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Original Research Article

HISTOPATHOLOGICAL SPECTRUM AND CLINICORADIOLOGICAL CORRELATION OF SINONASAL MASSES IN CHILDREN AGED 5–15 YEARS AT A TERTIARY CARE CENTRE IN JHARKHAND

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ABSTRACT

Background: Sinonasal masses in children comprise a heterogeneous group of inflammatory, infective, congenital, benign neoplastic, and malignant lesions. Their clinical and radiological features often overlap, making accurate diagnosis difficult. A combined assessment using clinical examination, diagnostic nasal endoscopy, computed tomography, and histopathology is essential for determining the nature and extent of these lesions.

Aim: To evaluate the histopathological spectrum of sinonasal masses and assess their clinicoradiological correlation in children aged 5–15 years presenting at a tertiary care centre in Jharkhand.

Materials and Methods: This cross-sectional observational study included 62 children aged 5–15 years with clinically suspected sinonasal masses. Detailed history, complete ENT examination, anterior and posterior rhinoscopy, and diagnostic nasal endoscopy were performed. Computed tomography of the nose and paranasal sinuses was used to assess lesion origin, density, extension, enhancement pattern, bony changes, and involvement of adjacent structures. Tissue specimens obtained through endoscopic or open surgical procedures were processed and examined histopathologically using haematoxylin and eosin staining. Data were analysed using Microsoft Excel and SPSS. Appropriate statistical tests, including the chi-square test, were applied, and a p-value below 0.05 was considered statistically significant.

Results: The majority of patients were aged 13–15 years (41.94%), and males predominated (67.74%). Nasal obstruction was the most common symptom (80.65%), followed by nasal discharge (64.52%) and epistaxis (45.16%). The maxillary sinus and nasal cavity were the most frequent sites of origin, each accounting for 41.94% of cases. Antrochoanal polyp was the most common endoscopic, radiological, and histopathological diagnosis. Histopathologically, inflammatory lesions constituted 54.84% of cases, followed by infective or granulomatous lesions (20.97%), benign neoplasms (19.35%), congenital lesions (3.23%), and malignant lesions (1.61%). Enlarged maxillary ostium showed a highly significant association with antrochoanal polyp ($p = 1.03 \times 10^{-10}$), while moderate or strong contrast enhancement was significantly associated with vascular or infective lesions ($p = 1.92 \times 10^{-13}$).

Conclusion: Paediatric sinonasal masses were predominantly inflammatory and infective. Computed tomography effectively demonstrated lesion extent and characteristic radiological features, while histopathology provided the definitive diagnosis. Integrated clinical, endoscopic, radiological, and histopathological evaluation is essential for accurate diagnosis and appropriate management.

INTRODUCTION

Sinonasal masses in children represent a diverse group of disorders involving the nasal cavity, paranasal sinuses, nasopharynx, and adjacent skull-base structures. Although many lesions are benign, their occurrence in a confined region can cause airway obstruction, recurrent bleeding, infection, facial deformity, orbital involvement, or intracranial extension. The paediatric sinonasal region undergoes continuous anatomical development, which may influence presentation, radiological appearance, and surgical accessibility. Their rarity, broad differential diagnosis, and overlapping manifestations often make early recognition difficult. Evaluation therefore requires systematic assessment and coordinated input from otorhinolaryngologists, radiologists, pathologists, paediatricians, neurosurgeons, and oncologists when indicated.[1]

The histopathological spectrum includes inflammatory polyps, infective and granulomatous lesions, congenital abnormalities, vascular tumours, benign neoplasms, and malignant tumours. Inflammatory polyps are important causes of nasal obstruction, but childhood nasal polyposis should not automatically be regarded as an isolated local disorder. It may be associated with chronic rhinosinusitis, cystic fibrosis, primary ciliary dyskinesia, allergic fungal rhinosinusitis, immunodeficiency, or other systemic conditions. A polypoidal lesion in a child should therefore prompt careful examination, endoscopy, and investigation for underlying disease. Recognising these associations is important because removal of the visible mass alone may not address the causative inflammatory process or prevent recurrence.[2]

