Section: Miscellaneous

Original Research Article

CLINICAL AND RADIOLOGICAL PROFILE OF PATIENTS WITH PARA NASAL SINUS INFECTIONS: A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Paranasal sinus infections are common conditions encountered in clinical practice and are associated with significant morbidity. Patients commonly present with symptoms such as nasal obstruction, nasal discharge, facial pain, headache and fever. Clinical examination alone may not accurately assess the extent of disease, making radiological evaluation essential for diagnosis and management. Computed tomography (CT) of the paranasal sinuses plays a vital role in identifying sinus involvement and associated anatomical variations. The present study was conducted to evaluate the clinical and radiological profile of patients with paranasal sinus infections. **Materials and Methods:** A hospital based cross sectional study was conducted among patients clinically suspected to have paranasal sinus infections attending the department of otorhinolaryngology in tertiary care hospital. Detailed clinical history and examination findings were recorded using a structured proforma. Radiological assessment was performed using CT scan of paranasal sinuses. Data regarding demographic characteristics, presenting symptoms, sinus involvement and radiological findings were analyzed using appropriate statistical methods. **Result:** A total of 37 patients were included in the study, with male predominance (67.6%). The majority belonged to the 18 -25 years age group. Acute sinusitis was the most common type (59.5%). Nasal obstruction and nasal discharge were the common presenting symptoms. Upper respiratory tract infection was the most common risk factor. X –ray PNS was the most commonly used radiological investigation. **Conclusion:** Paranasal sinus infections are commonly associated with characteristic clinical symptoms and significant radiological abnormalities. CT scan of paranasal sinuses is a valuable diagnostic tool for assessing disease extent and identifying anatomical variations. Early clinical and radiological evaluation can aid in prompt diagnosis, appropriate management and prevention of complications.

INTRODUCTION

Inflammation of the mucous membrane of the paranasal sinuses or underlying bone is known as sinusitis. It can be classified as acute rhinosinusitis, subacute rhinosinusitis, or chronic rhinosinusitis according on how long the symptoms last. A computed tomography (CT) scan of the sinuses without contrast is the preferred imaging method for patients with recurrent acute or chronic sinusitis, Conventional plain radiography offers restricted views of the anterior ethmoidal cells, the top two-thirds of the nasal cavity, and the frontal recess, but it is limited in its ability to show maxillary and frontal sinus disorders.[1]

The human facial bones' paranasal sinuses are hollow, air-filled spaces that play a vital function in lowering the weight of the skull, warming and humidifying the air that is inhaled, regulating the pressure inside the nasal cavity, and capturing dust particles. The maxillary, frontal, and sphenoid sinuses, along with ethmoid cells, are the four combined paranasal sinuses that share many similarities between and among individuals. The paranasal sinus is composed of three main parts: an open sinus drainage hole called the sinus ostium, thin

natural mucus secretions, and typically functioning hair-like cilia that exchange mucus out of sinuses.[2] Mucor, rhizopus, reconductor, and aspergillus are common causative species of acute fungal infections, which are uncommon but more common in immunocompromised people. There is aero-sinusitis Diabetes mellitus, swimming, diving, high altitude, climbing, dental infections and surgeries, trauma, and barotraumas are risk factors following fights. As a clinical picture, the local cardinal aspects include nasal discharge, nasal blockage, facial pain, and facial pressure, while the general symptoms include fever, headaches, anosmia, and auditory fullness. The symptoms include post-nasal discharge, purulent discharges in the nasal cavity, discomfort behind the eye to pressure on the eye, pain to pressure on the cheek, tenderness to pressure and percussion of the sinuses, and occasionally proptosis.[3]

Because of its greater soft-tissue resolution and lack of ionizing radiation, magnetic resonance imaging (MRI) has emerged as a desirable addition to computed tomography (CT). MRI is highly effective in visualizing soft tissues and identifying anatomical variations of the paranasal sinuses.

