

A Comparative Study of Computed Tomographic Scan Findings and Operative Findings in Chronic Rhinosinusitis

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Abstract: *Chronic sinusitis affects more than 30 million people each year worldwide. Computed tomography (CT) has become a standard diagnostic tool in the evaluation of paranasal sinuses (PNS), but medical literature lacks studies correlating preoperative CT and intraoperative findings of functional endoscopic sinus surgery (FESS). The aim of our study was to evaluate PNS pathology on multidetector CT (MDCT) and correlate findings of MDCT with intraoperative findings in patients with chronic sinusitis and hence check for its usefulness during surgery.*

Keywords: Computed tomography, Paranasal sinuses, Functional endoscopic sinus surgery, Rhino-sinusitis

1. Introduction

Sinusitis in its simplest form is an inflammation of the mucous membranes of the sinuses[1]. Chronic Rhinosinusitis is one of the most common health care problems with significant impact on patient's general health. Patients present to the otorhinolaryngologist with various symptoms, including post nasal drip, rhinorrhea, blocked nose, itching of eyes and nose, anosmia, headaches and facial pain. CT has replaced conventional radiographs as imaging modality of choice for assessment of paranasal sinus diseases. CT plays an important diagnostic role in patients with sinonasal disease and determines the treatment[2]. CT is the imaging modality of choice since the advent of functional endoscopic sinus surgery[3]. CT Plays an important role in the preoperative evaluation of patients considered for FESS [4]. It is now mandatory and a medico legal requirement to evaluate PNS and nose before FESS, as this provides a "ROAD MAP" to guide the otorhinolaryngologist during surgery and to direct the surgical approach.

CT determines the distribution and extent of disease and detect those anatomic variations (like septal deviation, spur formation, concha bullosa, paradoxical curve of middle turbinate, onodi cell, variety of frontal cells, attachment of uncinate process and middle turbinate etc.) that may place the patients at increased risk for intra operative and postoperative FESS complications and there by reduces the morbidity and mortality of patients[5]. Although MRI provides better visualization of soft tissue than CT, its disadvantage is its inability to optimally display the cortical bone – air interface. Because both cortical bone and air have signal voids, at times, MR cannot be reliably used as an

operative "roadmap" to guide the surgeon during Functional Endoscopic Sinus Surgery.

The present study was undertaken in order to study the prevalence of anatomical variations in sinonasal area and to correlate the anatomical variations in sinonasal area and extent of disease with preoperative CT PNS to intraoperative endoscopic sinus surgery.

2. Aims and Objectives

- To correlate preoperative CT scan findings in patients undergoing endoscopic sinus surgery.
- To study the anatomical variations in paranasal sinuses by preoperative CT scan.

3. Materials And Methods

The study entitled "A Comparative Study of Computed Tomographic Scan Findings and Operative Findings in Chronic Rhinosinusitis" was carried out on 76 patients of chronic rhinosinusitis in radiology department of tertiary care center.

The study was carried out to study anatomical variations and pathology of paranasal sinuses by preoperative CT PNS and to correlate it with intraoperative endoscopic sinus surgery. There was potentially no risk involved to the patient in the study and patient would get benefit by participating in the study like undergoing accurate diagnosis and suitable management for the same.

- Patients with the complaints of Nasal obstruction, nasal discharge, reduced or loss of sense of smell, facial pain, headache.

- They underwent CT PNS (coronal, axial, sagittal cuts) if medical treatment failed.
- Ultimately they underwent functional endoscopic sinus surgery.

