



Role of Multidetector CT in Evaluation of Paranasal Sinus Pathologies with Histopathology Correlation

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Abstract

Background: Paranasal sinus diseases include a wide spectrum of conditions including inflammatory, non-neoplastic and neoplastic causes with a reported incidence of 1 to 4 % of the population

Aims & Objectives: To assess the role of CT in evaluation of inflammatory sinonasal diseases

Materials and Methods: All Patients referred from Department of Otorhinolaryngology for Paranasal Sinus CT to the Department of Radio diagnosis From December 2017 to October 2019

Results: Sinusitis is the most common pathology detected on CT and on final pathological diagnosis followed by polyp. Acute/chronic sinusitis -100% sensitivity and 79.6 % specificity. Polyps - sensitivity of 70.4% and specificity of 98.2%. Fungal sinusitis- sensitivity of 83.3% and specificity of 100%. Mucocele and rhinosporidiosis was diagnosed with 100% accuracy. Inverted papilloma and carcinoma (poorly differentiated)- specificity 100% for both, sensitivity 66.7% and 75 % respectively.

Conclusion: Pathological diagnosis correlated well with the CT diagnosis, proving that it is an ideal modality to evaluate sinonasal pathologies.

Introduction

Sinonasal imaging has progressed in an orderly fashion as each generation of imaging modality has advanced gradually on domain of the former generation.^[1] Paranasal sinus diseases include a wide spectrum of conditions including inflammatory, non-neoplastic and neoplastic causes with a reported incidence of 1 to 4 % of the population. The radiological evaluation of sinonasal diseases is very essential as the clinical

findings in these cases may be non-specific.^[2,3]

The role of imaging is to document the extent of disease, to answer questions regarding ambiguous cases, and to provide an accurate display of the anatomy of the sinonasal system. The plain films are no longer considered to be a part of the primary imaging armamentarium as they give only an outline of the anatomy and underlying pathology^[4]. CT has become the investigation of choice for radiological diagnosis of nasal and

sinus diseases Computerized tomography (CT) is considered the gold standard for preoperative evaluation of PNS diseases for appropriate patient selection before functional endoscopic sinus surgery (FESS) - providing a "ROAD MAP" for the surgeon^[5] MDCT can show anatomic structures that are not visualised by physical examination or diagnostic nasal endoscopy and is, hence, the study of choice for the surgeon who is considering functional endoscopic sinus surgery^[6] CT is best at defining the complex sinonasal anatomy and anatomic variations that are inaccessible by physical examination or endoscopy because of its 3D high resolution^[7].

Aims & Objectives

- 1) To assess the role of CT in evaluation of inflammatory sinonasal diseases by evaluating the sensitivity and specificity of CT in diagnosis of various inflammatory sinonasal diseases with histopathology correlation
- 2) To study prevalence and pattern of sinusitis in the studied population

Materials and Methods

Study Design

Cross Sectional Design-Diagnostic test evaluation.

Study Setting

Department of Radio diagnosis – Sree Mookambika institute of Medical Sciences

Study Period

From December 2017 to October 2019

Study Subjects

All Patients referred from Department of Otorhinolaryngology for Paranasal Sinus CT to the Department of Radio diagnosis, in the specified time period.

Inclusion Criteria

All patients referred from Department of Otorhinolaryngology for CT Paranasal sinus with follow-up histopathological confirmation from our institution, who will consent for the study.

Exclusion Criteria

All cases of trauma.

Inadequate CT evaluation.

Study sample size: 82

Results and Discussion

Sinusitis is the most common pathology detected on CT and on final pathological diagnosis followed by polyp.

The most common sinus involved was maxillary sinus and the commonest pattern of inflammation was sinonasal polyposis followed by osteomeatal unit pattern

Correlating CT diagnosis with final diagnosis, Acute/chronic sinusitis -100% sensitivity and 79.6 % specificity.

Polyps - sensitivity of 70.4% and specificity of 98.2%.