Clinical presentation varies according to the site, size, vascularity, biological behaviour, and direction of extension. Nasal obstruction, discharge, epistaxis, anosmia, headache, facial swelling, postnasal drip, snoring, and mouth breathing are common but nonspecific complaints. Advanced lesions may present with proptosis, visual disturbance, cranial nerve dysfunction, palatal bulging, or intracranial symptoms. Because benign, infective, congenital, and malignant masses may produce similar symptoms, clinical examination alone may not establish the diagnosis. Diagnostic nasal endoscopy helps determine laterality, surface characteristics, colour, attachment, bleeding tendency, and probable origin, but it may not demonstrate the full extent of lesions arising within the sinuses or extending beyond the nasal cavity.[3]

Radiological imaging is therefore essential. Computed tomography provides detailed assessment of the bony framework, sinus opacification, lesion density, calcification, widening of sinus ostia, remodelling, erosion, and destruction. It is useful for surgical planning and defining relationships with the orbit, skull base, pterygopalatine fossa, and infratemporal fossa. Magnetic resonance imaging provides superior soft-tissue contrast and is valuable when vascularity, perineural spread, orbital invasion, dural involvement, intracranial continuity, or congenital skull-base communication is suspected. A location-based interpretation can narrow the differential diagnosis, but radiological appearances often overlap. Imaging must therefore be interpreted with age, sex, symptoms, endoscopic findings, and histopathological features.[4]

Histopathological examination remains the definitive method for characterising most sinonasal masses. Haematoxylin and eosin staining permits assessment of tissue architecture, stromal composition, inflammatory response, vascular pattern, cellular atypia, mitotic activity, and invasion. Additional histochemical, immunohistochemical, or molecular tests may be required for lesions with overlapping morphology. Contemporary classification increasingly integrates microscopic findings with immunophenotypic and molecular alterations, particularly in sinonasal neoplasms. Accurate classification is important because lesions that appear similar on endoscopy or imaging may differ greatly in behaviour, treatment, recurrence risk, and prognosis. Communication among the surgeon, radiologist, and pathologist is necessary to ensure appropriate sampling and reduce errors caused by fragmented, necrotic, or haemorrhagic specimens.[5]

Infective and granulomatous diseases remain important in tropical and subtropical regions. Rhinosporidiosis is particularly relevant in the Indian subcontinent and commonly affects the nasal or nasopharyngeal mucosa as a friable polypoidal lesion. Its appearance may resemble an inflammatory polyp or vascular tumour, while extension into surrounding structures can appear aggressive radiologically. Environmental exposure, local epidemiology, and characteristic findings may raise suspicion, but confirmation depends on histopathological demonstration of the organism within affected tissue. Awareness of regionally prevalent diseases is essential because delayed or incorrect diagnosis may influence surgical planning, bleeding control, completeness of excision, and surveillance for recurrence.[6]

MATERIALS AND METHODS

This cross-sectional observational study was conducted at a tertiary care centre in Jharkhand among children presenting with sinonasal masses. The study period included 4 months for synopsis preparation, 12 months for data collection, and 6 months for thesis writing. A total of 62 patients were included in the study.

Children aged 5–15 years of either sex who presented to the Department of ENT outpatient department with symptoms suggestive of a sinonasal mass and whose parents or guardians were willing to provide consent for admission, evaluation, management, and follow-up were included in the

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study. Patients whose parents or guardians did not provide consent, children younger than 5 years or older than 15 years, patients with enlarged adenoids, those who had previously undergone nasal surgery for the same condition, critically ill patients, and children with septal deviation or septal abscess were excluded.

Patients fulfilling the eligibility criteria were enrolled and evaluated through detailed clinical history, complete physical examination, and relevant investigations. Information regarding presenting symptoms, duration of symptoms, and associated complaints was recorded. A complete ear, nose, and throat examination was performed in all patients.

Clinical evaluation included anterior and posterior rhinoscopy to assess the location, size, laterality, surface characteristics, and extent of the sinonasal mass. Diagnostic nasal endoscopy was performed for detailed visualisation of the nasal cavity, site of origin, attachment, vascularity, and extension of the lesion. Examination of the face, eyes, oral cavity, and throat was also performed to identify local extension and associated clinical features such as facial swelling, proptosis, and epiphora.

Radiological evaluation was performed in all patients. Computed tomography of the nose and paranasal sinuses was used to assess the site, extent, density, enhancement pattern, bony changes, sinus involvement, and relationship of the lesion with adjacent structures. Particular attention was given to radiological findings such as enlarged maxillary ostium, bony erosion or destruction, calcification, phleboliths, Holman–Miller sign, orbital extension, pterygopalatine fossa involvement, and intracranial continuity. X-ray of the paranasal sinuses was performed in selected patients as an initial screening investigation.

