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A Study of Correlation between CT Findings and MMA Findings in Cases of Maxillary Sinusitis

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Abstract
Introduction: *Sinusitis is a leading health care problem believed to be increasing in both incidence and prevalence. Rhinosinusitis refers to a group of diseases, mainly the inflammation and infection, which affect the mucosa of nose and paranasal sinuses. CT scan paranasal sinuses in coronal and axial views reveals mucosal changes deeper in osteomeatal complexes and helps to correlate anatomical and pathological information*
Objective: *To compare the CT scan findings and Middle meatal antrostomy findings in patients with Chronic Rhinosinusitis*
Methodology: *From the patients attending to ENT department, Gandhi hospital, Secunderabad. Patients of above 18 years age group with clinical features suggestive of maxillary sinusitis were chosen. They were subjected to CT scan paranasal sinuses examination, 50 patients with positive CT PNS findings were taken into study and admitted and posted for MMA.*
Results: *Commonest symptoms were nasal obstruction (70%), followed by headache (56%), sore throat (26%) and abnormality of smell (20%).In the present study regarding hazy antra 81.57% showed positive MMA findings, regarding mucosal thickening 58.33% antra showed positive MMA results, regarding polypoidal change 100% antra showed positive MMA findings .*
Keywords: *Chronic Rhinosinusitis, CT PNS, Middle Meatal Antrostomy, Nasal Obstruction, Osteomeatal complex.*

Introduction

Rhinosinusitis refers to a group of diseases, mainly the inflammation and infection, which affect the mucosa of nose and paranasal sinuses.[1] Sinusitis is a leading health care problem believed to be increasing in both incidence and prevalence.[2] Among the sinusitis, maxillary sinusitis is the commonest variety. Maxillary antrum, due to its peculiar anatomical nature and its close relation to the other sinuses and respiratory tract, more prone to infections.[3]

In maxillary sinusitis, specific way of diagnosis now a days is by CT scan paranasal sinuses examination coronal and axial views.[4] The endoscopist's interest is mainly in the middle meatus since frontal sinus, anterior and middle ethmoidal cella and the maxillary sinus drain here.[5] The region of the middle meatus with the anterior and middle ethmoids has been termed as the "osteomeatal complex" by Naumann.[6] The Ostio Meatal Complex: Comprises of Middle meatus, Uncinate process,Hiatus semilunaris, Infundibulum, Maxillary ostium, Bulla ethmoidalis, agger nasi cells. On removing the middle turbinate one can clearly see certain structures in the middle meatus. Anteriorly, there is the hook shaped uncinate process behind which lies a semilunar groove called the hiatus semilunaris. This groove separates the uncinate process from the bulla ethmoidalis, which is just behind.

Chronic Rhinosinusitis is a multifactorial disease. Factors contributing to rhinosinusitis can be mucociliary impairment, bacterial infection, allergy, swelling of mucosa due to any reasons, physical obstructions caused by anatomical variations in the nasal cavity or paranasal sinuses.[1]

Clinical features of CRS include pressure headaches, post nasal discharge, facial pressure and nasal congestion. Other features are nasal obstruction, anosmia / hyposmia, cough, Eustachian tube dysfunction etc.[7] Signs of chronic maxillary sinusitis are Crusting and discharge in the middle meatus, Congested nasal mucosa, Tenderness over the cheek, Post nasal drip. CT scan paranasal sinuses in coronal and axial views reveals mucosal changes deeper in osteomeatal complexes and helps to correlate anatomical and pathological information.

The use of CT scanning combined with Functional endoscopic sinus surgery (FESS) has empowered the modern sinus surgeon to treat patients more effectively. In addition to reviewing the scan to determine the presence of disease, CT scans of the sinuses can also be reviewed to evaluate potential areas of occlusion and variations of the patient's sinus anatomy in the setting of surgical planning. Sinus CT is used in correlation with clinical examination procedures, including nasal endoscopy. This study was done to compare the CT scan findings and Middle meatal antrostomy findings in patients with Chronic Rhinosinusitis

Aims and Objectives

1. To assess the clinical features of patients with Chronic maxillary sinusitis .
2. To know the supportive or misguiding authenticity of CT scan in dealing with the sinus pathology by surgery.

Materials and Methods

Study Design: A clinical study to find Correlation between CT Findings and MMA Findings in Cases of Maxillary Sinusitis

Study Area: Patients attending to E.N.T outpatient department, Gandhi hospital, Secunderabad.