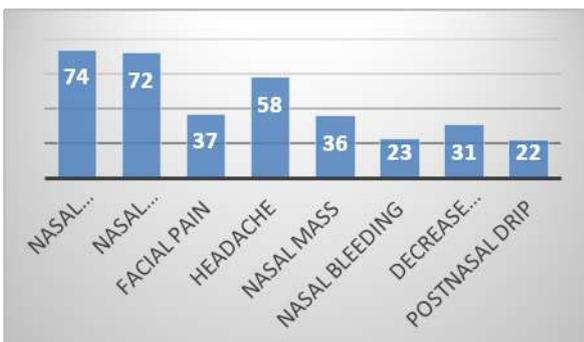
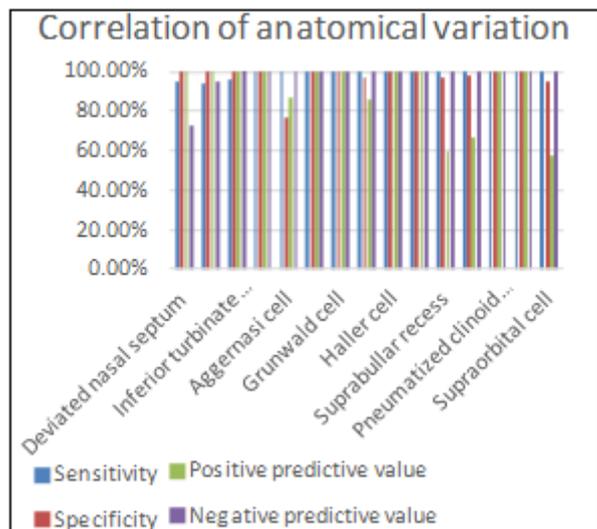
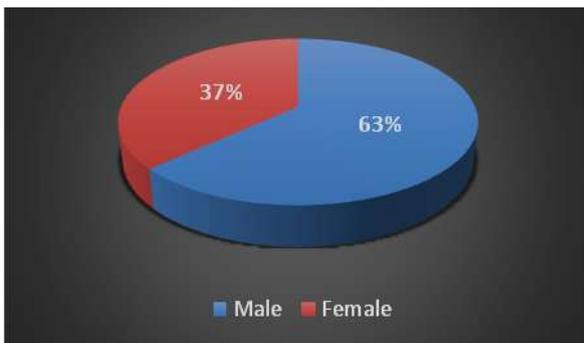
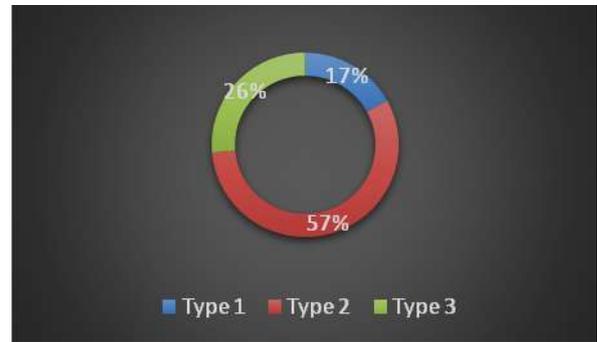
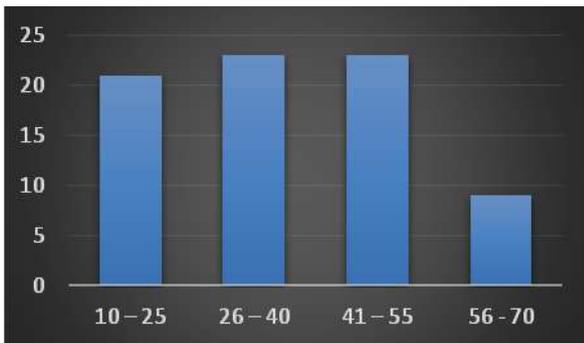
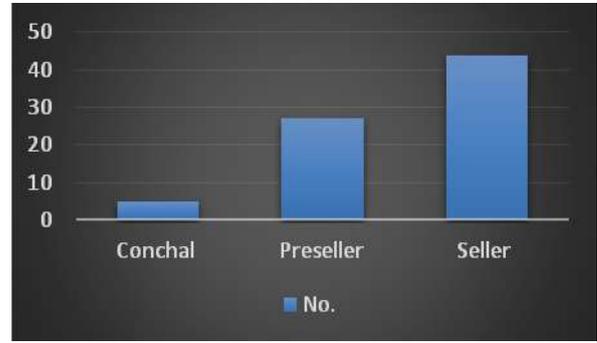
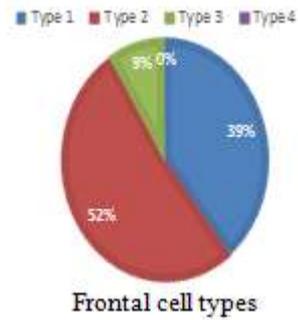
Inclusion Criteria

- All patients proved to have chronic rhinosinusitis not responding to medical treatment and undergoing CT PNS.
- Patients willing for FESS (Functional Endoscopic Sinus Surgery).

Exclusion Criteria

- Patient not willing to provide oral/written consent.
- Patients of facial trauma
- Patients with history of sinonasal surgery
- Patients not willing for surgery
- Patients without fulfillment of inclusion criteria.

