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Nasal Endoscopic Study in Regard To Anatomical Variations in Cases of Sinusitis in A Teritary Care Hospital in South India ¬– Case Series

ENT

KEYWORDS : Osteomeatal complex, Deviated nasal septum, Acute bacterial rhinosinusitis, Diagnostic nasal endoscopy.

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ABSTRACT

The term 'Sinusitis' refers to a group of disorders characterized by inflammation of the mucosa of the paranasal sinuses. Anatomical variations studied are found to block the osteomeatal complex (OMC) and cause sinusitis

In this study our aim is to find out various anatomical variations in cases of chronic sinusitis in regard to diagnostic nasal endoscopy among the patients attending ENT department in a tertiary care hospital.

This is a prospective study , conducted over a period of 7 months from 1/1/2013 to 31/7/2013 in Government ENT hospital, Visakhapatnam . Patients who were willing for the study on them were selected. Complete history was taken and thorough clinical examination was done along with the relevant investigations to find out the incidence of anatomical variations in relation to clinical sinusitis

. The clinical material for the present study comprises of 107 cases of Clinical Sinusitis admitted in our hospital.

1) Out of the 107 cases studied, 91(85%) cases had Chronic, 9(8%) had Subacute and 7(7%) had Acute complaints.

2) Out of the 107 cases, 32(29.91%) were in 21-30 years age group, 30(28.04%) in 11-20 years group and 28(26.17%) in 31-40 years group. So 84% of the patients were in the age range 11-40 years. Incidence of Rhinosinusitis declined beyond 40 years of age.

3) 60(56.07%) were male and 47(43.93%) were female. Male: Female = 1.3:1.

4) Presenting Symptoms in the decreasing order were Nasal obstruction(85%), Headache(71%), Nasal discharge(36%), Sneezing(29%), Facial congestion(24%), Post nasal discharge(18%), Disturbance of smell(14%), Aural complaints(11%) and Dental pain(0.9%).

5) Anatomical Variations leading to sinusitis were Concha bullosa(43%), Deviated nasal septum(34.6%), Paradoxical middle turbi nate(10.28%), Large bulla(7.48%),

INTRODUCTION

The term **"Sinusitis"** refers to a group of disorders characterized by inflammation of the mucosa of the paranasal sinuses. Because the inflammation nearly always also involves the nose, it is now generally accepted that **"Rhinosinusitis"** is the preferred term to describe this inflammation of the nose and paranasal sinuses. There are a number of factors that play a role in the development of rhinosinusitis, including both host and environmental factors.

Inflammation in the nose and sinuses from a variety of causes can result in sinus ostia obstruction and predispose to the development of an infection. Many factors have been described as playing a role in the development of ABRs. These include factors related to the host: **Genetic factors** such as immotile cilia syndrome or cystic fibrosis; **Anatomic abnormalities such as a Concha bullosa, Septal spur or Paradoxical turbinate**; certain **Systemic diseases or medical treatments** that predispose individuals to infections; no apostrophe and allergic or immune disorders. Rhinosinusitis may also develop in relationship to **Environmental factors:** bacterial, viral, or fungal infections, or **Inflammation** that occurs secondary to fungal or bacterial colonization. **Trauma;** primary or secondary, **Tobacco smoke exposure**, **Chronic or Acute irritants** or noxious chemicals; or **Iatrogenic** factors including surgery, medications, nasal packing or nasogastric tube placement. There is growing evidence that individuals with **Allergies** have a higher incidence of developing both acute and chronic rhinosinusitis.

RHINOSINUSITIS: SYMPTOMS/SIGNS

MAJOR	**MINOR**
Facial pain/pressure.	Headache.
Facialcongestion/fullness.	Fever (non-acute).
Nasal obstruction/blockage.	Halitosis.
Nasal discharge/purulence/discolored Posterior discharge.	Fatigue.
Hyposmia/anosmia.	Dental pain.
Purulence on nasal examination.	Cough.
Fever (acute RS only).	Ear pain/pressure/fullness.

Requires 2 Major factors or 1 Major and 2 minor factors for the diagnosis.

ANATOMICAL VARIATIONS LEADING TO SINUSITIS

NASAL SEPTAL DEVIATIONS:

The Nasal septum is fundamental to the development of the nose and paranasal sinuses. Nasal septal deviation is usually **Congenital** but may be **Posttraumatic** in some patients. Malalignment of the components of the adult nasal septum (septal cartilage, perpendicular ethmoidal plate and vomer) may cause deviation of the nasal septum, deformity of the Chondrovomerine articulation, or a septal spur.

