

FREQUENCY OF CARCINOMA MAXILLARY SINUS IN CHRONIC RHINOSINUSITIS ON COMPUTED TOMOGRAPHY

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ABSTRACT

Introduction: Most common disorder of para-nasal sinuses is rhino-sinusitis. It can be acute or chronic. Mostly it is viral, followed by bacterial and fungal. Maxillary sinus carcinoma appears as soft tissue density mass with variable enhancement pattern. CT scan is the gold standard for it and tells about the exact pathology in para-nasal sinuses.

Methods:A cross-sectional study of one year duration (July 2010- July2011) was done on patients referred to the radiology department from casualty. Sample size was 300 patients of all ages selected by non probability consecutive sampling with the exclusion of diagnosed and follow up cases. Data was analyzed in statistical software SPSS using 95% confidence interval.

Results: A mass was diagnosed in 15% of the patients. Of these, 18% patients had supra structure mass, 37% patients had site of the mass in infra structure and in 45% patients site of the mass was both (supra structure and infra structure), in 88% patients mass was heterogeneously hyperdense while in 12% patients mass was heterogeneously hypodense. In 28% patients mass was regular in shape while in 72% patients mass was of irregular shape. In 63% patients, mass was found on right side while in 37% patients, sinus was found on left side. Calcification was found in 28% patients while necrosis was found in 23% patients.

Conclusion: CT imaging has an essential role in the evaluation of a patient with a clinical history of a chronic sinusitis that fails to respond to antibiotic therapy. CT scan is the gold standard for it and tells about the exact pathology in paranasal sinuses. CT scan is readily available and it provides a non invasive, economic and safe imageologic procedure. It can retrieve the defections of nasal endoscopy.

Key Words: Rhinosininitis, Carcinoma, CT scan

INTRODUCTION

Most common disorder of paranasal sinuses is rhinosinusitis. It can be acute or chronic. Mostly it is viral or allergic, followed by secondary bacterial and fungal involvement. On the other hand there is a significant proportion with vasomotor rhinitis, drug induced rhino-sinusitis, nonallergic rhinitis with eosinophilia syndrome (NARES), structural rhinitis, neutrophilic rhinosinusitis and some with nasal polyposis . Patients with sinusitis present a variety of signs and symptoms. These include purulent discharge anteriorly or posteriorly which are believed to be the one of the most significant findings in the diagnosis of rhinosinusitis Maxillary sinus carcinoma appears as soft tissue density mass with variable enhancement pattern. Necrosis and calcification may be present. In 75% cases mass extends into adjacent structures like brain, orbit, other sinuses and nasal cavity with erosions of adjacent bones¹.

The four paired paranasal sinuses (maxillary, ethmoid, frontal and the sphenoid) drain into the

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nasal cavity. While the frontal, maxillary and anterior ethmoid drain through the osteomeatal complex in the middle turbinate, the posterior ethmoid sinuses and the sphenoids drain via the superior turbinate through the sphenoethmoidal recess. For the maxillary sinus the mucociliary activity must drain against gravity. Messerklinger suggested that recurrent sinusitis is often due to a focus of infection that has remained in a stenotic cleft of the lateral wall. These findings let to the understanding that for normal sinus function the patency of the so called "Osteomeatal complex" is critical. Several authors described opacification of the middle meatus and also inflammation in the dependent sinuses in patients with chronic rhinosinusitis^{2,3}. Sinus malignancy is present in approximately 18% of routine chronic rhinosinusitis specimens⁴.

Imaging and nasal endoscopy provide ample diagnosis in case of recurrent rhinosinusitis and extrasinus involvements. The high contrast of CT images clearly shows air spaces, opacified sinuses, and the fine structural architecture of bony anatomy. It is, therefore, the gold standard for delineating inflammatory sinus disease and evaluating mucosal abnormalities, sinus ostial obstruction, anatomic variants, and sinonasal polyps. Multidetector CT (MDCT) allows objective assessment of the patency of intercommunicating passages and shows how anatomic variants, inflammatory disease, or both may affect patency. Anatomic variants that may

predispose to disease include septal deviation, concha bullosa, Haller cells, hypoplasia of the maxillary sinus, and narrowing or obstruction of the osteomeatal complex.³⁹ MDCT can show anatomic structures that are not visible by physical examination or nasal endoscopy and is, therefore, the study of choice for the surgeon who is considering or planning functional endoscopic sinus surgery^{5, 6}.

