

Etiopathogenesis of nasal obstruction: A radiological study

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Abstract

Background: The present study is undertaken to know more about the etiopathogenesis of nasal obstruction. Although there has been plenty of studies from west on qualitative and quantitative assessment of nasal obstruction and its effects on quality of life and sleep apnea there is large scale Indian studies evaluating nasal obstruction and this study will be an endeavor in this regard. **Methodology:** Paranasal sinus CT scans of 42 patients with headache, nasal and post-nasal drainage, and nasal obstruction complaints were taken and evaluated. The patients had chronic and/or recurrent acute rhinosinusitis were enrolled in this study. CT examinations were carried out in the coronal plane with 3 mm slice thickness and 3 mm intervals. **Results:** CT scan findings (anatomical abnormalities) showed about 20 cases(47.6%) had deviated nasal septum, 6cases(14.2%) had sinonasal polyp, 10cases (about 23.8%) had concha bullosa, 4 cases (9.5%) had maxillary sinusitis **Conclusion:** The commonest signs are hypertrophied middle and inferior turbinate, Edematous Mucosa, Polyps and Sinus tenderness.

Keywords: Nasal obstruction, Paranasal sinus, Sinus tenderness.

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INTRODUCTION

The complaint of a blocked nose is commonly a complex clinical problem involving structural, mucosal and even psychological factors. In clinical practice it is commonly difficult to assess the importance of individual factors contributing to nasal obstruction and to decide on the treatment most likely to be effective in restoring satisfactory nasal breathing. The perception of nasal airflow is a subjective sensation and difficult to quantify.^{1,2,3} Each of the nasal structure has a specific function. While the septum provides basic infrastructure and support for the nasal structures and regulates nasal

passage, a proper concha humidifies and warms the inspired air and directs it to the olfactory mucosa, ventilates the sinuses and provides lamination.⁴ The present study is undertaken to know more about the etiopathogenesis of nasal obstruction. Although there has been plenty of studies from west on qualitative and quantitative assessment of nasal obstruction and its effects on quality of life and sleep apnea there is large scale Indian studies evaluating nasal obstruction and this study will be an endeavor in this regard.

MATERIAL AND METHODS

This study was conducted at Shadan Institute of Medical Sciences, Peerancheru, Telangana State between October 2013 to September 2015. Paranasal sinus CT scans of 42 patients with headache, nasal and post-nasal drainage, and nasal obstruction complaints were taken and evaluated. The patients had chronic and/or recurrent acute rhinosinusitis were enrolled in this study. CT examinations were carried out in the coronal plane with 3 mm slice thickness and 3 mm intervals. Any evidence of mucosal changes, ranging from minimal mucosal thickening to total sinus opacification detected on CT was considered as abnormal. The degree of pneumatization,

the relationship between nasal septum deviation located at the level of bulla ethmoidalis, and sinusitis, unilateral or bilateral occurrence were evaluated. Since the differentiation between bullous and extensive concha is difficult, but their consequences are similar, these two anomalies were regarded as variants and evaluated as one group.

Inclusion Criteria: All clinically diagnosed cases of nasal obstruction.

Exclusion Criteria

1. Patients not willing to take part in the study or unwilling to give their written consent for the study.
2. Patients taking systemic drugs that are likely to interfere with the nasal mucosa.
3. Patients with acute attack of sinusitis
4. Patients with sinus malignancies
5. Patients with orbital complications
6. Patient on treatment for coronary heart diseases(Aspirin hypersensitivity)

Method of Collection of Data

The cases selected for the study were subjected to detailed history taking and examination. Complete hemogram (HB, BT, CT, DC) and urine examination (albumin, sugar, microscopy) along with X-ray Para nasal sinuses were done for the patients. All the patients in active stage of the disease were treated with course of suitable Antibiotic, Systemic antihistamines and local decongestants. No patient received steroid therapy or immunotherapy. Each patient underwent a systemic diagnostic CT scan of nose and Para nasal sinuses

