



ORIGINAL RESEARCH PAPER

Radio-Diagnosis

“COMPARISON OF COMPUTED TOMOGRAPHIC FINDINGS AND FINDINGS OF FUNCTIONAL ENDOSCOPIC SINUS SURGERY IN CASES OF CHRONIC RHINOSINUSITIS”

KEY WORDS:

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ABSTRACT Computerized Tomography (CT) scan and FESS play a key role in the present day to day assessment of all the sinusal pathology and their management. Computerized Tomography (CT) provides preoperative information for the assessment of patients undergoing functional endoscopic sinus surgery (FESS). One of the major aims of CT of the sinuses is to delineate the extent of the disease, define any anatomical variants and relationship of the sinuses with the surrounding important structures. The study stresses that in all patients with sino nasal disease CT scan has to be done, to know the exact pathology and to plan for FESS if required. CT scan findings are almost similar to the findings of FESS and helps in management and provides “road map” to the surgeons.

INTRODUCTION:

Chronic rhinosinusitis is one of the most common chronic diseases affected worldwide. CT has become the standard diagnostic technique in the evaluation of paranasal sinuses¹. CT scan evaluation of the patients, who have to undergo eventually FESS, is useful in confirming the clinical diagnosis of chronic rhinosinusitis². The aim of this study is to evaluate and correlate between CT findings and endoscopic findings in FESS. Computerized tomography imaging (CT) of the paranasal sinuses and FESS has become a widely accepted tool for assessing the PNS and providing detailed anatomy of the lateral nasal wall and the disease process

AIMS AND OBJECTIVES

1. To correlate between CT findings and the endoscopic findings in Functional Endoscopic Sinus Surgery of chronic rhinosinusitis.

MATERIALS AND METHODS:

In this study, clinically diagnosed cases of chronic rhinosinusitis, referred from Department of ENT, government general Hospital Kurnool, underwent CT scan and functional endoscopic sinus surgery during the period from November 2016 to October 2018.

Method of collection of data (including sampling procedure if any):

1. Equipment: GE BRIGHT SPEED ELITE 16 slice Spiral CT Scanner.
2. Definition of a study subject: Clinically diagnosed cases of chronic rhinosinusitis; referred to the department of Radio-Diagnosis, KURNOOL MEDICAL COLLEGE & GGH, for CT evaluation of paranasal sinuses.

The method of study:

The patients were all clinically diagnosed cases of chronic rhinosinusitis who underwent pre-operative CT and FESS. The diagnostic validity was used for correlation between CT findings & FESS. The parameters which used for correlation were paradoxical middle turbinate, concha bullosa, turbinate hypertrophy, choanal atresia, mass, cysts, osteomeatal complex patency, polypoidal changes, mucosal thickening and frontoethmoidal disease.

Prior to subjecting the patients for radiographic examinations, age, sex and detailed clinical history was obtained along with thorough physical examination.

Images were obtained with 3 mm collimation in the coronal plane with the patient in the prone position and the neck hyper extended. The image interval was 3 mm through the osteomeatal complex. The tube potential 120 kVp and tube current 200–240 mA.

Comparative studies of FESS with CT PNS

Swati tendon et al in 2017 conducted a prospective study correlating CT and FESS findings in chronic sinusitis cases. 49 patients of chronic sinusitis underwent preoperative CT before FESS. In this study, significant correlation was seen between preoperative ct and intraoperative FESS findings for all sinuses except left maxillary sinus.

Maxillary sinus was found to be the most common involved sinus involved in chronic sinusitis.

OBSERVATIONS AND RESULTS

Table 1:- Age distribution

Age (years)	Number of patients	percentage
0 - 20	16	26
20 - 40	24	48
40 - 60	9	18
60- 80	1	2
Total	50	100

The age of the patients in the present study is from 15 – 75 years.

Maximum numbers of patients are in 20 – 40 years of age. 48 % of patients are in 2nd & 3rd decade .

