



## ROLE OF COMPUTED TOMOGRAPHY IMAGING IN EVALUATION OF PATHOLOGICAL LESIONS AND NORMAL VARIANTS OF PARANASAL SINUSES.

**Dr. Pratik R. Tailor**

Resident, Department of Radio-diagnosis, SMIMER Medical College, Surat.

**Dr. Mona D. Shastri**

Professor & Head, Department of Radio-diagnosis, SMIMER Medical College, Surat.

### ABSTRACT

**Background:** forty six patients who were suspected for the paranasal sinus pathologies were taken for this study. Its evaluation and early diagnosis help patients for the further plan of treatment. **Aim:** the aim of this study is to evaluate the role of computed tomography in paranasal sinus pathologies for pre-operative characterization based on location, extent, morphological characteristics and enhancement pattern. **Methods and material:** The study were conducted on 46 patients with complaints related to paranasal sinus who were referred to the department of radio-diagnosis, tertiary care hospital during the period one year. **Results:** various paranasal sinus pathologies ranging from the benign to malignant one were observed which were inflammatory polyp to carcinoma **Conclusions:** Computed tomography is superior in diagnosis over the clinical diagnosis of symptomatic patients and planning of management in paranasal sinus diseases.

**KEYWORDS :** paranasal sinuses, computed tomography, normal anatomical variants, histopathological analysis.

### INTRODUCTION

Pathological lesions of the paranasal sinuses has broad spectrum of conditions which can be any from benign to malignant diseases. These sinuses are in close anatomical relationship with orbit, cranial fossa, pterygopalatine fossa and infratemporal fossa. Hence early involvement of these areas is an important feature for the diagnosis and prognostication of the disease. Since clinical assessment is obscured by the surrounding bony structures which are the boundaries of the various paranasal sinuses, diagnostic radiology has ample role in it. While conventional X-ray demonstrates maxillary and frontal sinus disease they provide limited views of the anterior posterior and middle ethmoid cells, frontal recess and the upper part of the nasal cavity. Computed tomographic imaging provides detailed information of the paranasal sinuses its anatomical variations and pathological conditions and is now it's become the major alternative to plain radiographs of paranasal sinuses. Computed tomography demonstrates the anatomical details, variations and true local extent of the disease, which is essential in choosing the appropriate treatment modality along with the guiding the road map in functional endoscopic sinus surgery.

### AIMS & OBJECTIVES:

- To diagnose accurately the pathological lesions and anatomical variations of the paranasal sinuses.
- To diagnose the site and extension of lesion into the surrounding structures and to assess bony involvement.
- To correlate clinical diagnosis with other modalities along with Computed tomography diagnosis.
- To help the surgeons before functional endoscopic sinus surgery and to avoid known hazards.
- To establish the efficacy of computed tomography in detection and treatment of various paranasal sinus lesions.

### METHODOLOGY

46 patients referred to Department of Radiodiagnosis of SMIMER with clinically suspected paranasal sinus diseases for the study period of 1 year (December 2015 to November 2016). This was the prospective correlational descriptive clinical study carried out on 46 symptomatic paranasal sinus diseased patients who underwent CT paranasal sinuses. The scans were done on the MX 16 slice Philips CT machine.

**TECHNIQUE:** Patient position: Supine for axial lesions and prone for coronal lesions. Angulation: parallel to hard palate for axial sections and perpendicular to hard palate for coronal sections. Thickness: 5 mm for both coronal and axial sections. Extent: Coronal - posterior margin of sphenoid sinus to anterior

margin of nasal fossa and study was done in spiral mode. Axial - hard palate to upper margin of frontal sinus. Exposure: 120-125kVp, 130-140mAs, scan time -1.5 seconds. Bone window : window width-4000 HU, Window level-500HU. Soft tissue window: window width-90HU, Window level- 40HU. Contrast agent :Omnipaque 350 was used if indicated, at a calculated dose as per body weight as a single intravenous bolus injection after serum creatinine level was estimated. Finally clinical diagnosis was correlated with CT diagnosis.

#### • INCLUSION CRITERIA:

All the patients with clinically suspected paranasal sinus diseases.

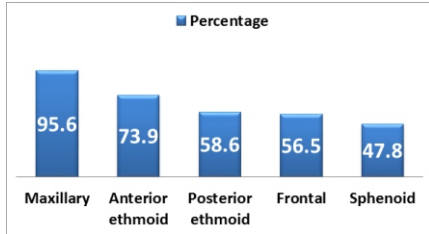
#### • EXCLUSION CRITERIA:

All traumatic conditions requiring paranasal sinus CT. Pregnant females.

