



Original Article

Pathologies of Paranasal Sinuses Diagnosed on Computed Tomography

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ABSTRACT

The pathological and physiological changes of the paranasal sinus are advanced. The paranasal sinuses are present as paired, air-filled chambers. Symptoms of paranasal sinuses include nasal obstruction, fever, nasal discharge, and swelling. The most common site of PNS pathologies is the maxillary sinus. Computed tomography aids in the diagnosis and provides a detailed image of PNS. **Objective:** To evaluate the most common occurring pathology of the paranasal sinus using Computed Tomography. **Methods:** It was a cross-sectional study that was collected from the Radiology Department of Aziz Bhatti Shaheed Hospital Gujrat' Pakistan from October 2022 to January 2022. The data was collected using simple random sampling and the sample size was collected from patients. The sample size collected was 83. The patients of the age group 10-60 were included in this study. The paranasal sinuses pathologies were diagnosed on a CBCT scan. Data were collected with the help of SPSS 20.0. **Results:** Out of 83 patients in which 45(54.2) are female and 38(45.8) are male. The most common disease is sinusitis. 22(26.5) patients represent Nasal obstruction, 19(22.5) with nasal discharge (22.9) and, 14(16.9) with swelling. The maxillary sinus is the most common site for PNS pathology. **Conclusions:** The patient of age group 30-45 is most suffering from PNS disease. The most common disease is the site. The CT scan provides high-quality Para nasal sinuses to aid accurate diagnosis of a patients suffering from a variety of Paranasal sinuses pathologies.

INTRODUCTION

The paranasal sinuses are found as paired, air-filled chambers surrounding the nasal cavity [1]. The maxillary sinus, ethmoid sinus, frontal sinus, and sphenoid sinus are present in the form of pairs [2, 3]. Nasal sinuses pathologies are common nowadays. Any pathogenic changes affecting the nasal mucosa may spread to the PNS [4]. Most people with the common cold exhibit nasal discharge, nasal blockage, headache, and nasal allergy symptoms, among others [5]. Pathological changes of paranasal sinuses involve numerous different disorders leading from inflammation to lesions that may be benign or malignant [6]. Computed tomography is the GOLD standard diagnostic test for the evaluation of paranasal sinuses pathologies [7, 8]. Computed tomography aids in the

diagnosis and provides information by displaying great anatomical soft tissue and bone features [9]. According to clinical opinion, sinus CT imaging is necessary for related problems such as headache, face discomfort, edema, or cranial nerve palsies and diagnoses the proper disease [10]. Computed tomography is a very appropriate modality for identifying diverse paranasal pathologies [11]. According to the National Population, Health Survey males had a higher prevalence of paranasal sinus diseases than females [12]. The patients of the age group 16-30 were included in this study. Paranasal inflammation is widespread among Pakistanis, particularly those living in Karachi, which has high pollution and humidity levels [13]. In the United States, an estimated 35,000,000 people

suffer from sinusitis each year [14]. Nearly 4 out of 5 individuals with nasal or PNS cancer in the US [15]. Plain radiography is not reliable for complex structures like paranasal sinuses. Paranasal inflammation, acute sinusitis, chronic sinusitis, benign and malignant lesions, Antrochoanal polyps, mucosal myeloma, and viral and fungal allergy [16, 17]. The major cause of paranasal pathological changes is infection that may be viral, fungal, or bacterial [18]. A patient's dentition pathological is also the reason for paranasal sinuses pathologies [15]. Reduced oxygenation, mucosal thickening, and soft tissue masses are all indications of paranasal sinus illness. The typical symptoms of a paranasal tumor may include facial deformities, edema, or recurrent epistaxis [5]. The most prevalent pathology is sinusitis 41% while the least common is osteoma 1.5% [19, 20]. The paranasal disorders most commonly impacted the age range from 16-30 years old [21]. The study aims to show the importance of CT scans in the diagnosis of various paranasal pathologies. It helps with proper visualization of the site of inflammatory or newly formed tissues in the PNS. This study is liable to compare the diagnostic usefulness of clinical diagnosis and sinus radiography for diagnosing paranasal sinus disorders in the clinical setting using sinus CT [22]. The purpose of this study is to raise awareness of the importance of CT scans for diagnostic purposes. This study will help radiologists to understand the differences between PNS diseases and the number of patients suffering from PNS pathologies. It helps to evaluate the role of computed tomography in the evaluation of paranasal sinuses diseases.