OBSERVATION AND RESULTS

Table 1: Age distribution (n=42)

S.No.	AGE (YEARS)	NO. OF CASES-n (%)
1	0-10	1 (2.3)
2	11-20	14 (33.3)
3	21-30	5 (11.1)
4	31-40	21 (50.0)
5	41-50	1 (2.3)
Total		42 (100)

Table 2: Sex Distribution (N= 42)

S.NO	Sex	No of Cases n (%)
1	Male	22 (52.36)
2	Female	20 (47.60)
Total		42 (100)

Table 3: Symptoms

S.No.	Symptoms	No. of Cases
1	NASAL OBSTRUCTION+HEADACHE+NASAL DISCHARGE	20
2	HEADACHE	22
3	NASAL OBSTRUCTION	22
4	NASAL DISCHARGE	20
5	ANOSMIA / HYPOSMIA	2
6	SNEEZING	15

Table 4: Laterality of Symptoms

S.no	Symptoms	Unilateral	Bilateral
1	NASAL DISCHARGE	8	12
2	HEADACHE	8	14
3	NASAL OBSTRUCTION	8	14

Table 5: Duration of Symptoms (n=42)

S.NO	Duration of Symptoms	No of cases N (%)
1	6 MONTHS	26 (61.90)
2	6 MONTHS- 1 YEARS	6 (14.28)
3	1 YEARS- 2 YEARS	6 (14.28)
4	2 YEARS – 4 YEARS	4 (9.52)
Total		42 (100)

Table 6: CLINICAL FINDINGS BY ANTERIOR RHINOSCOPY

S.No	Clinical Findings	No of Cases
1	ETHIMOIDAL POLYP	10
2	ANTRACHONAL POLYP	8
3	CONCHA BULLOSA	20

Table 7: Clinical Findings

S.NO	Clinical findings	Unilateral	Bilateral
1	NASAL DISCHARGE	10	10
2	ETHIMOIDAL POLYP	0	10
3	ANTRACHONAL POLYP	8	0
4	HYPERTROPHY OF INFERIOR TURBINATE	14	20
5	HYPERTROPHY OF MIDDLE TURBINATE	15	20
6	MAXILLARY SINUS TENDERNESS	2	4

Table 8: CT (Paranasal Sinus) Findings (n=42)

S.NO	CT Scan Findings	No. of Cases n (%)
1	DEVIATED NASAL SEPTUM	20 (47.6)
2	POLYP	6 (14.2)
3	CONCHA BULLOSA	10 (23.8)
4	MAXILLARY SINUSITIS	4 (9.5)
5	HYPOPLASIA	2 (4.7)
Total		42 (100)