Tissue specimens were obtained through endoscopic or open surgical excision, depending on the site and extent of the lesion. The specimens were fixed in 10% buffered formalin, processed using standard histopathological techniques, sectioned, and stained with haematoxylin and eosin. The final histopathological diagnosis was established on the basis of microscopic morphological features. Lesions were subsequently classified into inflammatory, infective or granulomatous, benign neoplastic, congenital, and malignant categories.

Clinicoradiological correlation was performed by comparing the clinical and endoscopic impressions with computed tomography findings and the final histopathological diagnosis. Specific radiological features were correlated with individual lesions, including enlarged maxillary ostium with antrochoanal polyp and moderate or strong contrast enhancement with vascular or infective lesions.

Ethical approval was obtained from the Institutional Ethics Committee of RIMS, Ranchi. Written informed consent was obtained from the parents or legal guardians of all participating children before enrolment. Confidentiality of the patients' identity and clinical information was maintained throughout the study.

The collected data were coded and entered into a Microsoft Excel spreadsheet and subsequently analysed using SPSS software. Categorical variables were expressed as frequencies and percentages, while continuous variables were summarised using mean and standard deviation. Appropriate statistical tests, including the chi-square test, were applied according to the type of data to evaluate clinicoradiological and histopathological associations. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1 shows the sociodemographic characteristics of the 62 children included in the study. The majority of patients belonged to the 13–15 years age group (26; 41.94%), followed by the 9–12 years group (21; 33.87%) and the 5–8 years group (15; 24.19%), indicating that sinonasal masses were more frequently encountered in older children. Male children predominated, with 42 cases (67.74%), while females accounted for 20 cases (32.26%), giving a male-to-female ratio of approximately 2.1:1. According to the modified Kuppuswamy socioeconomic classification, 36 children (58.06%) belonged to the lower-lower socioeconomic class and 26 (41.94%) belonged to the upper-lower class. None of the participants were from the lower-middle, upper-middle, or upper socioeconomic groups, suggesting that the study population largely represented children from economically disadvantaged backgrounds.

Table 2 summarizes the presenting symptoms and their duration among the study participants. Nasal obstruction was the most common presenting complaint, reported by 50 children (80.65%), with a mean symptom duration of 6.54 ± 3.41 months. This was followed by nasal discharge in 40 patients (64.52%), with a mean duration of 7.57 ± 2.93 months. Epistaxis was present in 28 cases (45.16%), while anosmia affected 27 children (43.55%). Other common symptoms included postnasal drip (37.10%), headache (27.42%), and sneezing (25.81%). Less frequent symptoms were snoring (11.29%) and proptosis (3.23%), the latter indicating advanced disease with orbital involvement. The longest mean duration of symptoms was observed for headache (8.41 months), whereas epistaxis had the shortest mean duration (4.82 months). Overall, the findings indicate that nasal obstruction and nasal discharge were the predominant clinical manifestations, with most symptoms persisting for approximately six to eight months before presentation.

Table 3 presents the diagnostic nasal endoscopic findings among children with sinonasal masses. Endoscopic examination revealed that the maxillary sinus and nasal cavity were equally the most

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common sites of origin, each accounting for 26 cases (41.94%), followed by the nasopharynx (8.06%), ethmoid sinus (6.45%), and skull base/intracranial region (1.61%). Regarding lesion laterality, 30 cases (48.39%) occurred on the right side, 27 (43.55%) on the left side, and only 5 cases (8.06%) were bilateral.

Based on endoscopic impression, antrochoanal polyp was the most frequently diagnosed lesion (26 cases; 41.94%), followed by rhinosporidiosis (20.97%), foreign body/rhinolith (11.29%), septal haemangioma (9.68%), juvenile nasopharyngeal angiofibroma (8.06%), ethmoidal polyp (6.45%), and meningocele (1.61%). These findings highlight the importance of diagnostic nasal endoscopy in identifying the site of origin and probable nature of sinonasal lesions before definitive treatment.

Table 4 describes the computed tomography (CT) characteristics of sinonasal masses. The nasal cavity was the most commonly involved anatomical site, observed in 45 patients (72.58%), followed by maxillary sinus extension (33.87%) and bony erosion (27.42%). Less common findings included involvement of the pterygopalatine fossa (9.68%), ethmoid sinus (6.45%), intracranial extension (3.23%), and orbital, frontal sinus, and infratemporal fossa involvement (1.61% each). No patient demonstrated sphenoid sinus extension. Regarding lesion density, soft-tissue density was the predominant CT appearance in 35 patients (56.45%), followed by hypodense lesions (29.03%), hyperdense lesions (8.06%), and other or CSF-density lesions (6.45%).