METHODS

It was a cross-sectional study that was collected from the radiology department of Aziz Bhatti Shaheed hospital Gujrat' Pakistan from October 2022 to January 2022. The data were collected using simple random sampling and the sample size was collected from patients. The sample size collected was 83. The patients of the age group 10-60 were included in this study. The paranasal sinuses pathologies were diagnosed on a CBCT scan. The patient was positioned lying flat on the back and also positioned face down with the chin elevated. The direction of the scan was caudocranial. The coronal and sagittal images were taken. Data were collected with the help of SPSS 20.0.

RESULTS

The sample size of 83 patients were added to this study with paranasal sinuses pathologies. Figure 1 shows that the age group of 31-45 has the highest frequency of 29 (34.9) following the age group 46-60 has a second higher frequency of 28 (33.7). The age group under 15 has the lowest frequency of 9 (10.8).

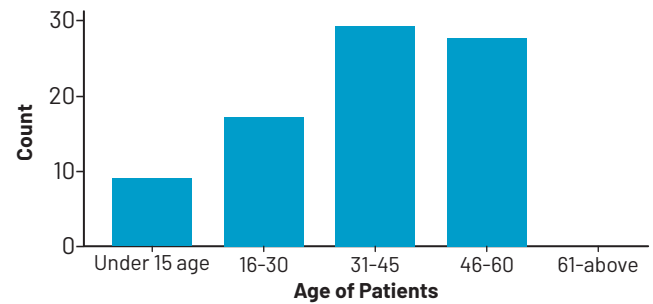


Figure 1: Age of patients

In figure 2, the percentage of gender is described as the female has the highest frequency of 45 (54.2) suffering from paranasal sinus diseases. The frequency of males is lower of 38 (45.8) out of 83 (100).

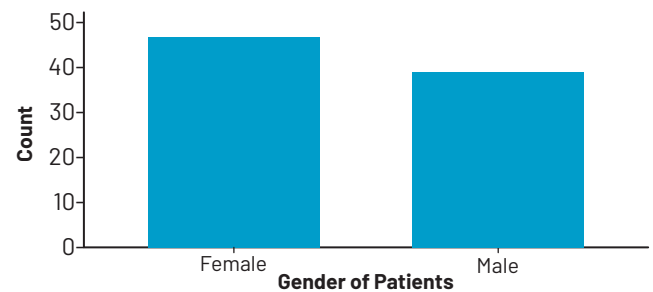


Figure 2: Gender of patients

Figure 3 describes the signs and symptoms of patients with PNS pathologies. The frequency of nasal obstruction is higher at about 22 (26.5). The other common symptom of PNS pathologies is nasal discharge with a frequency of 19 (22.9). The frequency of patients with swelling is 14 (16.9). All of the symptoms in patients are less common with a frequency of 7 (8.1).

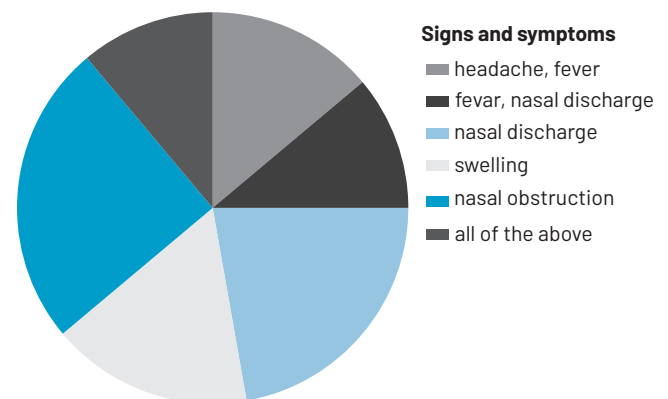


Figure 3: Sign and symptoms of patients

Table 1 describes the CT findings with the percentage frequency. The soft lesions have higher frequency of 40 (48.2) and the patient with Bony intact has a lower frequency of 11 (13.3).