Fungal sinusitis- sensitivity of 83.3% and specificity of 100%.

Mucocele and rhinosporidiosis was diagnosed with 100% accuracy.

Inverted papilloma and carcinoma (poorly differentiated)- specificity 100% for both, sensitivity 66.7% and 75 % respectively.

Sinonasal Patterns of Inflammation

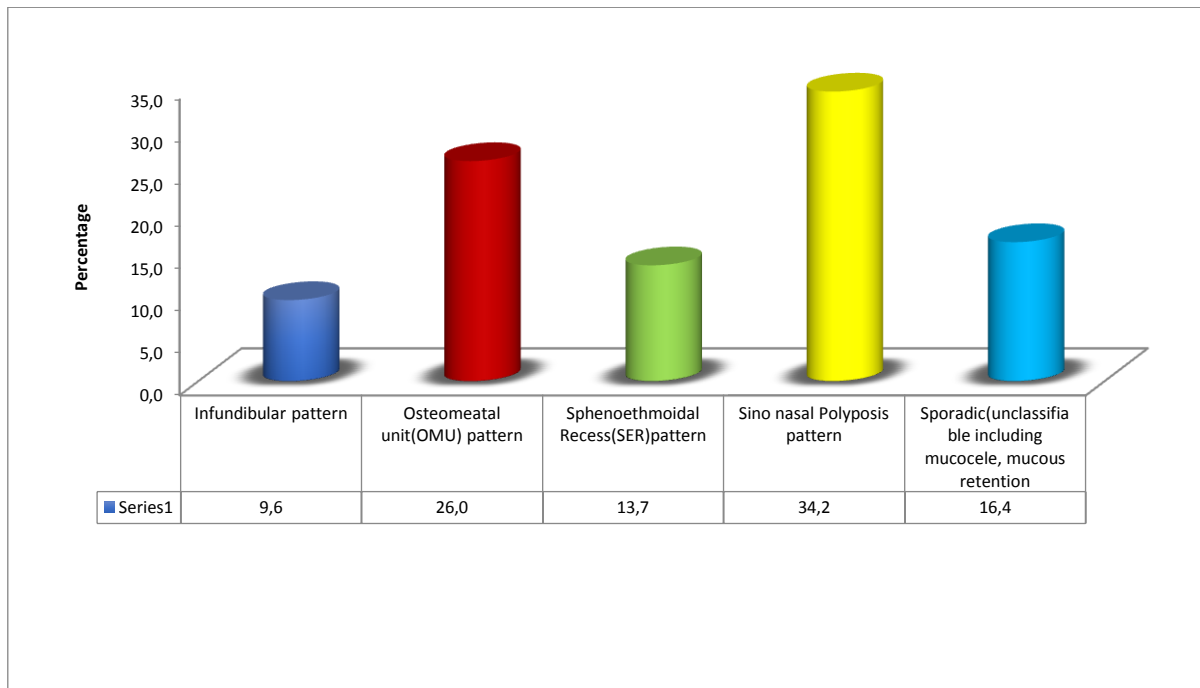
Infundibular pattern in 7(9.6%)

OMU pattern in 19(26%)

