ORIGINAL RESEARCH PAPER
Volume-6 | Issue-9 | September-2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

Role of MDCT in Detection and Evaluation of Lesions of Paranasal Sinuses

Radiology

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ABSTRACT

Title: Role of MDCT in Detection and Evaluation of Lesions of Paranasal Sinuses
Introduction: Paranasal sinus lesions are common and affect a wide range of population with a variety of etiologies. They include a wide spectrum ranging from inflammation to neoplasm, both benign and malignant, many of which have good prognosis on treatment. MDCT imaging provides detailed information of the paranasal sinuses of anatomy and the extent of disease.
Aims: To evaluate the lesions of paranasal sinuses, their origin its extension and spread into adjacent structures. To correlate CT results with histopathological diagnosis and operative findings wherever possible.
Study design: Descriptive study carried out in Dept of Radio-diagnosis of a tertiary hospital over a period of 2 years consisting of 50 patients of paranasal sinus (PNS) pathology. All patients underwent a non contrast CT scan of the PNS, contrast scan was done wherever indicated. The findings of CT scan were documented and compared with the intraoperative or follow up findings.
Results: The most common lesions were of inflammatory origin26 (52%) followed by neoplastic lesions in 19 (38%) patients and trauma in 5 (10%) patients.
Conclusion: Excellent agreement was found in the CT findings and surgical findings in PNS patholgies.

KEYWORDS

MDCT, PNS, sinuses, paranasal

Introduction:
Paranasal sinus lesions are common and affect a wide range of population with a variety of etiologies. They include a wide spectrum ranging from inflammation to neoplasm, both benign and malignant, many of which have good prognosis on treatment. Radiological evaluation has been relied upon to aid in confirming the diagnosis of paranasal sinus pathology for many years.Before the advent of CT (computerised tomography), conventional radiography was the modality of choice for evaluating lesions of paranasal sinuses. Conventional radiography however had inherent limitations. Early lesions were likely to be missed and advanced lesions underestimated. Intraorbital and intracranial involvement could not be assessed well.[1]

CT imaging provides detailed information of the paranasal sinuses and is now well established as an alternative to standard radiographs. CT has the ability to optimally display bone, soft tissue and air. This facilitates demonstration of anatomy and the extent of disease in and around the paranasal sinuses. By the virtue of its speed and isotropic resolution of thin slices, MDCT (Multidetecter computed tomography) offers unique advantages over previous single-detector–row CT, withimproved temporal and spatial resolution. Its applications like volume rendering, surface rendering, MIP (Maximum intensity projection), MPR (Multiplanar reconstruction) and improved resolution it becomes easier for early diagnosis of paranasal sinus lesions and improves prognosis. It clearly depicts the fine bony anatomy of ostiomeatal channels with which the modern surgeon needs to be familiar.[2,3]

Aim and Objectives:
1) To evaluate the lesions of paranasal sinuses, their origin its extension and spread into adjacent structures.
2) To correlate CT results with histopathological diagnosis and operative findings wherever possible.
3) To establish the efficacy of CT in detecting and treatment of various PNS lesions

Material and Methods:
Type of study: This is descriptive study.

Place of study: CT scan section of Department of Radiodiagnosis.

Duration of Study: The study was from Dec. 2012 to Dec. 2014.

Sample size: 50 patients were selected which presented with symptoms and signs of paranasal sinus lesions.

Inclusion Criteria: Clinical history of paranasal sinus lesions such as nasal discharge, nasal obstruction, epistaxis, facial pain, swelling over face. PNS lesions detected on plain radiography. History of facial trauma. Suspected orbital or intracranial complications of PNS lesions.

Exclusion criteria: Pregnant and pediatric patients were excluded from the study.

Machine used: MX-16, MDCT scanner by Philips. Medrad power pressure injector for contrast agent.

Observations and Results:
Table 1: Classification based on Clinical symptoms

SYMPTOMS	NO. OF PATIENTS	PERCENTAGE(%)
Headache	32	64
Nasal discharge	27	54
Nasal obstruction	22	44
Sneezing	8	16
Facial/cheek pain	7	14
Swelling over face/deformity	4	8
Epistaxis	4	8

Table 2: Distribution based on CT findings

PATHOLOGY	NO.OF PATIENTS	PERCENTAGE (%)
Inflammatory	26	52%
Neoplastic	19	38%
Traumatic	5	10%
Total	50	100

Table 3: Distribution of inflammatory lesions of PNS

CT FEATURES	NO. OF PATIENTS	PERCENTAGE (%)
Sinusitis	14	28%
Mucocele	3	6%
Polyps	3	6%
Fungal infections	6	12%
Total	26	52%

Table 4: Distribution of neoplasms

NEOPLASM	No. OF PATIENTS	PERCENTAGE (%)
Nasopharyngeal Angiofibroma	4	8%
Inverted papilloma	3	6%

Osteoma	3	6%
Fibrous dysplasia	1	2%
Haemangioma	1	2%
Squamous cell carcinoma	5	10%
Adenocarcinoma	1	2%
Olfactory neuroblastoma	1	2%
Total	19	38%

Table 5: Distribution of traumatic findings

	NO. OF PATIENTS
Blood in sinuses	4
Fracture of sinus wall	5
Fracture of skull bones	2
Pneumocephalus	1
Intracranial hematoma	1

Discussion:

In the present study an attempt has been made to study the importance of CT in evaluation of lesions of the paranasal sinuses. This includes studying the usefulness of CT scan not only in identifying the lesion but also in delineating the extension of the lesion. The computed tomographic scans of 50 patients who were found to have symptoms and signs suggestive of paranasal sinuses lesions were analysed with available similar studies.