Among the special CT findings, contrast enhancement (96.77%) and soft-tissue mass (93.55%) were the most frequent observations. Enlarged maxillary ostium was identified in 41.94%, bony erosion in 27.42%, calcification or phleboliths in 17.74%, Holman–Miller sign in 4.84%, and intracranial continuity in 3.23% of cases. These radiological features provided valuable information regarding lesion characterization and disease extent.

Table 5 compares the endoscopic diagnosis, CT diagnosis, and final histopathological diagnosis of sinonasal masses. Antrochoanal polyp remained the most common lesion across all diagnostic modalities, accounting for 41.94% on endoscopy, 33.87% on CT, and 30.65% on histopathology. Rhinosporidiosis showed complete agreement across all three modalities, representing 20.97% of cases. Similarly, rhinolith/foreign body and ethmoidal polyp demonstrated complete concordance between endoscopic, radiological, and histopathological diagnoses. CT identified one additional case each of juvenile nasopharyngeal angiofibroma and meningocele, which were subsequently confirmed on histopathology. Ethmoidal/frontoethmoidal mucoceles and rhabdomyosarcoma were detected on CT and confirmed histopathologically but were not diagnosed during initial endoscopic assessment. Histopathology also identified eight septal haemangiomas, compared with six cases detected by both endoscopy and CT. Overall, histopathological examination confirmed the definitive diagnosis and demonstrated good agreement with clinicoradiological findings while identifying a few lesions that were under-recognized clinically.

Table 6 presents the histopathological spectrum and clinicoradiological correlations of sinonasal masses. Histopathological evaluation showed that inflammatory lesions constituted the largest group, accounting for 34 cases (54.84%), followed by infective or granulomatous lesions (13 cases; 20.97%) and benign neoplastic lesions (12 cases; 19.35%). Congenital lesions were identified in 2 patients (3.23%), while malignant lesions were rare, with only one case (1.61%) diagnosed as rhabdomyosarcoma. Statistical analysis demonstrated highly significant clinicoradiological correlations.

The association between enlarged maxillary ostium and antrochoanal polyp was highly significant (Chi-square test, $p = 1.03 \times 10^{-10}$). Similarly, the association between moderate to strong contrast enhancement and vascular or infective lesions was also highly significant (Chi-square test, $p = 1.92 \times 10^{-13}$). These findings indicate that specific CT features are strong predictors of particular histopathological diagnoses and support the usefulness of radiological evaluation in the preoperative assessment of pediatric sinonasal masses.

Table 1: Sociodemographic characteristics of children with sinonasal masses (N = 62)

Variable	Category	Number (n)	Percentage (%)
Age group (years)	5–8	15	24.19
	9–12	21	33.87
	13–15	26	41.94
	Total	62	100.00
Gender	Male	42	67.74
	Female	20	32.26
	Total	62	100.00
Socioeconomic status	Lower-lower	36	58.06
	Upper-lower	26	41.94
	Lower-middle	0	0.00
	Upper-middle	0	0.00
	Upper class	0	0.00
	Total	62	100.00

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Table 2: Distribution of presenting symptoms and their duration among study participants (N = 62)

Presenting symptom	Number of cases	Percentage (%)	Mean duration (months)	Median duration (months)	Standard deviation
Nasal obstruction	50	80.65	6.54	6.5	±3.41
Nasal discharge	40	64.52	7.57	7.0	±2.93
Epistaxis	28	45.16	4.82	4.5	±2.21
Anosmia	27	43.55	7.37	8.0	±3.73
Postnasal drip	23	37.10	5.96	5.0	±2.74
Headache	17	27.42	8.41	8.0	±3.52
Sneezing	16	25.81	7.44	8.0	±3.81
Snoring	7	11.29	6.00	6.0	±1.00
Proptosis	2	3.23	6.50	6.5	±0.71

Table 3: Diagnostic nasal endoscopic characteristics of sinonasal masses (N = 62)