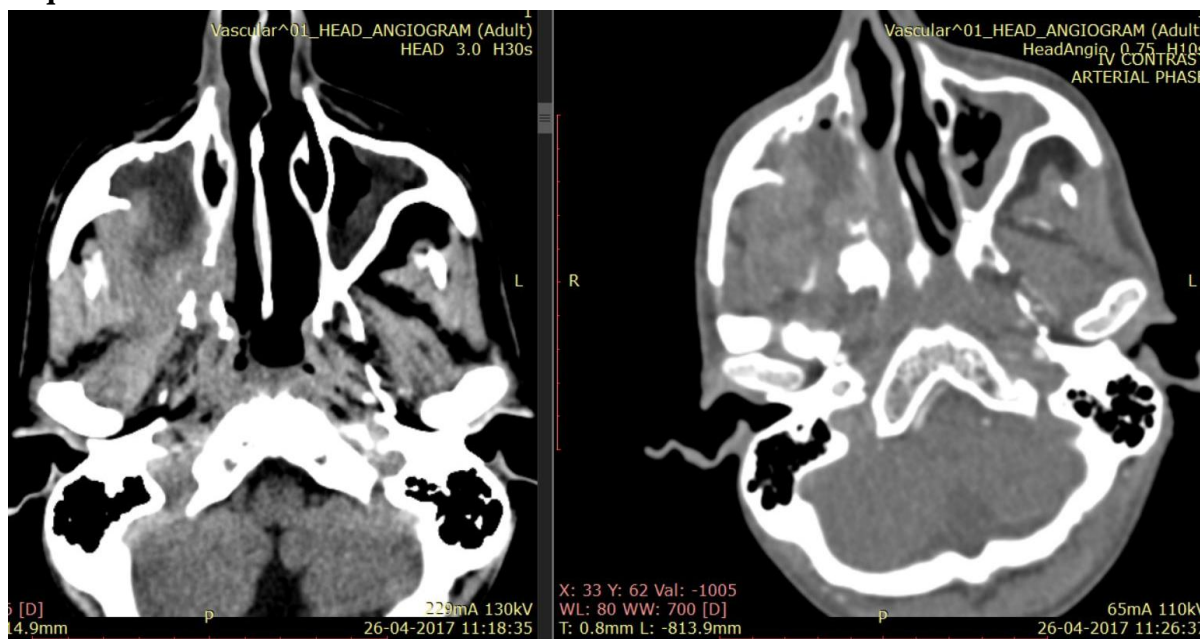
SER pattern in 10(13.7%)

Sinonasal polyposis pattern in 25(34.2%)

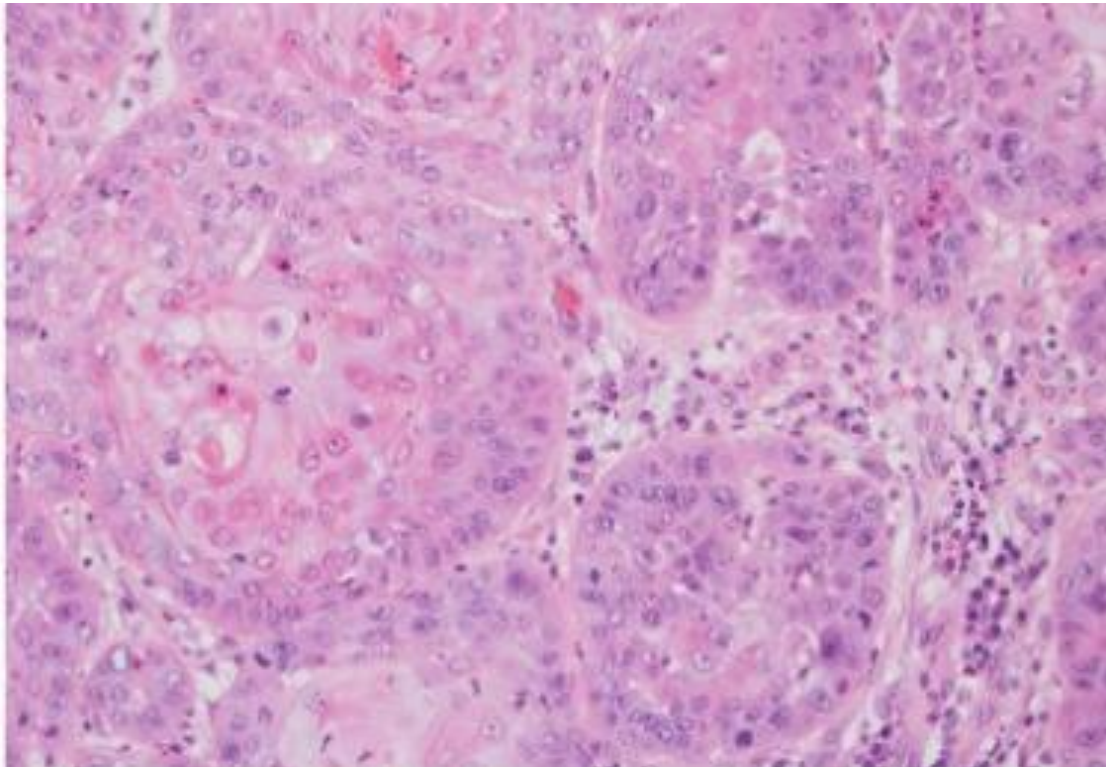
Sporadic or unclassifiable pattern in 12(16.4%)