Study Duaration: 6 months between January 2013 – June 2013

Sample Size: A total of 50 patients with Chronic Rhinosinusitis refractory to medical treatment who requires Functional Endoscopic sinus surgery were admitted during the study period

Study Population: Patients attending to E.N.T outpatient department with clinical features, such as Headache, facial pain and Nasal discharge of preferably more than 3 months are randomly selected

Inclusion Criteria

1. Cases of CRS with infective pathology with symptoms for at least 12 weeks.
2. Patients refractory to a minimum of 6 weeks of medical treatment.
3. Patients above 18 years of age.

Exclusion Criteria

1. Acute sinusitis with symptoms less than 12 weeks
2. Cases of CRS with allergic pathology
3. Patients below 18 yrs
4. Patients who are not willing

Sampling technique: All the patients with chronic rhinosinusitis who were refractory to medical treatment requiring FESS were selected randomly.

Ethical committee clearance was taken from Hospital authorities.

Examination of Study Subjects

In all the study subjects detailed history was elicited and clinical examination of ear, nose and throat was done with special reference to the nose. Anterior Rhinoscopy was done in detail about septum, turbinates, nasal mucosa and to know the pathology. patients were sent for radiological investigation. To ensures the maximum possible accuracy in this study; the patients are given the following instructions.

1) Return immediately after the radiological investigation is over, for admission and to perform and for preparation to MMA.
2) Do not blow their noses forcibly during and after radiological investigation.
3) Radiological investigation is the plain CT examination of para nasal sinuses.
4) After reporting back to E.N.T outpatient department with plain CT investigation depending on the findings patients were included in the study and posted for MMA and findings are compared.

Results

From the patients attending to ENT department, Gandhi hospital, Secunderabad. Patients of above 18 years age group with clinical features suggestive of maxillary sinusitis were chosen. They were subjected to CT scan paranasal sinuses examination, 50 patients with positive CT PNS findings were taken into study and admitted and posted for MMA. Totally 100 antra, belonging to 50 patients were subjected to radiological examination (CT scan paranasal sinuses) followed by surgery(endoscopic middle meatal antrostomy) and the findings were compared. Highest age incidence was in 20-29 age groups i.e. in third decade followed by people in fourth and fifth decade. Least incidence was observed in patients above 50 years shown in table 1.

In the present study the male: female ratio was 66%: 34% shown in table 2. In the present study commonest symptoms were nasal obstruction (70%), followed by headache (56%), sore throat (26%) and abnormality of smell (20%) shown in table 3. In the present study deviated nasal septum was the commonest presenting sign (74%) followed by hypertrophied inferior turbinate (58%) shown in table 4. In the present study38% antra showed hazyness radiologically, 24% antra showed mucosal thickening, 19% showed clear antra and 11% showed opaque antra shown in table 5. Out of 100 middle meatal antrostomies majority of sinuses showed clear antra, followed by purulent discharge in 26 antra, polypoidal change in 16 antra, mucopurulent discharge in 14 antra, thickening of sinus mucosa 12% shown in table 6 . In the present study regarding hazy antra 81.57% showed positive MMA findings, regarding mucosal thickening 58.33% antra showed positive MMA results, regarding polypoidal change 100% antra showed positive MMA findings shown in table 7.

Table – 1 Age Disctribution

Age in years	No. of Patients	Percentage
10-19	7	14%
20-29	22	44%
30-39	9	18%
40-49	9	18%
>50	3	6%

Table – 2 Gender Distribution

Sex	No. of Patients	Percentage
Male	33	66%
Female	17	34%

Table – 3 Symptomatology

Symptoms	No. of patients	Percentage
Nasal obstruction	35	70%
Headache	28	56%
Sore throat	13	26%
Hyposmia	10	20%
Nasal discharge	7	14%
Sneezings	6	12%
Ear complaints	3	6%
Epistaxis	2	4%
Dental complaints	2	4%
Difficulty in breathing	1	2%
Watering from eyes	1	2%

Table 4: Signs

Signs	No. of patients	Percentage
Deviated nasal septum	37	74%
Hypertrophied inferior turbinate	29	58%
Congested nasal mucosa	16	32%
Retracted tympanic membrane	8	16%
Post nasal drip	7	14%
Concha bullosa	3	6%
Hypertrophied middle turbinate	2	4%
Discharge in middle meatus	1	2%

Table 5 CT Scan Findings

CT scan appearance	Number of antra	Percentage
Clear	19	19%
Opaque	11	11%
Hazy	38	38%
Mucosal thickening	24	24%
Polypoidal change	8	8%

Table - 6 Middle meatal antrostomy findings

MMA finding	No. of antra	Percentage
Clear antra	32	32%
Purulent discharge	26	26%
Polypoidal change of sinus mucosa	16	16%
Mucopurulent discharge	14	14%
Thickening of sinus mucosa	12	12%

