Original Article

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Utility of CT Scan in Assessment of Paranasal Sinus Pathology

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Abstract

Background: Paranasal sinuses are a group of four paired air-filled spaces that surround the nasal cavity. The present study was conducted to assess utility of CT scan in assessment of paranasal sinus pathologies. **Subjects and Methods:** The present study was conducted on 96 patients with pathologies of PNS of both genders. All patients were subjected to CT scan using Planmica machine. **Results:** Age group 20-30 years had 32 patients, 30-40 years had 38 patients and 40-50 years had 14 patients and > 50 years had 12 patients. The difference was significant (P< 0.05). Common pathologies were inflammatory seen in 40 patients, sinusitis in 32, neoplastic in 8, polyposis in 6, sinus hypoplasia in 5 and others in 4 patients. The difference was significant (P< 0.05). CT findings were sclerosis seen in 2 benign and 1 malignant lesions, erosions 1 each in benign and malignant, thinning 1 each in benign and malignant and increase sinus size 1 in malignant lesions. **Conclusion:** Authors found that CT scan is useful in assessment of lesions of paranansal sinus. Common pathologies were inflammatory, sinusitis, neoplastic, polyposis and sinus hypoplasia.

Keywords: Computed tomography, Paranasal sinus,Malignant lesions.

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Introduction

Paranasal sinuses are a group of four paired air-filled spaces that surround the nasal cavity. The maxillary sinuses are located under the eyes; the frontal sinuses are above the eyes; the ethmoidal sinuses are between the eyes and the sphenoidal sinuses are behind the eyes. The sinuses are named for the facial bones in which they are located.[1]

Pathologies of sinuses are becoming common nowadays due to various reasons. For the management of diseases affecting sinuses, their basic knowledge about anatomy is must.[2] Sinus surgery is a common procedure which requires a radiological description of the anatomy and its anatomical variations in nose and paranasal sinuses. Diseases of paranasal sinuses (PNS) are a major health problem. Most of the times physical examination is nonspecific and radiological evaluation has been relied on as an aid in confirming the diagnosis.[3] Traditionally, plain radiographs were the modality of choice in the evaluation of paranasal sinuses. In recent years, because of technologic advancements in imaging, CT has supplanted conventional radiography as the primary diagnostic modality and has also contributed in the change in therapeutic approach. Standard plain radiographs still have a limited role in the imaging of the paranasal sinuses and are used as the initial technique before the application of CT. The refinement of CT technology has resolved the traditionally difficult problem of identifying lesions of the paranasal sinuses. It has also allowed improved accuracy in evaluating the soft tissues about the sinuses.[4]The present study was conducted to assess utility of CT scan in assessment of paranasal sinus pathologies.

Subjects and Methods

The present study was conducted in the department of Radiodiagnosis. It comprised of 96 patients with pathologies of PNS of both genders.Ethical clearance was taken before starting the study. They were informed regarding the study and consent was obtained.

Data such as name, age, gender etc. was recorded. All patients were subjected to CT scan using Planmica machine. For direct coronal imaging, the patient was kept in prone position or in supine position with the head of the patient free leading edge of the table of the scanner. The gantry angle used in case of coronal imaging was perpendicular to the plane of hard palate. 3 mm sections from anterior margin of nose to the posterior margin of sphenoid sinus were taken. Results were tabulated and statistically analyzed. P value < 0.05 was considered significant.

Results

Table 1: Distribution of patients of patients

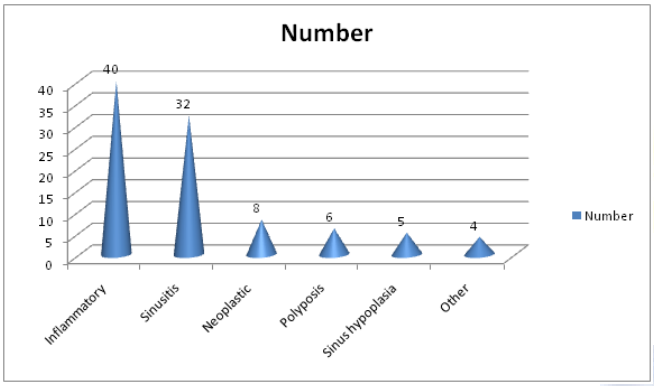
Age group	Number	P value
20-30	32	0.02
30-40	38	
40-50	14	
>50	12	

Table 1 shows that age group 20-30 years had 32 patients, 30-40 years had 38 patients and 40-50 years had 14 patients and > 50 years had 12 patients. The difference was significant (P< 0.05).