4. Statistical Analysis and Result



PNS lesion	Patients
Nasal polyp	88%
Chronic rhinosinusitis	9%
Allergic fungal rhinosinusitis	3%

Anatomical variants	Patients
Deviated nasal septum	89.47%
Concha bullosa	27.63%
Paradoxical middle turbinate	15.76%
Haller cell	17.11%
Onodi cell	21.05%

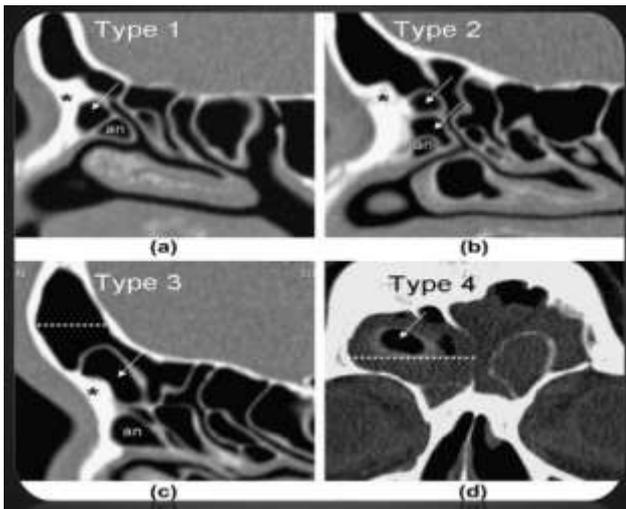


Figure 1: Types of Frontal cells

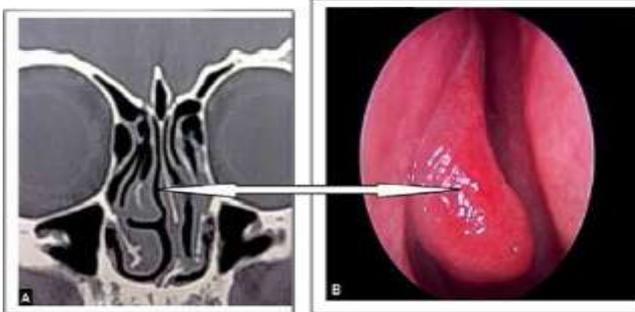


Figure 2: Septal spur

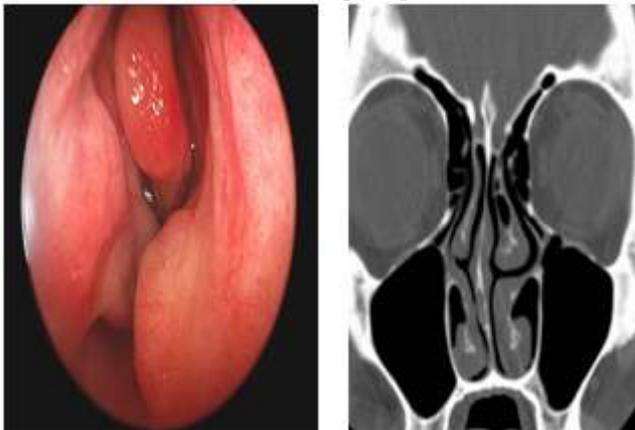


Figure 3: deviated nasal septum



Figure 4: Agger nasi cell

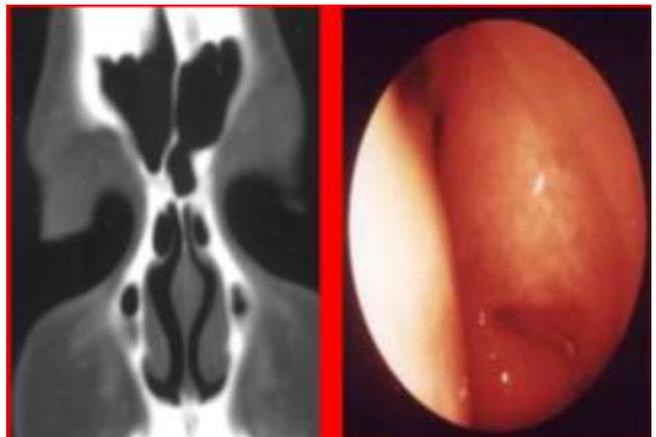


Figure 5: Paradoxical middle turbinate

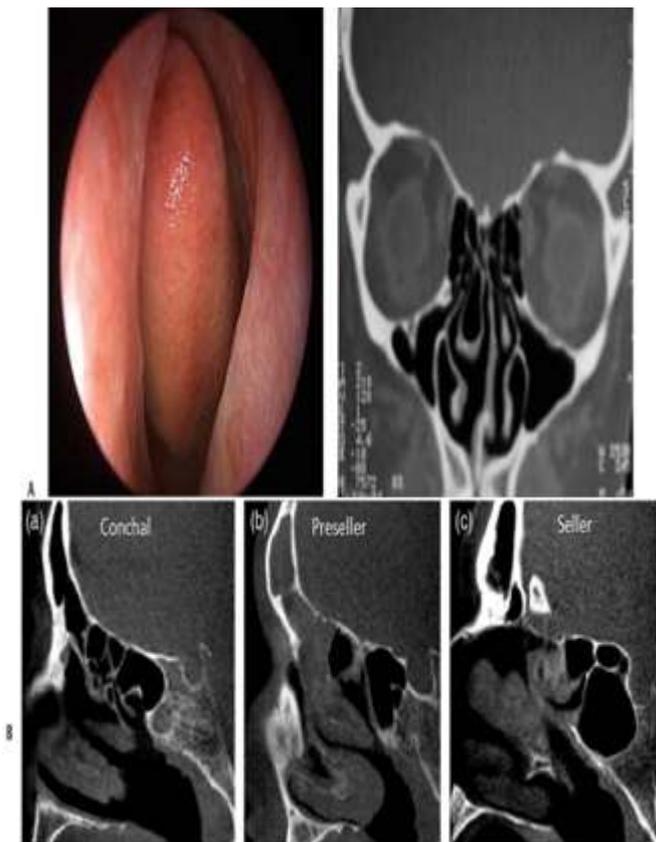


Figure 6: Concha bullosa

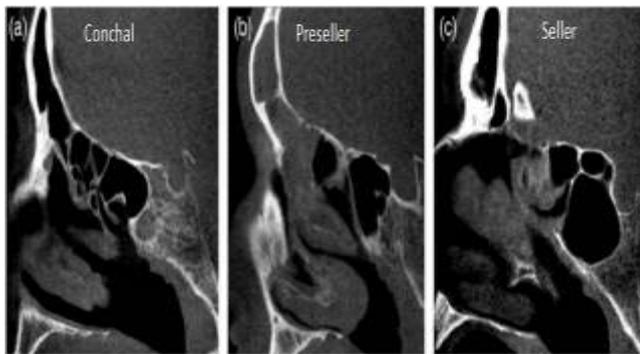


Figure 7: Types of sphenoid pneumatization



Figure 8: Fungal sinusitis

5. Discussion

Chronic Rhinosinusitis (CRS) is a common disorder with significant impact on patient's life [6].

Advantage of CT scan

- It shows progressively deeper structures e.g. uncinate process, bulla ethmoidalis, concha bullosa, ground lamella, sphenoid sinus in an anteroposterior direction [7].
- It shows relationship of the above structures to important areas such as lamina papyracea and skull base.
- Dehiscences of lamina papyracea are better visualized.
- Most of the anatomical details can be seen well in coronal sections.
- Certain structures like the pterygopalatine fossa, fossa of rosenmuller and the optic nerve are better seen on axial scans.
- A sagittal reconstruction allow to study the anatomy of lateral nasal wall like suprabullar recess, retrobullar recess and the region of the frontal recess. Pneumatization of the sphenoid in relation to the pituitary fossa can be studied prior to pituitary surgery in sagittal cut.