Table 7: Comparision of CT findings and MMA findings

Group	CT scan appearance of antra	No. of maxillary antra	No. of antra showing positive MMA findings	Percentage
I	Clear	19	0	0%
II	Opaque	11	10	90.9%
III	Hazy	38	31	81.57%
IV	Mucosal thickening	24	14	58.33%
V	Polypoidal change	8	8	100%

Discussion

Highest age incidence was in 20-29 age groups i.e. in third decade followed by people in fourth and fifth decade. Least incidence was observed in patients above 50 years. A study conducted by Manuseth, B.M patil (2005)[9] showed maximum age incidence was in third decade, a study conducted by shrestha.et.al (2010) [10]also showed maximum age incidence in third decade. Our study goes in the same line.

In the present study the male: female ratio was 66%: 34%. In the study of Manuseth and B.M patil (2005) showed it was 64%: 36%. In the study of shresha.et.al (2010) it was 56%: 44%. Our study supports the earlier people observations.[10]In the present study commonest symptoms were nasal obstruction (70%), followed by headache (56%), sore throat (26%) and abnormality of smell (20%). In Manuseth, B.M patil study (2005)[9] nasal obstruction followed by nasal discharge were the common complaints, in study of zojaji[11]. et al (2008) common complaint was nasal obstruction followed by nasal discharge, in study of shrestha[10]. et al (2010) nasal discharge was the main complaint followed by nasal obstruction. This study goes in line with Zojaji. et al (2008). In the present study deviated nasal septum was the commonest presenting sign (74%) followed by hypertrophied inferior turbinate (58%). In the study of Manuseth and B.M patil[9] (2005) hypertrophied inferior turbinate (34%) was the common presenting sign, in the study of zojaji. et al[11] (2008) hypertrophied inferior turbinate (66%) was the common presenting sign followed by septal deviation (57%) he conducted study in 51 patients. In the study of shrestha. et al[10] (2010) pus in the middle meatus (88%) was the common sign. In this study deviated nasal septum must have contributed for Sino nasal pathology. In the present study 38% antra showed hazyness radiologically, 24% antra showed mucosal thickening, 19% showed clear antra and 11% showed opaque antra. In study conducted by Bhaskar. K. patle, Hemanth Umarji[12] (44) out of 5 patients 3 patients showed mucosal thickening. In the study of zojaji. et al[11] (2008) 27 patients showed mucosal thickening in CT scan, 9 patients showed polyp. This study was conducted in 51

patients. In the above studies thickening of mucosa noted as predominant radiological sign. It was found that 19% of antra were radiologically clear, 11% were opaque and 38% were hazy, 24% of antra revealed mucosal thickening, 8% revealed polypoidal change. Out of 100 middle meatal antrostomies majority of sinuses showed clear antra, followed by purulent discharge in 26 antra, polypoidal change in 16 antra, mucopurulent discharge in 14 antra, thickening of sinus mucosa 12%.In the present study regarding hazy antra 81.57% showed positive MMA findings, regarding mucosal thickening 58.33% antra showed positive MMA results, regarding polypoidal change 100% antra showed positive MMA findings. Study conducted by zojaji. et al[11] (2008) 34 patients showed mucosal thickening, 9 patients showed polyp in CT scan and in these 29 patients with mucosal thickening showed positive results in endoscopic sinus surgery, and all the patients with polyp in CT scan showed positive findings in endoscopic sinus surgery. According to study conducted by Manuseth, B.M patil[9] (2005) CT scan showed highest sensitivity for maxillary sinus (92%) with operative findings.

Conclusion

1. After the CT scan para nasal sinus examination all the patients were posted for middle meatal antrostomy, and the findings are purulent discharge seen in 26% of cases, mucopurulent discharge seen in 14% cases, polyp arising from sinus mucosa seen in 16% of cases, thickening of sinus mucosa seen in 12% of cases, clear antra seen in 32% of cases.
2. CT scan paranasal sinuses findings are compared with MMA findings found that all the radiologically clear antra MMA findings are clear antra, out of 11 radiologically opaque antra 10 showed positive MMA findings accuracy is 90.9%, out of 38 radiologically hazy antra 31 antra showed positive MMA findings accuracy is 81.57%, only 14 antra showed positive MMA findings out of 24 radiologically mucosal thickening antra, polypoidal change of antra gave 100% positive MMA findings.

   So it was concluded that clear, opaque, hazy and polypoidal changed antra of radiologically gave reliable MMA findings, only in mucosally thickened antra radiologically was showed little less reliability.
3. CT scan examination of paranasal sinuses can give clear picture of pathology present in the sinuses before examining directly with endoscope while doing surgery.

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