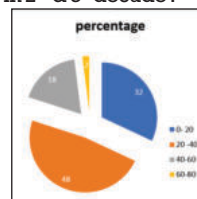


Figure No. 1: Pie chart age distribution

Table – 2 :Sex distribution

Sex	Number of patients	percentage
Male	26	52
Female	24	48
Total	50	100

The present study shows slight male preponderance i.e. 52% in males and 48% in females patients. Thus male to female ratio is 1.08 : 1

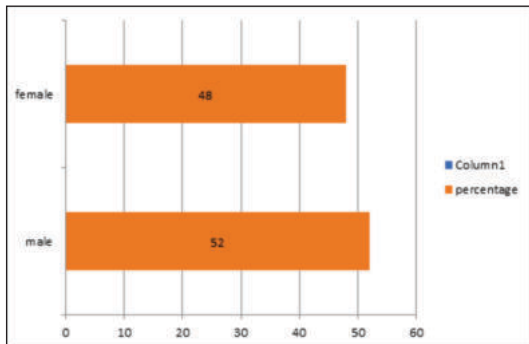


Figure No.2: Bar graph sex distribution

Table 3:- Symptoms

Symptoms	Number of patients	Percentage
Headache	40	80
Nasal obstruction	38	74
Nasal discharge	20	40
Post nasal discharge	19	38
Sneezing	13	26
Epistaxis	9	18
Others	4	8

Common symptoms of the patients in the present are headache (80%) and nasal obstruction (74%) ,nasal discharge (40%),epistaxis (18%) and other symptoms (8%) like ear block, foul smell etc ,are less common .post nasal discharge is seen in 38%,sneezing in 26% with other symptoms.

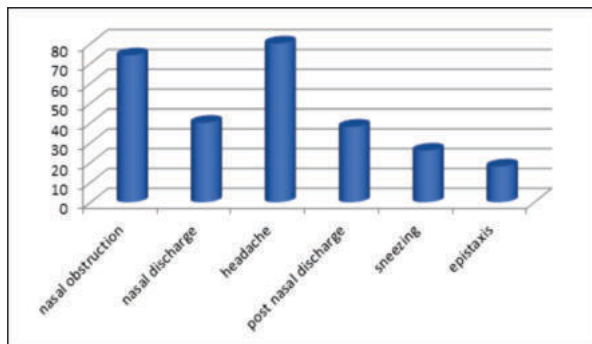


Figure No.3: Bar chart Symptoms

Table 4 :Signs

Signs	Number of patients	Percentage
Nasal mucosa : congested	17	34
Nasal mucosa : pale	13	26
Nasal mucosa : normal	11	22
Nasal mucosa :edematous	9	18
Inferior turbinate :hypertrophy	21	42
Middle turbinate :hypertrophy	17	34
Middle meatus : non purulent	15	30
Middle meatus : purulent	38	76
Nasal polyps	16	32
Sinus tenderness	43	86
Granular posterior pharyngeal wall	31	62

In the present commonest sign is sinus tenderness which is seen in 86% followed by purulent mucous discharge in 76% and granular posterior pharyngeal wall in 62% of patients. hypertrophied middle turbinate is found in 34% whereas non purulent middle meatal discharge is seen in 30% of the patients. other signs like inferior turbinate hypertrophy are seen in 42%,edematous mucosa in 18%,congested mucosain 34% and pale mucosa in 26%,normal mucosa in 22% of patients.