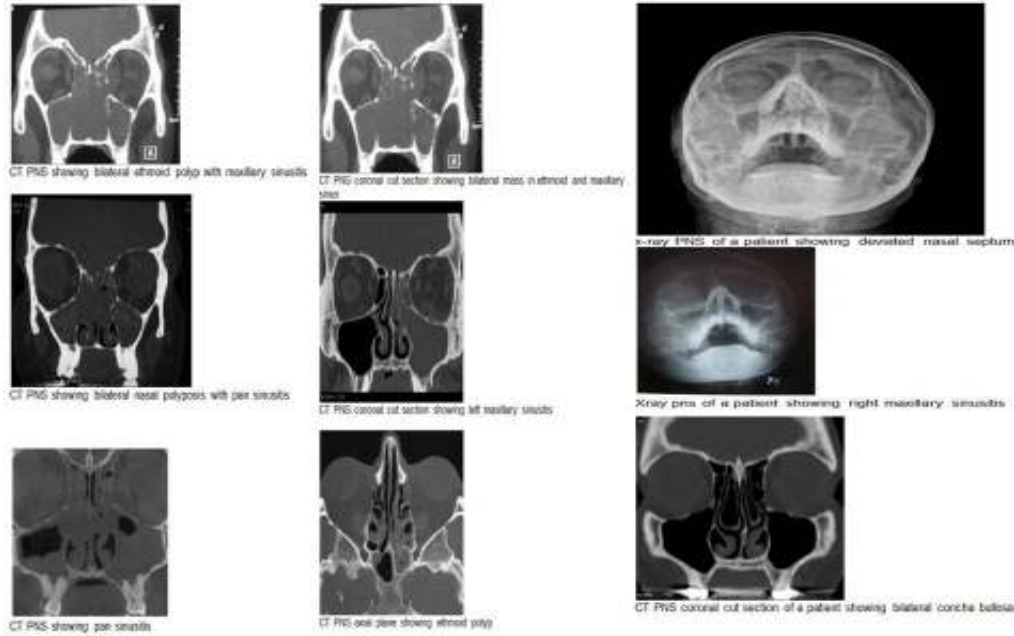


Figure 1: CT PNS and X-ray

RESULTS

In this study 42 cases have been taken out of which maximum cases are in the age group between 30 to 40 years (are about 21 cases-50%). Second group is between 11 to 20 years (are about 14 cases-33.3%) and the least being in the age group from 0 to 10 (are about 1 case-2.3%) and 41 to 50 (are about 1 case-2.3%). In this study sex distribution between male and female is 22:20 (52.36%:47.60%) i.e. male patients are more than female patients. All the patients who presented with history of nasal obstruction along with headache (22 cases about - 52.38%), nasal obstruction (22 cases about - 52.38%), nasal discharge (22 cases - about 52.3%), anosmia (about 2 cases - about 4.76%) and sneezing (about 13 to 15 cases - 35.7%) have been selected for this study who were not cured by medical line of treatment. Patients commonly presented with headache (7 to 8 are unilateral and 12 to 15 are bilateral) nasal discharge (8 are unilateral and 12 to 14 have bilateral) nasal obstruction (about 7 to 8 are unilateral and 13 to 14 are bilateral). CT scan findings (anatomical abnormalities) showed about 20 cases (47.6%) had deviated nasal septum, 6 cases (14.2%) had sinonasal polyp, 10 cases (about 23.8%) had concha bullosa, 4 cases (9.5%) had maxillary sinusitis.

DISCUSSION

This study included 42 patients who presented with nasal obstruction, headache, and nasal discharge. They were subjected to CT scan and who did not respond to medical line of treatment. Age of patients varied between 0-50 years with maximum no. of patients in 31-40 years (21 cases about-

50%) category and with 2nd highest in 11 to 20 (14 cases about - 33.3%) and the least being 0 to 10 years (1 case about - 2.3%) and 41 to 50 years (1 case - about 2.3%). The study conducted by Jack M. Gwaltney, Jr., C. Douglas Phillips, R. David Miller, and Donald K. Riker⁵ on 'Computed Tomographic Study of the Common Cold (1992)' shows out of 31 patients subjected to CT scan there were about 21 females and 10 males and the age range from 19 to 35 with the mean age 24 years. By comparing the above study the mean age is about 25 years equal to the study done by Jack M. Gwaltney Jr., C. Douglas Phillips, R. David Miller, and Donald K. Riker. In our study 22 patients i.e. 52.38% were male while 20 patients i.e. 47.61% were females. The study conducted by Jack M. Gwaltney, Jr., C. Douglas Phillips, R. David Miller, and Donald K. Riker⁵ on 'Computed Tomographic Study of the Common Cold (1992)' out of 31 patients 21 were women 67.7% and 10 were male 32.3%. By comparing above studies males were more in our study than females compared to the above study wherein they have more females than males. The reason could be negligence of females coming to our hospital than males. In the present study nasal discharge, nasal obstruction, and headache were the common symptoms which are present in 20-22 patients (about 50%). Followed by sneezing in 15 (35.7%) patients, and nasal discharge present in 10 patients (23%) and other symptoms like anosmia/hypsomia/cacosmia etc. in 3 (7%) patients. In the majority of patients the duration of symptoms were present for more than 6 months. In the study conducted by Kirtane M.V⁶ *et al* (1991) the commonest complaint