Additionally, it is quite useful for identifying and classifying inflammation and sinus masses. When evaluating paranasal sinus disorders, CT is frequently the preferred imaging modality. However, its use has been justified for patients with complicated infections, invasive fungal infections, and soft tissue masses of the sinuses due to the greater diagnostic value of MRI in the differential diagnosis of cysts and soft tissue masses compared with CT.[4]

Chronic conditions that may be bacterial, fungal, allergic, or mitotic can affect the paranasal sinuses. The sinus can be assessed and a diagnosis made using a variety of methods, including plain x-rays, sinoscopy, tomograms, ultrasonic scans, CT scans, and magnetic resonance imaging. In this setting, ordinary x-rays continue to be the most affordable and accessible form of inquiry. It has the benefit of less radiation than CT scans, but its resolution is not as good as that of MRIs or CT scans.[5]

MATERIALS AND METHODS

A hospital-based cross-sectional study was conducted to assess the clinical and radiological profile of patients with paranasal sinus infections attending the Department of Otorhinolaryngology in a tertiary care hospital. The study was carried out in the Department of ENT in government medical college Jagdalpur Chhattisgarh over a period of 6 months from October2025 to March 2026. Written informed consent was obtained from all study participants before data collection. All patients clinically suspected to have paranasal sinus infections and fulfilling the inclusion criteria during the study period were included in the study. A total of 37 patients were included in the study using convenient sampling method. After obtaining informed consent, detailed demographic information including age and gender was recorded. Clinical history regarding symptoms, duration of illness, and associated complaints was obtained using a predesigned structured questionnaire. General physical examination and ENT examination were performed in all patients. Radiological evaluation was done using computed tomography (CT) scan of paranasal sinuses in axial and coronal sections.

Inclusion Criteria

- Patients aged above 18 years.
- Patients presenting with symptoms suggestive of paranasal sinus infection.
- Patients willing to participate in the study.
- Patients who underwent CT scan of paranasal sinuses.

Exclusion Criteria

- Patients with history of facial trauma.
- Patients with sinonasal malignancy.
- Patients with previous sinonasal surgery.
- Patients with congenital nasal anomalies.

Statistical Analysis

The collected data were entered into Microsoft Excel and analyzed using SPSS version 25.0. Categorical variables were expressed as frequencies and percentages. Continuous variables were expressed as mean and standard deviation. Association between clinical and radiological findings was analyzed using Chi-square test. A p-value of <0.05 was considered statistically significant.

RESULTS

Table 1: Age and sex distribution of study subjects.

Age (years)	Males	Females	Total (%)
18 - 25	12	05	17(45.9%)
26 - 35	06	04	10(27.0%)
36 - 45	07	03	10(27.0%)
Total	25	12	37(100%)

[Table 1] shows age and sex distribution of study subjects. The majority of study participants belonged to the 18 – 25 years age group (45.9%). Male patients (67.6%) were more commonly affected compared to female patients (32.4%).

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Table 2: Distribution of types of sinusitis among study participants

Types Of Sinusitis	Frequency(N)	Percentage (%)
Acute Sinusitis	22	59.5%
Chronic Sinusitis	08	21.6%
Allergic Sinusitis	06	16.2%
Fungal Sinusitis	01	2.7%
Total	37	100

[Table 2] shows the distribution of types of sinusitis among study participants. Acute sinusitis was the most common type observed among the study participants accounting for 59.5% of cases, followed by chronic sinusitis (21.6%) and allergic sinusitis (16.2%).

Fungal sinusitis was least common, seen in 2.7% of patients.

Table 3: distribution of clinical symptoms among study participants

Clinical Symptoms	Frequency (N)	Percentage (%)
Nasal Obstruction	30	81.1%
Nasal Discharge	28	75.7%
Headache	24	64.9%
Facial Pain	20	54.1%
Fever	12	32.4%
Postnasal Drip	10	27.0%
Hyposmia/ Anosmia	08	21.6%

[Table 3] shows distribution of clinical symptoms among study participants. Nasal obstruction was the most common presenting symptom observed among the study participants, followed by nasal discharge and headache. Facial pain and fever were also commonly reported symptoms.