Endoscopic parameter	Finding	Number of cases	Percentage (%)
Site of origin	Maxillary sinus	26	41.94
	Nasal cavity	26	41.94
	Nasopharynx	5	8.06
	Ethmoid sinus	4	6.45
	Skull base/intracranial	1	1.61
	Total	62	100.00
Laterality	Right side	30	48.39
	Left side	27	43.55
	Bilateral	5	8.06
	Total	62	100.00
Endoscopic impression	Antrochoanal polyp	26	41.94
	Rhinosporidiosis	13	20.97
	Foreign body/rhinolith	7	11.29
	Septal haemangioma	6	9.68
	Nasopharyngeal angiofibroma	5	8.06
	Ethmoidal polyp	4	6.45
	Meningocele	1	1.61
	Total	62	100.00

Table 4: Radiological characteristics of sinonasal masses on computed tomography (N = 62)

Radiological parameter	CT finding	Number of cases	Percentage (%)
Anatomical involvement	Nasal cavity involvement	45	72.58
	Maxillary sinus extension	21	33.87
	Bony erosion	17	27.42
	Pterygopalatine fossa involvement	6	9.68
	Ethmoid sinus extension	4	6.45
	Intracranial extension	2	3.23
	Frontal sinus extension	1	1.61
	Infratemporal fossa involvement	1	1.61
	Orbital involvement	1	1.61
	Sphenoid sinus extension	0	0.00
Lesion density	Soft-tissue density	35	56.45
	Hypodense	18	29.03
	Hyperdense	5	8.06
	Other/CSF density or missing	4	6.45
	Total	62	100.00
Special CT signs	Contrast enhancement	60	96.77
	Soft-tissue mass	58	93.55
	Enlarged maxillary ostium	26	41.94
	Bony erosion/destruction	17	27.42
	Calcification/phleboliths	11	17.74
	Holman–Miller sign	3	4.84
	Intracranial continuity	2	3.23

Table 5: Comparison of endoscopic, radiological, and histopathological diagnoses of sinonasal masses (N = 62)

Diagnosis	Endoscopic diagnosis, n (%)	CT diagnosis, n (%)	Histopathological diagnosis, n (%)
Antrochoanal polyp	26 (41.94)	21 (33.87)	19 (30.65)
Rhinosporidiosis	13 (20.97)	13 (20.97)	13 (20.97)
Rhinolith/foreign body	7 (11.29)	7 (11.29)	7 (11.29)
Juvenile nasopharyngeal angiofibroma	5 (8.06)	6 (9.68)	6 (9.68)
Septal haemangioma	6 (9.68)	6 (9.68)	8 (12.90)
Ethmoidal polyp	4 (6.45)	4 (6.45)	4 (6.45)
Meningocele	1 (1.61)	2 (3.23)	2 (3.23)
Ethmoidal/frontoethmoidal mucocele	0 (0.00)	2 (3.23)	2 (3.23)
Rhabdomyosarcoma	0 (0.00)	1 (1.61)	1 (1.61)
Total	62 (100.00)	62 (100.00)	62 (100.00)

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Table 6: Histopathological spectrum and significant clinicoradiological associations of sinonasal masses

Analysis category	Histopathological type or radiological association	Number/ test	Percentage/ p-value	Statistical interpretation
Histopathological spectrum	Inflammatory lesions	34	54.84%	—
	Infective/granulomatous lesions	13	20.97%	—
	Benign neoplastic lesions	12	19.35%	—
	Congenital lesions	2	3.23%	—
	Malignant lesions	1	1.61%	—
	Total	62	100.00%	—
Clinicoradiological correlation	Enlarged maxillary ostium versus antrochoanal polyp diagnosis	Chi-square test	1.03×10^{-10}	Highly significant
	Moderate/strong contrast enhancement versus vascular or infective lesions	Chi-square test	1.92×10^{-13}	Highly significant