#### • RESULTS:

- Out of 46, almost 2/3<sup>rd</sup> of patients were male (65.2%) and 1/3<sup>rd</sup> of patients were female (34.8%). Highest numbers of patients were in the range of 21- 30yrs. Youngest patient was of 9 yrs old and oldest patient was 59 years old. Most of the patients had nasal obstruction (56%) followed by nasal discharge (28%), headache (24%). The least common complaint was sneezing (4%). Deviated nasal septum was seen in 61% of patients with more common to right side. Among the normal variants, concha bullosa was the most common (30%), followed by Haller cells (17%), Onodi cells (9%), prominent agger nasi cells (6.5%), hypoplastic frontal sinus (6.5%).
- Out of 46 were positive cases, most common diseased sinus was maxillary sinus (95.6%), followed by anterior ethmoid (73.9%), posterior ethmoid (58.6%), frontal (56.5%) and sphenoid sinus (47.8%). Most common pathology detected by CT was inflammatory polyp (45.6%). In all these patients, diagnosis was confirmed by HPR. Next common pathology diagnosed by CT was chronic sinusitis (36.9%). Out of which, majority were confirmed as chronic sinusitis and others were diagnosed as fungal sinusitis by HPE. Out of all cases of chronic sinusitis, 2 patient had pansinusitis. Only 1 case of frontal sinus osteoma and one case of brown tumour and one cases of angiofibroma and two cases of papilloma were evaluated. Only 1 case of neoplastic lesion was seen which was proved to be poorly differentiated nasopharyngeal carcinoma by HPE. Biopsies of 46 patients were sent for histopathological examination. Inflammatory polyps were common among them in 21 patients, followed by chronic sinusitis 17 and fungal sinusitis in 3 patients, 1 patient of ethmoid sinus osteoma and 1 patient of brown tumour and 1 patient of angiofibroma and 1 patient of

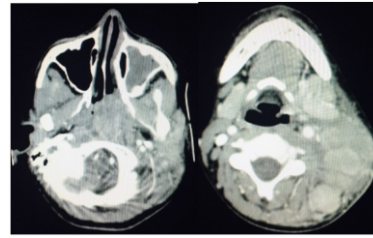
papilloma were evaluated. FESS findings were similar to CT findings in 44 patients and different from CT findings in 2 patient. These different findings were related to fungal disease. After comparing the clinical, CT and final diagnosis, best comparison observed between CT and final diagnosis.



• INVOLVEMENT OF SINUSES(N=46)

**DISCUSSION:**

- Out of 46, almost 2/3<sup>rd</sup> of patients were male and 1/3<sup>rd</sup> of patients were female (34.8%) Highest numbers of patients were in the range of 21- 30yrs. Youngest patient was of 9 yrs old and oldest patient was 59 years old our study findings are similar to Gliklich RE et al. Most of the patients had nasal obstruction(56%) followed by nasal discharge (28%) , headache (24%).The least common complaint was sneezing (4%) these findings are similar to mugdil SP et al.Deviated nasal septum was seen in 61% of patients with more common to right side these findings are similar to maru yk et al.
- Among the normal variants, concha bullosa was the most common (33%), followed by Haller cells (19.5%) , Onodi cells(9%),prominent agger nasi cells(6.5%), hypoplastic frontal sinus(6.5%) , these findings are similar to Tatli MM et al .Most common pathology detected by CT was inflammatory polyp (45.6%) followed by chronic sinusitis (36.9%).In all these patients, diagnosis was confirmed by histopathologically. Out of all cases of chronic sinusitis, 2 patient had pansinusitis with destruction of the walls are seen with expansion of sinuses these findings were similar to the peryguini et al. Only 1 case of ethmoid sinus osteoma and one case of brown tumour and one cases of angiofibroma and two cases of papilloma were evaluated. Only 1 case of neoplastic lesion was seen which was proved to be poorly differentiated nasopharyngeal carcinoma by HPE.
- Biopsies of 46 patients were sent for histopathological examination. Inflammatory polyps were common among them in 21 patients, followed by chronic sinusitis 17 and fungal sinusitis in 3 patients, 1 patient of ethmoid sinus osteoma 1 patient of brown tumour and 1 patient of angiofibroma which arises from the pterigopalatine foramen with intensely enhancing on post contrast study and 1 patient of papilloma were evaluated , its well defined lobulated soft tissue density lesion in the right maxillary sinus these findings were similar to the yung PW et al and wayne scott kubal. FESS findings were similar to CT findings in 44 patients and different from CT findings in 2 patient. These different findings were related to fungal disease.



Large ill defined homogeneously enhancing soft tissue density lesion is seen in the nasopharynx and extending into the bilateral sphenoid sinus through the erosion of floor of the sphenoid sinuses. Multiple homogeneously and heterogeneously enhancing enlarged discrete lymph nodes are seen in left sided level IB,II,III,IV & V . Findings suggestive of NASOPHARYNGEAL CARCINOMA.

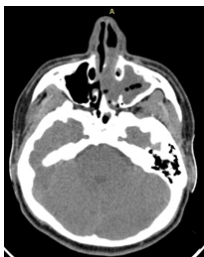
**CONCLUSION**

- Maxillary sinus most frequently involved sinus amongst all and least involved sinus was sphenoid . Most of the patients were in the 2nd and 3rd decades with male preponderance. Most common complaint presented was nasal obstruction and nasal discharge. Fungal sinusitis and dense secretions are potential drawback on computed tomography to differentiate them. Sinonasal polyp was common pattern of inflammation of sinuses. Computed tomography had great results in evaluation of benign and aggressive lesions, which was 98% in this study attributable to the less number of aggressive or malignant lesions studied. Computed tomography is mandatory in assessment of paranasal sinus diseases and to look for any bone erosion or destruction with adjacent structure involvement as clinical assesment of these lesions in patients were not up to that mark. Computed tomography is superior in diagnosis over the clinical diagnosis of symptomatic patients and planning of management in paranasal sinus diseases.

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**IMAGES:**



Hypodense lesion is seen in the left maxillary sinus extending into the left nasal cavity and reaching up to left Choana may represent Antro –Choanal polyp. Mildly dilated nasal septum towards right side.