Septal deviations may compromise key areas like the Osteomeatal unit leading to impaired drainage of the sinuses. Deviations may also be associated with a Concha bullosa or Hypertrophied turbinates on the roomy side. These variations in turn may compromise the Osteomeatal unit.

VARIATIONS OF THE TURBINATES

concha bullosa

paradoxic curvature

secondary middle turbinate

duplicate turbinates

There are two main Osteomeatal channels: (1) the **anterior ostiomeatal unit**, which includes the frontal sinus ostium, frontal recess, maxillary sinus ostium, infundibulum, and middle meatus; and (2) **the posterior ostiomeatal unit**, which consists of the sphenoid sinus ostium, sphenoethmoidal recess, and the superior meatus. These channels provide communication between the ipsilateral frontal, anterior ethmoid, and maxillary sinuses.

AIMS AND OBJECTIVES

To find out anatomical variations in relation to clinical sinusitis in regard with nasal endoscopy among the patients attending government ENT hospital Visakhapatnam for a period of seven months.

Materials and methods

This is a prospective study conducted over a period of 7 months from January 2013 to AUGUST 2013, in government ENT hospital Visakhapatnam.

The patients who are admitted in our hospital were randomly selected for the study.

INCLUSION CRITERIA:

Patients with either two major or one major + two minor symptoms suggestive of Rhino sinusitis.

Evidence of Rhino sinusitis on DNE

EXCLUSION CRITERIA:

Patients who met the criteria for Rhino sinusitis but had Sino nasal polyposis or Allergic fungal sinusitis.

Complicated sinusitis, Sino nasal Malignancy, Osteomyelitis, Abscess.

Patients with alteration of PNS anatomy due to facial trauma.

Previous sinus surgery.

OBSERVATIONS:

Of the 107 cases, 60(56.07%) were males and 47(43.93%) were females.

TABLE 1 : AGE DISTRIBUTION

Of the 107, 32 patients (29.91%) belong to age group 21-30 years, 30 (28.04%) belong to age group 11-20 years, 28 (26.17%) belonged to 31-40 years category, 14(13.08%) were in 41-50 years category, only 3(2.8%) in 51-60 years and no cases below 10 years.

The study shows that Rhino sinusitis is more prevalent in the age group 11-40 years i.e. 2nd to 4th decade(84%). After 40 years the incidence tends to decline as evident from the table.

S.no	Category(years)	No. of cases	%
1.	**0-10(A)**	0	0
2.	11-20(B)	30	28.04
3.	21-30(C)	32	29.91
4.	31-40(D)	28	26.17
5.	41-50(E)	14	13.08
6.	51-60(F)	3	2.8
Total		107	100.00

TABLE 2: INCIDENCE OF SYMPTOMS IN RHINOSINUSITIS:

Major presenting symptoms were Nasal obstruction (85%), Headache(71%), Nasal discharge(36%) and Sneezing(29%). Less common symptoms include Facial congestion(24%), Posterior nasal discharge(18%), Disturbance of smell14%), Aural symptoms(11%) and Dental pain(1%).

S.no	Symptom	No. of cases	%
1.	Nasal Obstruction	91	85
2.	Headache	76	71
3.	Nasal Discharge	39	36
4.	Sneezing	31	29
5.	Facial Congestion	26	24
6.	Post Nasal Discharge	19	18
7.	Disturbance of smell	15	14
8.	Aural Symptoms	12	11
9.	Dental Pain	01	0.9

TABLE 3 : INCIDENCE OF MUOSAL ABNORMALITIES

In the present study, Maxillary sinus was predominantly involved(87%), followed by Ethmoidal sinus(72%), Sphenoid sinus(38.3%) and Frontal(34.6%).

Involved sinus	**Bilateral**	**Only right**	**Only left**	**Total**	**%**
Maxillary	68	10	15	93	87
Ethmoidal	61	8	8	77	72
Frontal	17	11	9	37	34.6
Sphenoid	22	4	15	41	38.3

TABLE 4: INCIDENCE OF ANATOMICAL VARIATIONS:

Anatomical Variations leading to sinusitis were Concha bullosa(43%), Deviated nasal septum(34.6%), Paradoxical middle turbinate(10.28%), Large bulla(7.48%).