Case 1- Squamous Cell Carcinoma

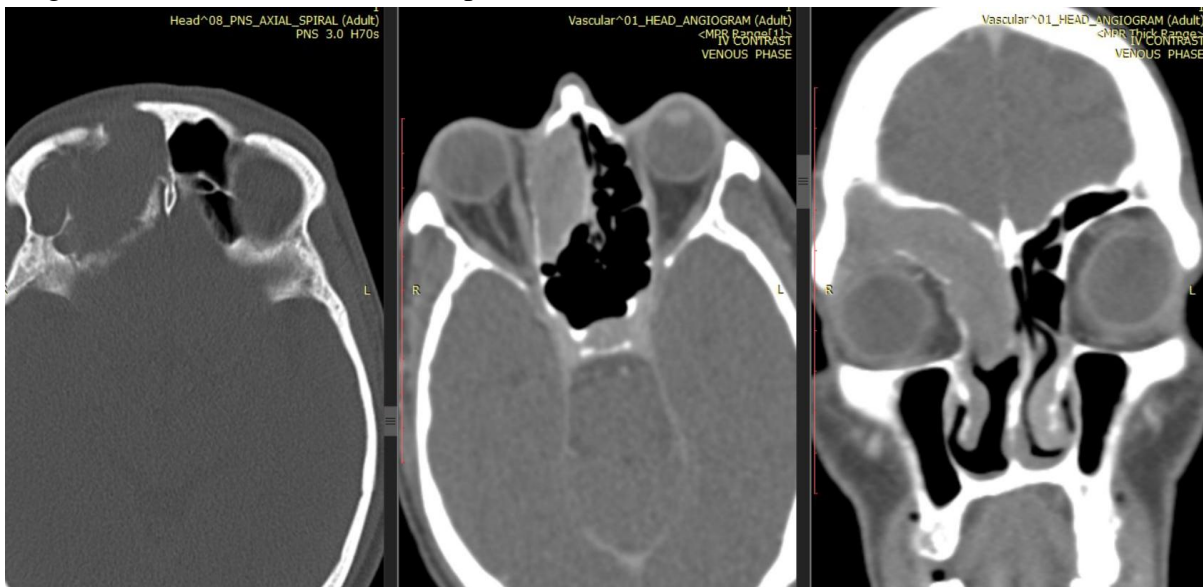


CT plain and post contrast study showing enhancing soft tissue density mass in right maxillary sinus with extension into infratemporal fossa, pterygopalatine fossa, orbit and sphenoid sinus