Table 2: Pathologies seen with PNS

Pathologies	Number	P value
Inflammatory	40	0.01
Sinusitis	32	
Neoplastic	8	
Polyposis	6	
Sinus hypoplasia	5	
Other	4	

Table 2, graph 1 shows that common pathologies were inflammatory seen in 40 patients, sinusitis in 32, neoplastic in 8, polyposis in 6, sinus hypoplasia in 5 and others in 4 patients. The difference was significant (P< 0.05).

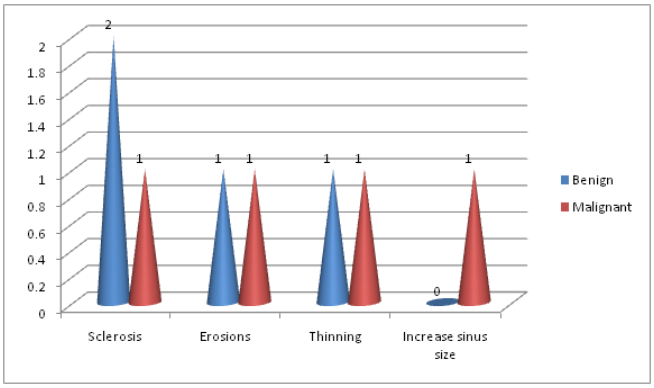


Graph 1: Pathologies seen with PNS

Table 3: CT features of benign and malignant neoplasms

CT features	Benign	Malignant	P value
Sclerosis	2	1	0.91
Erosions	1	1	
Thinning	1	1	
Increase sinus size	0	1	

Table 3, graph 2 shows that CT findings were sclerosis seen in 2 benign and 1 malignant lesions, erosions 1 each in benign and malignant, thinning 1 each in benign and malignant and increase sinus size 1 in malignant lesions.



Graph 2: CT features of benign and malignant neoplasms

Discussion

The function of sinuses are to decrease the relative weight of the front of the skull, regulation of intranasal and serum gas pressures, increasing resonance of the voice, providing a buffer against facial trauma, insulating sensitive structures like dental roots and eyes from rapid temperature fluctuations in the nasal cavity etc.[5]

Their clinical assessment is hampered by the surrounding bony structures hence for confirmation of their diagnosis, the role of radiology is of paramount importance. Imaging of the sinuses is usually done to approve the clinical findings when history and physical examinations are suggestive of PNS lesions, but the patient is not responding to conventional treatment. Plain radiography could not display the three-dimensional structures in a two-dimensional plane. It can provides limited views of the anterior ethmoid cells along with the upper two-thirds of the nasal cavity. Computerized tomography (CT) is considered the gold standard for preoperative evaluation of PNS diseases for appropriate patient selection for functional endoscopic sinus surgery (FESS).[6]The present study was conducted to assess utility of CT scan in assessment of paranasal sinus pathologies.

In our study, age group 20-30 years had 32 patients, 30-40 years had 38 patients and 40-50 years had 14 patients and > 50 years had 12 patients. We observed that common pathologies were inflammatory seen in 40 patients, sinusitis in 32, neoplastic in 8, polyposis in 6, sinus hypoplasia in 5 and others in 4 patients. Bagul et al[7]in their study in a total of 110 patients of varied age group presenting with symptoms and signs of paranasal sinus diseases found that paranasal sinuses pathologies were more common in male (62%) compare to female population (33%). Most common age group affected by the paranasal sinuses pathologies was 11-30 years age group (45.5%) and least common age group was less than 10 years.

We found that CT findings were sclerosis seen in 2 benign and 1 malignant lesions, erosions 1 each in benign and malignant, thinning 1 each in benign and malignant and increase sinus size 1 in malignant lesions. Kanwar et al[8]in their study all patients underwent noncontrast CT (NCCT) of PNSs on multi-detector CT Philips Ingenuity Core 128 multi-slice unit and subsequently underwent functional endoscopic sinus surgery. A maximum number of patients were in the age group of 21–30 years.

Ludwick J[9] found that CT is very useful in depicting sinuses. Moreover it has benefit that it is inexpensive as compared to MRI and provides hard tissue profile better than MRI.Graber et al[10] characterized malignant tumors in paranasal sinuses on CT scan by their nonhomogeneous structure, destructed bony margins of the sinuses and infiltration into neighboring regions. Graber depicted the precise location and

extension of the tumors. Thus, helping in their exact staging and finally in the management of these tumors.

Conclusion

Authors found that CT scan is useful in assessment of lesions of paranansal sinus. Common pathologies were inflammatory, sinusitis, neoplastic, polyposis and sinus hypoplasia.

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