Surgery and radiation therapy are the main treatments for primary sinus cancer. Patients with advanced disease may be prescribed system chemotherapy⁷. Surgery is often a tricky enterprise because of the tumor's proximity to important nerves, the eyes and brain. Because it is the goal of surgery to remove all disease, leaving normal tissue at the margins, reconstruction of tissues or nerves may be necessary at times. In some cases, a person may need more than one operation to remove the cancer and to help restore the appearance and function of the tissues⁸. A craniofacial resection or skull base surgery may be necessary in paranasal sinus cancer and will require the close cooperation of a neurosurgeon with the head and neck surgeon⁹.

It contributes to a significant amount of health care expenditure due to direct costs arising from physician visits and antibiotics, as well as indirect costs related to missed days at work and a general loss of productivity due to a decrease in life-quality of those affected. The 1996 total direct health care expenditures in the USA attributable to sinusitis were estimated with \$ 5.8 billion. Of this number about 58.7% (or \$3.5 billion) is probably related to chronic sinusitis alone. It is estimated that 13.4 million office visits/year are related to sinusitis and/or its sequelae¹⁰.

MATERIALS AND METHODS

Sampling

A total of 300 patients, visiting the opd of Haya-tabad Medical Complex Peshawar, were included in this cross-sectional study spanning one year duration. Suspects of all ages, both the sexes and with clinical symptoms were included. Pre-diagnosed and follow up cases were excluded to avoid bias. Sampling procedure was simple non probability consecutive sampling. Informed consent from the patient or attendant was obtained. Explanation was given to the patients regarding the nature of the procedure, time consumed, and risk to the patient, data review and publication.

Diagnosis

Diagnostic criteria included CT findings like hyperdense or heterogenous mass within the maxillary sinus involving whole or a part of maxillary sinus, extension into surrounding structures, disruption of normal bony outlines. Standard protocol for CT scan PNS axial and coronal sections was adopted using X-VISION TOSHIBA HELICAL CT SCANNER available in HMC Peshawar. All

the patients with carcinoma maxillary sinus diagnosed on CT were referred for biopsy and result were followed. Data was documented using the attached proforma. Approval from PGMI ethics and research committee was taken.

Data Analysis Procedure

The data was analyzed with the help of statistical programme SPSS, version 10. Mean and standard deviation was computed for numeric variables like age. Frequency and percentage were computed for categorical variables like gender, presence of various clinical features and CT findings, malignancy. All the results were presented in the form of tables and graphs.

RESULTS

Table 1 shows details of mass findings. Site of Mass among 45 (15%) was observed, as in n=8 (18%) patients site of the mass was in suprastructure, in n=17 (37%) patients site of the mass was infrastructure and in n=20 (45%) patients site of the mass was both (supra structure and infra structure). Density of Mass among 45 (15%) was observed as in n=40 (88%) patients mass was heterogenously hyperdense while in n=5 (12%) patients mass was heterogenously hypodense. Shape of Mass among 45 (15%) was observed as in n=13 (28%) patients mass was in regular shape while in n=32 (72%) patients mass was in irregular shape. Sinus involved by Mass among 45 (15%) was observed as in n=28 (63%) patients mass was found on right side while in n=17 (37%) patients mass was found on left side. Calcification was found in n=13 (28%) patients while necrosis was found in n=10 (23%) patients.

Erosions by mass among 45 (15%) was observed as erosion was found in n=33 (73%) patients and was not found in n=12 (27%) patients as is depicted by table 2.

Table 3 shows the frequency of carcinoma maxillary sinus using CT scan. On the bases of CT scan findings, frequency of carcinoma maxillary sinus found in n=45(15%) patients while in n=255(85%) patients there was no evidence of carcinoma maxillary sinus. But the same results were observed in biopsy reports in which the frequency of carcinoma maxillary sinus was found in n=24(8%) patients while in n=276(92%) patients there was no evidence of carcinoma maxillary sinus.