The diagnosis of inflammatory sinus disease can often be difficult to be made as the nasal symptoms are neither sensitive nor specific in predicting the underlying pathology. A study was conducted at Chigateri General Hospital and Bapuji Hospital which is attached to J.J.M Medical College, Davangere in Karnataka State. A total of 45 patients were included who had undergone preoperative CT and functional endoscopic sinus surgery thereafter. The results were similar with our study.

6. Conclusion

CT scan is mandatory as a preoperative work up in patients who have to undergo FESS; as it provides a map by the help of which the operation can be done.

CT is the modality of choice to assess the relevant anatomic variations of sinonasal region.

CT is the modality of choice in imaging the paranasal sinuses for evaluating the chronic diseases and associated complications.

CT may help to differentiate between fungal sinusitis and polyp or inspissated pus.

CT is the modality of choice in evaluating the bone erosion or destruction.

CT helps in staging the PNS disease and its extension and involvement of surrounding structures.

CT has very much emerged as the gold standard in preoperative diagnosis and allows for accurate patient selection for FESS.

Excellent depiction of the anatomy of the osteomeatal unit, the bony architecture as well as anatomic variations using high resolution coronal sections of PNS were extremely useful to the surgeons for planning of FESS.

CT scan serves as a road map for the potentially hazardous clefts of the paranasal sinus.

It is non-invasive, rapid, convenient investigation which helps in documentation and education.

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