Table 4: distribution of risk factors associated with paranasal sinus infections

Risk Factors	Frequency(N)	Percentage (%)
Upper Respiratory Tract Infections	15	40.5%
Allergy	10	27.0%
Smoking	06	16.2%
Deviated Nasal Septum	05	13.5%
Dental Infections	01	2.7%

[Table 4] shows distribution of risk factors associated with paranasal sinus infections. Upper respiratory tract infection was the most common risk factor associated with paranasal sinus infections, observed in 15(40.5%) patients, followed by allergy in 10(27.0%) patients. Smoking and deviated nasal septum were present in 6(16.2%) and 5 (13.5%) patients respectively, while dental infection was the least common risk factor seen in 1 (2.7%) patient.

Table 5: radiological findings among study participants

Radiological Investigation	Frequency(N)	Percentage (%)
X- Ray PNS	37	80.4%
Ct Scan PNS	08	17.4%
MRI	01	2.2%

[Table 5] shows radiological findings among study participants. X- ray PNS was the most commonly performed radiological investigation among the study participants accounting for 37 (80.4%) cases, followed by CT scan PNS in 8 (17.4%) patients. MRI was the least commonly used investigation and was performed in 1(2.2%) patient.

DISCUSSION

Rhino sinusitis significantly affects the patient's quality of life and has a considerable impact on psychological wellbeing and daily activities. As the male-to-female ratio approached unity, no significant gender difference was observed in the study. Similar findings of a slight male predominance were reported by Fasulna et al. (2011) in Southwest Nigeria and Ahmad et al. (2004) in Northeastern Nigeria. Only twenty patients underwent computed tomography (CT) scan of the paranasal sinuses prior to surgery. CT imaging plays a vital role in the evaluation of patients with chronic rhinosinusitis. However, in resource-limited countries, the high cost of this investigation may limit its accessibility for many patients.[6]

The first radiologic finding of a doubledensity appearance of the maxillary antrum caused by the deposition of calcium salts, such as calcium phosphate and calcium sulfate, was reported by Stammberger et al. This finding was pathognomonic for fungal rhinosinusitis. A study by Killeen et al. found that allergic fungal mucin was typically more radiodense and that fungus balls had higherdensity and more diverse components on radiography. In half of our cases, similar results were observed. Mucor was the most often isolated species in our

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investigation, although Chakrabarti et al. in north India discovered that Aspergillus was the most frequent cause
Of fungal rhinosinusitis.The most frequent side effects of fungal rhinosinusitis were orbital pain, cranial neuropathy, and vision loss, according to Cho et al.[7]
Headache was the most common presenting complaint (67.7%), followed by nasal discharge (40.8%), nasal obstruction (42.3%), facial pain (33.8%), and others (37.7%). Similar results were also reported by Kushwah et al, Asruddin et al, and Dewan et al. They all came to the conclusion that the most common presenting
ailment was a headache. The most often affected sinus in the current study was the maxillary sinus (83.5%), which was followed by the ethmoid (74.7%), sphenoid (43.9%), and frontal (54.9%). Similar findings were reported by Kushwah et al, Chaitanya et al., Zinreich, Bolger, and Maru and Gupta.[8]
Computed tomography plays a crucial role in differentiating invasive from noninvasive fungal sinusitis by demonstrating characteristic radiological features. Early radiological diagnosis aids in timely treatment and helps prevent disease-related complications. Similar observations were reported by Aribandi et al., who highlighted the value of CT imaging in assessing the extent and pattern of sinus disease.[9]
Radiological imaging, particularly CT scan, is considered the investigation of choice in evaluating paranasal sinus infections and their complications. The findings of the present study are in accordance with Mafee et al., who reported that CT imaging accurately demonstrates mucosal thickening, sinus opacification, and anatomical variations associated with rhinosinusitis.[10]
In the study, nasal obstruction and nasal discharge were the predominant symptoms among patients with paranasal sinus infections. Comparable observations were made by Ahmed et al., who reported that these symptoms were the leading clinical manifestations in patients with chronic rhino sinusitis.[11]

CONCLUSION

Paranasal sinus infections are commonly associated with symptoms such as nasal obstruction, nasal discharge, headache and facial pain. Radiological evaluation, especially CT scan of paranasal sinuses, plays an important role in identifying the extent of disease and associated anatomical variations. The present study demonstrated a significant correlation between clinical presentation and radiological findings among patients with paranasal sinus infections. Early clinical assessment along with appropriate radiological evaluation can add in accurate diagnosis, timely management and prevention of complications.

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