Table 4 depicts the frequency of carcinoma maxillary sinus in chronic rhinosinusitis as diagnosed by biopsy.

DISCUSSION

Most common disorder of paranasal sinuses is rhinosinusitis. Malignancies in chronic rhinosinusitis is about 22% in Pakistan. In paranasal sinuses malignancies five years survival probability is 45%. Malig-

Table 1. Details of mass findings.

Mass Findings		Frequency	Percentage
Site	Supra structure	8	18%
	Infra structure	17	37%
	Both	20	45%
Density	Heterogenous hyperdense	40	88%
	Heterogenous hypodense	5	12%
Shape	Regular	13	28%
	Irregular	32	72%
Sinus In- volved	Right	28	63%
	Left	17	37%
Calcifica- tion	Yes	13	28%
	No	32	72%
Necrosis	Yes	10	23%
	No	35	77%

Table 2. Erosions findings.

Erosions Find- ings	Frequency	Percentage
Yes	33	73%
No	12	27%
Total	45	100%

Table 3. Frequency of carcinoma maxillary sinus in chronic rhinosinusitis on CT Scan

C a r c i n o m a M a x i l l a r y s i n u s	Frequency	Percentage
Yes	45	15%
No	255	85%
Total	300	100%

Table 4. Frequency of carcinoma maxillary sinus in chronic rhinosinusitis according to biopsy reports

C a r c i n o m a M a x i l l a r y s i n u s	Frequency	Percentage
Yes	24	8%
No	276	92%
Total	300	100%

nancies are common in 5th and 6th decades. Computed Tomography is the study of choice for the imaging and evaluation of paranasal sinuses disease. Computed Tomography gives better information about the bony structures and soft parts. Computed Tomography also provides an anatomic roadmap, when surgery is required. Computed Tomography has the capacity to evaluate intracranial extension in case of tumors. In the diagnosis of paranasal sinus carcinoma the gold

standard is Computed Tomography.

In our study site of Mass among 45(15%) was observed as in 18% patients had suprastructure involvement, 37% patients had infrastructure involvement and 45% patients had both suprastructure and infrastructure involvement. Similar results were found in study done by Abdi H et al in which 20% patients had mass in suprastructure, 35% patients had in infrastructure and 45% patients had in both supra structure and infra structure. 12

In our study density of Mass among 45(15%) was observed as in 88% patients mass was heterogeneously hyperdense while in 12% patients mass was heterogeneously hypodense. Similar results were found in study done by Abdi H et al in which in 80% patients mass was heterogeneously hyperdense while in 20% patients mass was heterogeneously hypodense.⁵⁶

In our study shape of Mass among 45(15%) was observed as in 28% patients mass was of regular shape while in 72% patients mass was of irregular shape. Similar results were found in study done by Abdi H et al in which in 22% patients mass was of regular shape while in 78% patients mass was of irregular shape.⁵⁶

In our study sinus involved in Mass among 45(15%) was observed as 63% patients mass was found in right maxillary sinus while in 37% patients mass was found in left maxillary sinus. Similar results were observed in study done by Abdi H et al in which 63% patients had mass on right side while in 37% patients mass was on left side.⁵⁶

On the bases of CT scan findings, frequency of carcinoma maxillary sinus found in to be 15% while more accurate results were observed in biopsy reports in which the frequency of carcinoma maxillary sinus was 8%. Similar results were found in another study

done by Olubunmi et al., (2005) in which frequency of carcinoma maxillary sinus was 18% On CT scan while the frequency of carcinoma maxillary sinus was 6% in biopsy reports¹³

CONCLUSION

CT imaging has an essential role in the evaluation of a patient with a clinical history of a chronic rhinosinusitis that fails to respond to antibiotic therapy. CT scan is the gold standard for it and tells about the exact pathology in paranasal sinuses. CT scan is readily available and it provides a non invasive, economic, anewed and safe imaging procedure. It can retrieve the defections of nasal endoscopy.

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