DISCUSSION

The present study included 62 children aged 5–15 years, of whom the largest proportion belonged to the 13–15-year age group (41.94%), followed by the 9–12-year (33.87%) and 5–8-year (24.19%) groups. This progressive increase with age suggests that sinonasal lesions may become more clinically apparent in older children because of increasing lesion size, longer symptom duration, or improved reporting of symptoms. A clear male predominance was observed, with 67.74% males and 32.26% females, giving a male-to-female ratio of approximately 2.1:1. Lathi et al. (2011), in a clinicopathological study of 112 patients with sinonasal masses, also reported male predominance, with 68 males (60.71%) and 44 females (39.29%), corresponding to a ratio of approximately 1.5:1. Although their population ranged from 8 to 70 years, the similar male predominance supports the sex distribution observed in the present paediatric study. In addition, all children in the present study belonged to the lower-lower or upper-lower socioeconomic classes, which may reflect differences in environmental exposure, healthcare access, nutritional status, and delayed presentation in the study population.[7] Nasal obstruction was the most frequent symptom in the present study, affecting 50 children (80.65%), followed by nasal discharge in 40 (64.52%), epistaxis in 28 (45.16%), anosmia in 27 (43.55%), and postnasal drip in 23 (37.10%). Garg et al. (2014), in a prospective study of 147 sinonasal and nasopharyngeal space-occupying lesions, similarly reported nasal obstruction in 128 patients (87.07%) and nasal discharge in 102 patients (69.39%). These frequencies were slightly higher than the present findings but showed the same pattern of symptom predominance. In the present study, headache occurred in 27.42%, sneezing in 25.81%, snoring in 11.29%, and proptosis in 3.23% of children. The mean duration ranged from 4.82 months for epistaxis to 8.41 months for headache, demonstrating a considerable delay between symptom onset and diagnosis. The high frequency of obstruction and discharge in both studies indicates that these symptoms are common but nonspecific manifestations of sinonasal disease, while epistaxis, anosmia, or proptosis may indicate vascularity, extensive disease, or involvement of adjacent structures.[8] Diagnostic nasal endoscopy in the present study demonstrated that the maxillary sinus and nasal cavity were the most frequent sites of origin, each accounting for 26 cases (41.94%). Most lesions were unilateral, with 48.39% occurring on the right side and 43.55% on the left side, whereas only 8.06% were bilateral. Antrochoanal polyp was the most frequent endoscopic diagnosis, representing 26 cases (41.94%), followed by rhinosporidiosis in 20.97%, rhinolith or foreign body in 11.29%, septal haemangioma in 9.68%, juvenile nasopharyngeal angiofibroma in 8.06%, ethmoidal polyp in 6.45%, and meningocele in 1.61%. Al-Mazrou et al. (2009) reviewed 35 surgically treated patients with antrochoanal polyps, including 19 children (54.29%) and 16 adults (45.71%), demonstrating the clinical importance of this lesion in the paediatric population. Although their study included only patients with antrochoanal polyps and therefore had a different denominator, its substantial paediatric representation supports the predominance of antrochoanal polyps observed among children in the present study. The maxillary origin and predominantly unilateral presentation further correspond to the established endoscopic behaviour of antrochoanal polyps.[9] Computed tomography demonstrated nasal cavity involvement in 45 children (72.58%), maxillary sinus extension in 21 (33.87%), bony erosion in 17 (27.42%), pterygopalatine fossa involvement in 6 (9.68%), and ethmoid sinus extension in 4 (6.45%). Intracranial extension was observed in two cases (3.23%), while frontal sinus, infratemporal fossa, and orbital involvement were each found in one case (1.61%). Sadek et al. (2024) evaluated 124 patients with unilateral chronic sinusitis, including 66 paediatric and 58 adult patients, and found that the maxillary sinus was the most frequently affected sinus in both groups, followed by the anterior ethmoid sinus. They also reported significantly greater bone expansion and erosion and greater involvement of adjacent structures among paediatric patients, with p-values of 0.028 and 0.027, respectively. The present findings similarly demonstrate that paediatric inflammatory and mass-forming lesions may produce substantial anatomical extension and bony alteration. The presence of bony erosion in 27.42% of the present cases should therefore not