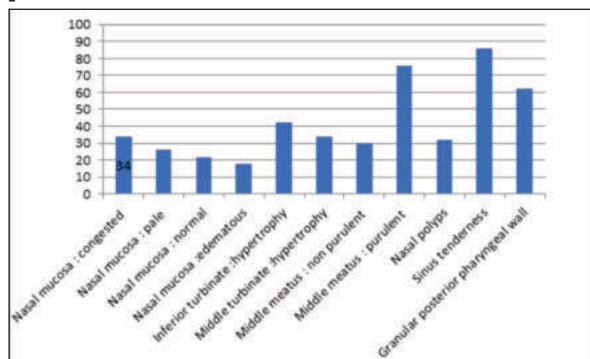


Figure No.4: Bar Chart of signs

Table 5:- Patterns of involvement of various sinus groups shown by CT scan

No of sinuses involved	No.of patients	Percentage
None	1	2
One	20	40
Two	12	24
Three	9	18
Four	8	16

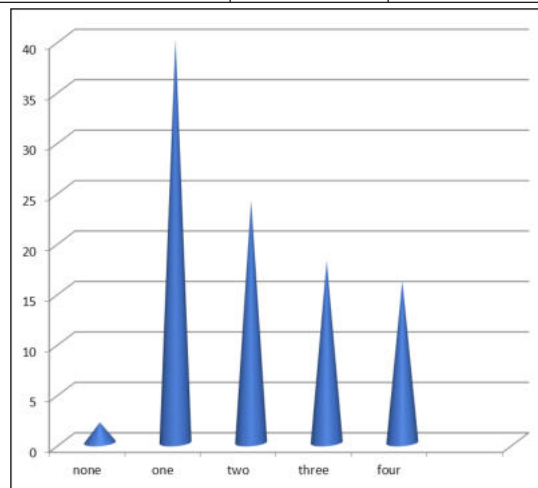


Table 6: Correlation between CT- Scan and FESS in patients with Chronic rhinosinusitis

FINDINGS	FESS POSITIVE		FESS NEGATIVE		KAPPA
	CT Scan positive	CTScan negative	CT Scan positive	CT Scan negative	
Mucosal thickness	28	2	5	15	0.71
Left OMC patency	32	2	0	16	0.86
Right OMC patency	31	3	0	16	0.87
Hypertrophy of inferiorturbinate	32	1	3	14	0.88
Hypertrophy of middle turbinate	7	1	1	41	0.85
Septal deviation	27	4	1	18	0.81
Polyp	8	4	0	38	0.77

Mass	4	0	1	45	0.88
Cyst	6	0	0	44	1
Choanal atresia	0	1	0	50	0
Concha bullosa	4	0	2	44	0.7

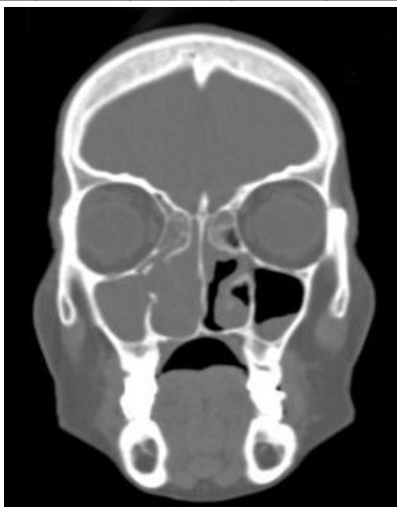


Figure no:5 Coronal and axial CT Scan images showing pansinusitis with right sided sinonasal polyposis

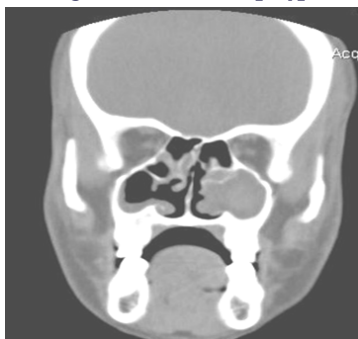


Figure no:6:Coronal CT-PNS Showing left antrochoanal polyp and right maxillary and ethmoid partial sinusitis

DISCUSSION:

Advantages of CT scan are:

To sum up, the CT scan serves as a “road map” for the surgeon as he negotiates the potentially hazardous clefts of the PNS unit. It is a non-invasive, rapid, convenient investigation, which helps in documentation and education. CT scan delineates the extent of disease, anatomical and pathological variations far better than other methods.