In our study, 26 (52%) patients were diagnosed to have inflammatory sinus disease, out of which 14 had sinusitis, 3 patients had mucoceles, 3 had polyps and 6 had fungal infection. Multiple sinuses were affected in patients of sinusitis and spread to contiguous sinuses was common. Pansinusitis was noted in 2 patients. These patients with inflammatory sinusitis showed mucoperiosteal thickening. These findings were in accordance with Schatz C et al[4] who stressed that normal sinus mucosa is not visualised on the scan. In our study, thin coronal sections were taken in the region of OMU in patients who were to undergo FESS. These were very useful for the exact depiction of fine bony details as well as the anatomic variations and were of great help to the surgeons for planning FESS. This has been documented by HahnelS et al[5].

In our study, 19 (38%) patients were diagnosed to have neoplastic conditions, out of which 7 (36.8 %) suffered from malignant lesions and 12 (63.2%) had benign lesions. Total number of males affected was 13 (68.4%) out of which 4 (30.7%) were diagnosed to have malignant lesions while 9 (69.2%) had benign conditions. Out of 6 (31.6%) females affected, 3 (50%) suffered from malignant conditions and 3 (50%) from benign lesions. The primary sinuses involved in malignancy were maxillary in 4 (66.66%) patients, ethmoid in 1 (16.67%) and frontal in 1(16.67). These findings were comparable with those of Kondo M et al[6] who stated that majority of the (80%) sinus malignancy arise in the maxillary antrum. Histopathological examination of 5 (71.4%) patients showed presence of squamous cell carcinoma, 1(14.3%) patient had adenocarcinoma and 1 (14.3%) had olfactory neuroblastoma with secondary affection of sinuses. These findings were comparable to those of Weber et al[7] and Zbaren P et al[8] who found approximately half of the malignant lesions to be squamous cell carcinoma. Administration of intravenous contrast was useful to show early extension into the infratemporal fossae, intraorbital and intracranial extension. These were in accordance with the findings of Mancuso et al[9].

In our study 5 patients had history of trauma. All 5 patients had fracture of sinus wall. Multiple fractures were common. 4 patients had fresh blood within the sinus with CT value of 50-60 HU. In our study 1 patient had fracture of anterior and posterolateral walls of maxillary sinus. One patient had fracture of anterior and medial wall of right maxillary sinus.One had fracture lateral wall of right maxillary sinus, anterior and posterior walls of right frontal sinus, right frontal and parietal bone, this patients also had pneumocephalus and intracerebral hematoma in right frontal region. Two patients had fracture of anterior and posterior walls of frontal sinus out of which one had associated fracture of roof of orbit right parietal bone . Our findings correlated with those of Pollak[10] who stated that vertical part of frontal bone is particularly vulnerable to blunt trauma. Volume rendered images of the skull and face gave good idea to the operating surgeon about the exact location of the fracture site.

Conclusion:

Multidetector computed tomography of the paranasal sinuses has improved the visualisation of PNS anatomy and has allowed greater accuracy in evaluating paranasal sinus disease.

Bibliography:

1. Zinreinch SJ. Paranasal sinus imaging. Otolaryngol Head Neck Surg. 1990 Nov;130(5 Pt 2):863-8.
2. White PS, Cowan IA, Robertson MS. Limited CT scanning techniques of the paranasl sinuses. The journal of laryngology and otology Jan 1991 Jan;105(1):20-3
3. Dennis K Heffner, Classification of human upper respiratory tract tumors: Otolaryngic Pathology, Armed Forces Institute of pathology, Washington, DC20306:219-29.
4. Schatz CJ, Becker TS. Normal CT anatomy of paranasal sinuses. Radiol Clin N Amer.1984 Mar;22(1):107-18.
5. Hahnel S, Ertl-Wagner B, Tasman AJ, Forsting M, Jansen O. Relative value of MR imaging as compared with CT in the diagnosis of inflammatory paranasal sinus disease.Radiolgy.1999 Jan;210(1):171-6.
6. Knodo M, Horicuchi M, Shiga H, Inuyama Y, Dokiya T, Takata Y et al. Computed tomography of malignant tumors of the nasal cavity and paranasal sinuses. Cancer. 1982 Jul 15;50(2):226-31.
7. Weber AL, Tadmor R, Davis R, Roberson G. Malignant tumours of the sinuses. Radiologic evaluation, including CT scanning, with clinical and pathological correlation. Neuroradiology. 1978 ;16:443–8.
8. Zbaren P, Richard JM, Schwaab G, Mamelle G. Malignant neoplasms of nasal cavity and paranasal sinuses. HNO.1987 Jun; 35(6):246-9.
9. Mancuso AA, Hanafee WN, Winter J, Ward P. Extensions of paranasal sinus tumours and inflammatory diseases as evaluated by CT and pluridirectional tomography. Neuroradiology.1978;16:449-53.
10. Pollak K and Payne EE. Fractures of the frontal sinus. Otolaryngol Clin North Am.1976 Jun;9(2):517-22.