CT Findings	Frequency (%)
Bony intact	11(13.3)
Soft lesions	40(48.2)
Both	7(8.4)
None	25(30.1)
Total	83(100)

Table 1: CT Findings

Table 2 describes the sites of lesions. The maxillary sinus is the most common site of lesions with a frequency of 35(42.2). The frontal sinus 11 and the scaphoid sinus 10 have the almost same amount of frequency with a difference of 1. The less common site of lesion is the scaphoid sinus of frequency 10(12.0).

Sites of lesions	Frequency (%)
Maxillary sinus	35(42.2)
Frontal sinus	11(13.3)
Ethmoid sinus	16(19.3)
Scaphoid sinus	10(12)
All sinuses	11(13.3)
Total	83(100)

Table 2: Sites of Lesions

Table 3 describes the diseases of PNS. The most common pathology of PNS is Sinusitis 37(44.6) following polyps 17(20.5), rhinosinusitis 7(8.4), Tumor 4(4.8) and fungal sinusitis 2(2.4).

Diseases of PNS	Frequency (%)
Normal	16(19.3)
Sinusitis	37(44.6)
Polyps	17(20.5)
Rhinosinusitis	7(8.4)
Tumor	4(4.8)
fungal sinusitis	2(2.4)
Total	83(100)

Table 3: Diseases of PNS

Table 4 describes the types of lesions, the bilateral lesions are common with a frequency of 48(57.8) and unilateral with a frequency of 20(24.1).

Types of Lesions	Frequency (%)
unilateral	20(24.1)
Bilateral	48(57.8)
None	15(18.1)
Total	83(100)

Table 4: Types of Lesions

DISCUSSION

The objective of the current study was to characterize the PNS pathologies using CT scans. A higher frequency of PNS diseases was noted in females in the age group of 31-42 than in males. The common disease among PNS pathologies was Sinusitis. The main cause of the PNS

pathology was noted to be nasal obstruction. The main site of the lesions was the Maxillary sinus. Soft tissue lesions were common in CT scans. The most common type of lesion was Bilateral. The CT scan is the most accurate diagnostic modality for the evaluation of paranasal sinus pathologies. The published study by Maillet *et al.*, determined the paranasal sinuses pathologies [23]. The most common was considered as sinusitis. The frequency of sinusitis is 57% whereas the tumor was considered as the less common PNS pathology, which is relevant to the current study. The previous studies and current study both concluded that CT is the best mode of investigation for paranasal sinuses pathologies. The published study by Marmura and Silberstein determine that the frequency of paranasal sinus pathology is common among females of age group 16-35 [24]. The current study also states that the frequency of female has higher amount of paranasal diseases. The age group is 16-45 which is similar to the previous studies. Both studies concludes that the amount of female suffering from PNS pathologies are higher than male. The recent study by Dong *et al.*, has similar finding to the current study showing that the maxillary sinus(36.4%) and the ethmoid sinus(29.5) are the common site of PNS pathologies [25]. The current study also describes that the common site is maxillary sinus. The previous study is similar to the current study.

CONCLUSIONS

The patient of age group 16-45 was mostly suffering from the PNS disease. The most common disease is the sinusitis. The CT scan provides high quality images of paranasal sinuses to aid accurate diagnosis in patients suffering from a variety of Paranasal sinuses pathologies.

Conflicts of Interest

The authors declare no conflict of interest

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