was nasal discharge occurring in 25 patient i.e 78.10% followed by head ache in 22 patients (68.7%) and nasal obstruction in 22 patient (68.70%) the other complaints sneezing in 6 patients (18.70%) anosmia/cocosmia in 2 patients (6.25%) the duration of symptoms varied from 3 months 30 years. In the study conducted by Venkatachalam *et al*⁷ (1999) the commonest symptoms were nasal discharge 147 patients (70%) and nasal obstruction 183 patients (87.14%) the other symptoms were post nasal obstruction 86 patient (40.95%) sneezing 48 patients (27.85%) hyposmia/anosmia 57 patients (35.71%).

By comparing above 2 studies with our study, it has been observed that most of their patients complained of nasal discharge which could be selection of randomly all the cases of nasal discharge (common cold), but in our study only those cases who did not respond to medical line of treatment were included. In this study common clinical signs present were congested mucosa in 8 patients (19.40%) while pale mucosa was present in 13 patients (30.95%). The other findings were nasal polyp in 15 patients (35.91%) middle meatus discharge and turbinate hypertrophy in 10 patients (23.80%) inferior turbinate hypertrophy in 8 patients (19.04%), sinus tenderness in 6 patients (14.28%) In the study conducted by Venkatachalam *et al*⁷ the clinical findings were hypertrophy inferior turbinates (10%) hypertrophied middle turbinate (17.14%) congested mucosa membrane (15.71%) sinus tenderness, (7.14%) and ethmoidal polyps (12.80%). In study conducted by Kritane M.V *et al*⁶ hypertrophied inferior turbinate was present in (9.50%) middle turbinate hypertrophy in (12.30%) sinus tenderness in 40.60% polyps in (12.50%) of the cases. By comparing the above studies it has been observed that all the acute signs are exaggerated in other studies since they included cases which were not treated by medical line of management. In the present study 27 patients (64.28%) had chronic rhinosinusitis while 15 patients (35.71%) had gross sinonasal polyposis. In the study conducted by Venkatachalam V.P *et al*⁶ 67 patients have sinonasal polyposis (31.90%) and chronic rhinosinusitis 143 patients (68.09%). CT scan of Paranasal sinuses were done in all the cases to look at abnormality.

In the present study out of 42 patients the CT findings of deviated nasal septum are 20(47.6%), nasal polyposis are about 6 cases, concha bullosa are 10 cases (23.8%). The study conducted by Jack M. Gwaltney, Jr., C. Douglas Phillips, R. David Miller, and Donald K. Riker⁵ on 'Computed Tomographic Study of the Common Cold (1992), 27 out of 31 patients who were subjected to ct

scan had abnormalities of one or both maxillary sinuses; the abnormalities were bilateral in 23 subjects (85 percent) and unilateral in 4 (15 percent). CT scans included marked septal deviation in 6 (19 percent), concha bullosa (air cells of the turbinate) in 11 (35 percent). By comparing the above 2 studies most of the patients in chronic rhinosinusitis and anatomical abnormality can easily be diagnosed by radiology which is evident thus suggests that CT scan helps in proper diagnosis.

CONCLUSION

The commonest age group which causes nasal obstruction is 31 to 40 years of age group. Males are more than females due to negligence of women and poor socio economic stature. Bilateral are more than unilateral since allergic conditions are more common. Commonest causes of nasal obstruction and headache are gross deviated nasal septum, anatomical abnormalities such as concha bullosa, and polyps. The main causative factors of nasal obstruction on CT study are found to be deviated nasal septum, concha bullosa, hypertrophied turbinates and polyps.

Hence CT scan is the clinical guide to the surgeon to evaluate the disease and severity of Anatomical abnormality causing chronic rhinosinusitis.

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