

Parnasal Sinuses Mucosal Thickening: Comparison between Conventional Radiography and Computed Tomography

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ABSTRACT

Objective: To seek comparison between radiographic finding with CT examination of moderate maxillary sinusitis, mucosal thickening in cases with history of recurrent sinunasal disease.

Study design: Convenience sampling.

Settings: This study was conducted in Radiology Department of Jinnah hospital, Lahore which is a tertiary care hospital.

Duration of study: It was completed in three months from 27th January to 26th April 2009.

Subjects and methods: First 75 consecutive patients with moderate maxillary mucosal thickening on plain radiography were evaluated. Computed tomographic findings were recorded in each of the cases.

Results: For maxillary sinus moderate mucosal thickening on plain radiography the negative finding in other sinus can not be relied upon. CT showed findings in such cases like isolated maxillary sinusitis (64%), mucosal thickening only (50.7%), Ipsilateral sinusitis affecting the frontal, anterior and middle ethmoids and the maxillary antrum (36%), posterior ethmoid and sphenoid sinusitis (30.7%), ethmoid polyp (16%) and maxillary polyp (10.7%). Moreover, it is seen that with increasing maxillary mucosal thickening on plain radiography i.e. from 6mm to greater than 8mm, the pattern and frequency of findings on CT also increases.

Conclusion: CT is more conclusive in the paranasal sinus pathology diagnosis as compare to the conventional x-ray radiology.

Key words: Computed tomography, paranasal sinus, mucosal thickening

INTRODUCTION

Radiographic sign of maxillary mucosal thickening is common finding in routine outpatient paranasal sinus x-rays. About 0.5% of common colds are complicated by signs or symptoms of paranasal sinusitis, most often localized to or involving the maxillary sinus.

Sinonasal disease is a common cause of illness in local population due to various allergens and environmental pollution, and is seen on sinus x-rays usually as mucosal thickening. Simplest and least discomfort means of demonstrating acute sinusitis is by radiography. Chronic paranasal sinusitis most frequently overlooked, is a significant source of morbidity and economic loss. Since computerized tomography (CT) is the modality of choice to evaluate chronic sinusitis, it is of great importance to have an idea about extent of usefulness of CT in comparison to radiography.

Recent research on inflammatory sinus disease has implicated a central role for the ethmoid labyrinth, which may influence changes in the maxillary and frontal sinuses. CT scan can provide excellent

definition of the paranasal sinuses and particularly the ethmoids, which is a prerequisite for endoscopic surgery.

Acute sinusitis causes swelling of mucosa, which appears as an opaque rim at periphery of sinus. Recurrent acute sinusitis can lead to chronic rhinosinusitis which presents in certain recognized patterns on CT. Complications of acute sinusitis are chronic rhinosinusitis, osteomyelitis, intracranial abscess and orbital cellulites.

Purpose of this study is to develop a better understanding of x-rays and CT appearances of maxillary sinus mucosal disease. Study will attempt to detect chronic rhinosinusitis and or other complications that could be left undetected in routine radiographic examinations, but are diagnosed on CT.

OBJECTIVE

The objective of this study was to seek comparison between radiographic finding with CT examination of moderate maxillary sinusitis, mucosal thickening in cases with history of recurrent sinunasal disease.

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MATERIAL AND METHODS

Cross-sectional comparative study carried out on 75 cases in Radiology Department of Jinnah Hospital, Lahore from 27th January to 26th April 2009. All young adult patients (18-60 years) with radiographic finding having maxillary sinus mucosal thickening of 6mm or more were selected, having sinunasal illness for more than 21 days. Clinically at least two of the following symptoms must be present in each patient. Nasal blockage, Nasal discharge, Excessive sneezing, Post nasal drip, Halitosis. Patients with known congenital mucocillary disorders like cystic fibrosis, kartagener's syndrome. Immunocompromised patients, Patients on long term use of antihistamines, Post operative patients of nasal diseases, Patients already diagnosed as having neoplastic disease, are not excluded.