S.no	Anatomical Variation	Bilateral	Only right	Only left	Total	Incidence (%)
1.	Concha Bullosa				46	42.99
	Lamellar	06	07	05	18	
	Bulbous	13	09	06	28	
2.	Deviated Nasal Septum	-	19	18	37	34.60
3.	Agger Nasi	39	04	01	44	41.12
4.	Haller Cell	09	01	01	11	10.28
5.	Paradoxical Middle Turbinate	03	06	02	11	10.28
6.	Large Bulla	06	02	00	08	07.48
7.	Onodi Cell	03	03	00	06	05.61
8.	Pneumatised Uncinate	01	01	01	03	02.80

DISCUSSION:

In our study highest incidence was in the age group 21-30, closely followed by 11-20 and 31-40 years. However, different workers like **Rong Sashy (2004), Evccj.More (2004), Sinha 1952), Mc Neill (1963)** and **Das (1972)** reported highest incidence in the age group 31-40.

The incidence of nasal obstruction in the present study correlates with the study by **Michael Joseph C et al (2009).**

Nasal obstruction can be attributed to the presence of nasal discharge, deviated nasal septum, hypertrophied inferior turbinate or a concha bullosa.

Headache was the 2nd commonest complaint in the present study in 76(71%) cases. This is in agreement with the studies of **Sinha (1952)-65.2%, M.T.Hedayati (2010)-74%, K.Aaseth, R.B.Ganlee (2008) -74%.**

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Nasal discharge was present in 39(36%) cases, **Sinha (1952)** reported incidence of nasal discharge in about 50% and **M.T.Hedayati (2010)** observed it to be 66%. **Michael Joseph C et al (2009)**, **Crooks (1942)** and **Ballonger 1943)** observed that puss in the nasal cavity usually signifies the presence of empyaema of the sinuses.

In the present study, Maxillary sinus was predominantly involved (87%), followed by Ethmoidal sinus (72%), Sphenoid sinus (38.3%) and Frontal (34.6%).

Zenerich published Maxillary sinus involvement in 65%, posterior ethmoid in 40%, Frontal in 34% and Sphenoid in 29%. **Bolger** reported Maxillary sinus involvement in 77%, Posterior ethmoid in 38.6%, Frontal sinus in 36.6% and Sphenoid in 25.4%.

In the present study of 107 cases concha bullosa was seen in 46(42.99%) cases. In 19 cases, it was bilateral, 16 only on the right side and 11 only on the left side.

Zinreich (2003) published concha bullosa was seen in 36% , Bolger(1991) reported concha bullosa in 53% cases, Lioyd (1990) reported in 14% cases.

In the present study, significant DNS **(**Moderate and Severe**)** was seen in 37(34.6%) cases, 19 had DNS to the right side and 18 to the left side.

Zinreich (2003) reported incidence of deviated nasal septum in 21% cases, Bolger (1991) suggested DNS in 18% cases , Wanamaker (1996) reported DNS in 20% cases.

CONCLUSION:

The clinical material for the present study comprises of 107 cases of Clinical Sinusitis admitted in our hospital.

Out of the 107 cases, 32(29.91%) were in 21-30 years age group, 30(28.04%) in 11-20 years group and 28(26.17%) in 31-40 years group. So 84% of the patients were in the age range 11-40 years. Incidence of Rhinosinusitis declined beyond 40 years of age.

2) Presenting Symptoms in the decreasing order were Nasal obstruction(85%), Headache(71%), Nasal discharge(36%), Sneezing(29%), Facial congestion(24%), Post nasal discharge(18%), Disturbance of smell(14%), Aural complaints(11%) and Dental pain(0.9%).

3)Anatomical Variations leading to sinusitis were Concha bullosa(43%), Deviated nasal septum(34.6%), Paradoxical middle turbinate(10.28%), Large bulla(7.48%).

It was found out that variations like Concha Bullosa, Deviated Nasal Septum and Agger Nasi were the major conditions that led to sinusitis. Haller Cell, Paradoxical Middle Turbinate and Large Bulla were seen only in few cases.

These variations, by narrowing the drainage pathway of the Paranasal sinuses, impair the drainage of secretions from the sinuses, which subsequently may get infected. In fact, close approximation of adjacent surfaces will impair the ciliary activity, affecting the normal drainage of sinuses. This subsequently leads to inflammation and oedema of the nasal and sinus mucosa, further impairing ciliary activity and aggravating stasis of secretions.

The results correlate well with some of this study of the previous established studies. So we strongly believe that these above mentioned Anatomical Variations can play an important role in the pathogenesis of sinusitis.

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