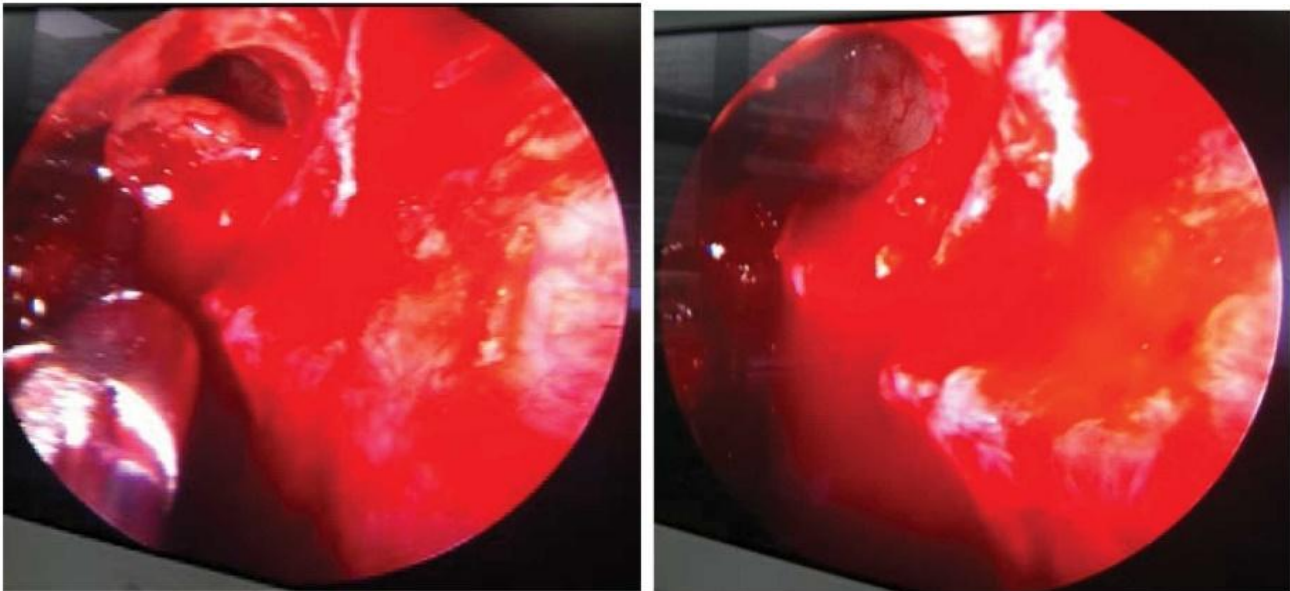


Photomicrograph - High power view showing cells with abundant eosinophilic cytoplasm and foci of keratinization

Case 2- Right Frontoethmoidal Inverted Papilloma



CT plain and post contrast study showing homogenously enhancing soft tissue density lesion causing expansion of the sinus and widening of ipsilateral frontoethmoidal recess and extending into middle meatus. Orbital involvement with destruction of superior and medial walls of orbit.



Endoscopic view of inverted papilloma of frontal sinus-intraoperative and postoperative images

Conclusion

In conclusion, pathological diagnosis correlated well with the CT diagnosis, proving that it is an ideal modality to evaluate sinonasal pathologies.

This study thus proves that CT is an excellent imaging modality for evaluating the normal anatomy, variants, pathologies and associated complications of the paranasal sinuses thus helping the planning and further management of the patient.

References

1. Yousem DM. Imaging of sinonasal inflammatory disease. *Radiology*. 1993;188(2):303–14.
2. Zinreich JS. Functional anatomy and Computed Tomography imaging of the paranasal sinuses. *The American Journal of the Medical Sciences*. 1998;316(1):2–12.
3. Mafee MF. Endoscopic sinus surgery: Role of the Radiologist. *AJNR Am J Neuroradiol*. 1991;12(5):855–60.
4. Fatterpekar G, Delman B, Som P. Imaging the paranasal sinuses: Where we are and where we are going. *Anat Rec*. 2008; 291(11):1564-72.
5. Zinreich S. Rhinosinusitis: Radiologic diagnosis. *Otolaryngology - Head and Neck Surgery*. 1997;117(3):27-34.
6. Miller JC. Imaging for Sinusitis. *Radiology Rounds A Newsletter for Referring Physicians Massachusetts General Hospital Department of Radiology*. 2009;7(8).
7. Momeni AK, Roberts CC, Chew FS. Imaging of chronic and exotic sinonasal disease: Review. *AJR*. 2007;189:S35-S45.