Disadvantages of CT scan: -

- Radiation dose to the sensitive areas like cornea and lens is particularly high when axial cuts are taken – nearly 185 times more than that recorded for plain X – rays. Careful positioning of the patient in the scanner can reduce this. Repeated scans causes more exposure to radiations.
- Inability to differentiate between fibrous tissue (post-op) and inflammatory mucosal disease. Thus, CT scan falsely indicates recurrent disease because of the presence of postoperative fibrosis in the PNSs. (i.e, Specificity of CT is lower than the Sensitivity of CT).
- Inability to determine the mucosal conditions of the nasal cavity.
- Relatively expensive investigation.

Common Fess Techniques Used

For the surgical treatment of inflammatory sinonasal disease, FESS has largely replaced more traditional sinus surgery techniques. It is now believed that obstruction of the drainage

portals of the sinuses, particularly the anterior ethmoid, is the primary cause of recurrent sinusitis. The rationale for FESS is that these techniques allow restoration of the flow of sinus secretions through their native drainage portals, allowing the inflamed sinus to return to a normal state, thus hopefully alleviating the patient’s symptoms^{44,45,46,47}.

Comparative findings in CT and FESS of nasal cavity

1. Deviated nasal septum: It is seen in 33(66%) patients on endoscopy and 28(56%) patients on CT scan,



Fig no 7: Coronal ct section showing deviated nasal septum towards left side.

2) Maxillary ostium patency: patency of the maxillary ostium is seen in 33(66%) cases in right and 34(68%) cases on the left on FESS.

On CT scan the present study shows 31(62%) on right and 32(64%) cases on left, has patency.

Comparative findings in CT and FESS in relation to anatomical variant Uncinate process:

Pneumatized uncinata process is seen in 2 cases (4%) on the right and one case on the left on CT scan, while on FESS only 1 case (2%) is seen on the left.

Agger nasi: 8(16%) cases on the right and 14((28%) cases on left were demonstrated with FESS whereas on CT scan shows 15 (30%) on right and 18(36%) cases on the left.

Comparative study of CT and FESS on mucosal changes and other pathological conditions

Inferior turbinate hypertrophy: It is seen in 33 (66%) patients on both right and left on FESS, whereas on CT scan shows 35 (70%) on both the left and right side.



Figure no:8, Right inferior turbinate hypertrophy

- **Hypertrophy of Middle turbinate:** It is seen in 8(16%) cases on FESS & CT scan. The hypertrophy of the middle turbinate is mostly seen in cases with allergy
- **Masses and Cysts:** CT Scan and FESS showed almost similar results
- **Polyp:** It is seen in 12(24%) cases detected on FESS whereas CT scan did not show the findings, thereby showing that FESS is of more diagnostic value in evaluating polyps as mild polyposis could only be seen in

FESS. On CT, only extensive polyposis can be identified.

Mucosal thickness:

Frontal sinus haziness can be better seen in CT scan compared to FESS. Maxillary mucosal thickening noted in 23(46%) cases on CT scans and 20(40%) in FESS. Maxillary mucosal thickening is mostly seen associated with other sinus involvement Anterior ethmoidal and sphenoid sinus haziness is seen in 12 cases (24%) in CT scans and 8(16%) in FESS. Endoscopically, drainage of secretions from the superior or supreme meatus or from the sphenoethmoidal recess may be the only indication of posterior sinus disease.



Figure No 9: Bilateral Concha Bullosa

CONCLUSION

- CT scan has got a better advantage compared to FESS in detecting the anatomical variants as well as to know the condition of the sinus cavity and the extent of disease in sinuses. The study stresses that in all patients with sino nasal disease CT scan has to be done, to know the exact pathology and to plan for FESS if required. CT scan findings are almost similar to the findings of FESS and helps in management and provides “road map” to the surgeons .

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