CT technique: Coronal sections are used ideally for fully evaluation of the nose and paranasal sinuses, especially as most present-day CT scanners allow post processing reformats for further views in different planes if required. The advent of multislice scanning has enabled the acquisition of a 3D volume block with isotopic voxels. This allows multiplaner reconstruction.

The ideal scan thickness varies from center but prefer to use 3-5mm slice thickness to cover from the anterior margin of the frontal sinus to the posterior margin of the sphenoid sinus. Thinner slice thickness of 2-3 mm reconstructed at 1mm with various

reformat can be utilized when helical CT is available. There is no need for intravenous contrast.

The radiation dose is kept to the minimum by use of low mA with peak kV of 120. Images should be obtained at an intermediate setting of about 2000-2500 HU window width, 200-350 HU window level, as this provides details of bone and soft tissues on a single set of films.

RESULTS

For maxillary sinus moderate mucosal thickening on plain radiography the negative finding in other sinuses can not be relied upon. CT showed findings in such cases like isolated maxillary sinusitis (64%); mucosal thickening only (50.7%); ipsilateral sinusitis affecting the frontal, anterior and middle ethmoids and the maxillary antrum (36%); posterior ethmoid and sphenoid sinusitis (30.7%) ethmoidal polyp (16%) and maxillary polyp (10.7%). Ethmoidal changes were demonstrate in most of the cases with maxillary sinus diseases, therefore, ethmoidal labyrinth may influence changes in other sinuses especially maxillary sinuses.

Moreover, it is seen that with increasing maxillary mucosal thickening on plain radiography i.e from 6mm to >8mm, the pattern and frequency of findings on CT also increases. It means that correlation coefficient (r) is 0.55 in male patients and 0.52 in female patients with 0.60 in all patients. Therefore, it is important to appreciate CT changes of sinusitis.

Table – 1: Distribution of patients according to age and sex (n=75)

Age of patients (years)	Frequency (%)		Frequency (%)
	Male	Female	
<20	4(8.7)	3(10.3)	7(9.3)
20-29	29 (63.0)	15(51.7)	44(58.7)
>30	13 (28.3)	11(37.9)	24(32.0)
Total	46 (100.0)	29(100.0)	75(100.0)
Mean \pm SD	25.72 \pm 4.93	26.31 \pm 6.24	25.95 \pm 5.44

Table – 2: Comparison of maxillary mucosal thickness on plain radiograph with mean number of abnormal findings on computed tomography (male patients only)(n=46)

Axillary mucosal thickness on plain radiograph	(n)	Mean \pm SD	Statistical Test (ANOVA)
6mm	24	1.79 \pm 0.97	F-Statistics = 7.311
7mm	11	1.64 \pm 0.809	p-value <0.01
8mm	4	3.00 \pm 0.000	
>8mm	7	3.29 \pm 0.951	

DISCUSSION

Radiographic sign of maxillary sinus mucosal thickening is common finding in routine outpatient paranasal sinus x-rays. Radiography can improve the diagnostic accuracy of sinusitis and correlate well with sinus aspiration. However, many issues remain unsolved, especially the question of when to order CT

of paranasal sinuses. Some specialist routinely order CT for patients with suspected chronic sinusitis, yet it is unclear how primary care physician should use. This investigation and what role it can play in understanding the disease in local population.

Maxillary sinus is most commonly involved in disease process i.e sinusitis. CT can provide excellent definition of the paranasal sinuses and particularly the ethmoids, which is a prerequisite for endoscopic surgery.

Some studies show that CT findings in chronic rhinosinusitis patients with and without allergy showed maxillary mucosal thickening were significantly more common in allergic chronic rhinosinusitis patients.

This study shows, 75 cases with moderate maxillary mucosal thickening on plain radiography were evaluated. The results were mentioned below. It is important that CT remains the standard modality for diagnosing sinusitis, but MRI frequently is necessary, especially for patients with intracranial complications. Both diagnostic methods have improved the management and outcomes of patients who have sinusitis with complications.

CONCLUSION

Though the plain radiography have primary importance for diagnosis of sinusitis but CT give more accurate detail regarding paranasal sinuses particularly about ethmoids sinuses and complications of sinusitis.

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