinavakaran, Sanguansak Thanaviratananich, NilubonSangsilp, (2005)[14] observed 25% incidence of Onodi cells. The observations concerning the incidence of Onodicells is not consistent to that observed by above mentioned authors.

Conclusion

The most common anatomical variation associated with deviated nasal septum was Hypertrophied Inferior turbinate followed by Paradoxical Middle turbinate and Concha Bullosa. The least encountered variation was Everted Hypertrophied Uncinate and Onodicells. The CT scan provides supplementary clinical data to the history and endoscopic examination and assists in directing surgical treatment to the affected areas.

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