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automatically be interpreted as evidence of malignancy, as expansile inflammatory, infective, and vascular lesions can also produce pressure erosion or remodelling in children.[10] Comparison of the diagnostic modalities showed varying levels of agreement between endoscopy, CT, and histopathology. Rhinosporidiosis was diagnosed in 13 cases (20.97%), rhinolith in seven (11.29%), and ethmoidal polyp in four (6.45%) by all three modalities, demonstrating complete numerical concordance for these lesions. In contrast, antrochoanal polyp was suspected in 26 cases (41.94%) endoscopically, 21 cases (33.87%) radiologically, and confirmed in 19 cases (30.65%) histopathologically. CT identified two meningoceles, two mucoceles, and one rhabdomyosarcoma, which were subsequently confirmed histopathologically but were not fully recognised during the initial endoscopic assessment. Rawat et al. (2013) reported that clinical and radiological findings were consistent in 83.07% of patients with sinonasal masses, while the remaining cases had differing or inconclusive radiological findings. Their observations correspond with the present study, in which clinicoradiological assessment accurately characterised several lesions but produced discrepancies in some inflammatory, vascular, congenital, and malignant conditions. These findings confirm that endoscopy and CT are complementary diagnostic methods, whereas histopathology remains essential for establishing the definitive diagnosis.[11] Inflammatory lesions constituted the largest histopathological category in the present study, accounting for 34 cases (54.84%). Infective or granulomatous lesions represented 13 cases (20.97%), benign neoplastic lesions 12 cases (19.35%), congenital lesions two cases (3.23%), and malignant lesions one case (1.61%). When inflammatory, infective, and congenital lesions are grouped as non-neoplastic conditions, they represent 49 of 62 cases (79.03%), while benign and malignant neoplasms account for 19.35% and 1.61%, respectively. Bist et al. (2012), in a prospective study of 110 sinonasal masses, reported 63 non-neoplastic lesions (57.27%), 23 benign neoplasms (20.91%), and 24 malignant neoplasms (21.82%). The proportion of benign neoplasms in their study was comparable to the present value of 19.35%; however, malignant lesions were markedly less common in the present study. This difference is likely attributable to the restriction of the present investigation to children aged 5–15 years, whereas the study by Bist et al. included patients across a broader age range, including adults in whom epithelial sinonasal malignancies occur more frequently. The predominance of inflammatory and infective lesions in the present study therefore reflects the expected disease spectrum in children.[12] An enlarged maxillary ostium was demonstrated on CT in 26 children (41.94%), and its association with the diagnosis of antrochoanal polyp was highly significant, with a p-value of 1.03×10^{-10}. This strong relationship is anatomically consistent with the extension of an antrochoanal polyp from the maxillary sinus through the natural or accessory ostium into the nasal cavity and choana. Bidkar et al. (2019) evaluated CT findings in 22 patients with antrochoanal polyps and found that widening of the accessory maxillary ostium was significantly greater on the affected side than on the unaffected side, with mean measurements of 91.45 ± 57.00 and 55.32 ± 38.96, respectively, and a p-value of 0.018. They also observed significantly reduced alveolar bone thickness along the medial wall and floor of the affected maxillary sinus. These observations support the present finding that ostial enlargement is a valuable imaging marker of antrochoanal polyp. The substantially lower p-value in the present study indicates a particularly strong association between enlarged maxillary ostium and the final diagnosis, although differences in study design, measurement methods, and sample composition should be considered.[13] Contrast enhancement was present in 60 of the 62 lesions (96.77%) in the present study, while a definable soft-tissue mass was seen in 58 cases (93.55%). Bony erosion or destruction was found in 27.42%, calcification or phleboliths in 17.74%, Holman–Miller sign in 4.84%, and intracranial continuity in 3.23%. Moderate or strong contrast enhancement showed a highly significant association with vascular or infective lesions, with a p-value of 1.92×10^{-13}. Sivalingam et al. (2015), in a prospective CT study of 40 histologically confirmed sinonasal neoplasms, reported 24 benign and 16 malignant lesions and observed intense homogeneous post-contrast enhancement in all cases of juvenile nasopharyngeal angiofibroma. They also found bone destruction in 12 of 16 malignant lesions (75%), while benign lesions more commonly produced remodelling, deformity, or erosion. Their findings support the strong enhancement pattern observed in vascular lesions in the present study and demonstrate the value of CT in differentiating vascular masses from other sinonasal abnormalities. However, because enhancement may also occur in infective and inflammatory lesions, the CT enhancement pattern must be interpreted together with lesion density, anatomical origin, bony response, endoscopic appearance, and histopathological findings.[14]

CONCLUSION

The present study demonstrated that sinonasal masses in children were predominantly inflammatory and infective, with antrochoanal polyp being the most common lesion. Nasal obstruction and discharge were the leading symptoms, while CT effectively defined lesion extent, density, bony changes, and involvement of adjacent structures. Significant correlations were observed between enlarged maxillary ostium and antrochoanal polyp, and between strong contrast enhancement and

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vascular or infective lesions. Histopathological examination remained essential for definitive diagnosis and accurate classification. A combined clinical, endoscopic, radiological, and histopathological approach is therefore crucial for appropriate management of paediatric sinonasal masses.

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