Clinicopathologic and radiologic features of pediatric unilateral nasal masses at a tertiary hospital

Eman R. Alanazi*, Ali A. Almomen, Hadeel M. Aljafer, Ghaleb M. Alazzeh, Abdurahmn M. Alkhatib

Department of Otorhinolaryngology and Head and Neck Surgery, King Fahad Specialist Hospital, Dammam Eastern, Saudi Arabia

Received: 07 February 2020
Accepted: 09 June 2020

*Correspondence:
Dr. Eman R. Alanazi,
E-mail: eman1990@icloud

ABSTRACT

Background: Cases of unilateral nasal masses (UNM’s) are usually inflammatory but some are neoplastic in nature. We conducted this study to determine the clinic-pathologic features, radiological findings and patterns of UNM’s in our institution.

Methods: We conducted a retroactive chart review of all pediatric cases followed and treated for medically untreatable UNM from 2015 till 2018 at King Fahad Specialist Hospital (KFSH) in Dammam, Saudi Arabia.

Results: Cases of 25 patients (16 males and 9 females) with a mean age of 10.81±4.53 years were studied. There were 12 patients (48.0%) who presented with a nasal obstruction, and nasal polyp was found by fiberoptic nasal endoscopy (FNE) in 12 patients (48.0%). Two patients (8.0%) had unremarkable FNE findings. The most common site of origin of the mass was the ethmoid sinus (24.0%). Twenty patients (80.0%) had FESS, 3 (12.0%) had endoscopic excision, 1 had FESS plus abscess drainage and 1 (4.0%) had marsupialization. Two patients (8.0%) had recurrence 12 months after surgery, and one patient (4.0%) had recurrence six months after surgery. Six patients (24.0%) had malignant tumor of which 3 patients (12.0%) expired from the disease.

Conclusions: Pediatric patients with a UNM may present with varied symptoms and may show unremarkable results with nasal endoscopy. However the risk of having an underlying malignant process is very high, thus a histopathologic diagnosis is warranted to confirm the diagnosis.

Keywords: Clinical, Nasal masses, Pathological, Pediatric, Radiological

INTRODUCTION

Unilateral nasal mass (UNM) is an abnormal growth in one side of the nose which can be benign or malignant. It can be present at birth as a congenital anomaly or can develop in the adult life. Among UNM’s, polyps are the most common which can occur among adults (age group 40 years and above), and has a prevalence of about 37.06%. Schwannoma, a benign tumor also presents as a UNM in 4% of patients with head and neck tumors. Cases of pleomorphic adenoma has also been reported to cause unilateral nasal obstruction presenting as a UNM. Other reported cases of UNM include chronic sinusitis, allergic fungal sinusitis, papilloma, squamous cell carcinoma, mucocele and papilloma virus polyp.

Presenting clinical symptoms of patients with UNM’s include nonspecific symptoms including nasal obstruction, epistaxis, nasal congestion, rhinorrhea, facial pain, and dental and orbital complaints which are more common among cases of neoplastic origin. Among pediatric patients, UNM commonly presents with unilateral nasal congestion, nasal obstruction, headache and ophthalmologic complaints.
Pediatric patients presenting with UNM poses a clinical challenge on account of the varied differences in the underlying etiologies. Because of this, we conducted this study to determine the demographic characteristics and presentation of pediatric patients presenting with UNM, its clinic-pathologic features, radiological findings and patterns of unilateral nasal obstruction in our institution.

METHODS

We conducted a retrospective chart review of all pediatric cases followed and treated for UNM from 2015 till 2018 at King Fahad Specialist Hospital (KFSH) in Dammam, Saudi Arabia.

Inclusion criteria

Medically untreated cases of UNM in the nasal cavity, paranasal sinuses and nasopharynx requiring surgical treatment were included in the study.

Exclusion criteria

Cases with bilateral nasal masses, chronic rhinosinusitis and adult patients were excluded in the study.

Because of the rarity of pediatric patients presenting with UNM, the sample size calculation for our study was unknown at the start (as suggested by Van der Lee et al, 2007), thus we deemed to include all cases that were diagnosed, followed and treated for UNM during the aforementioned time frame.13

Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 23.0 (SPSS Inc., Armonk, New York, USA). Results were presented as number and percentage (for categorical variables) and as mean and standard deviation (for continuous variables). The study was approved by the Institutional Review Board (IRB) of KFSH, Dammam, Saudi Arabia.

RESULTS

There were 25 patients that were included in the study. 16 (64.0%) males and 9 (36.0%) females, and all were Saudi nationals. The mean age of all patients was 10.81±4.53 years (range: 4 months to 17 years). The most common presenting symptom was nasal obstruction (n=12, 48.0%), followed by headache in 3 patients (12.0%). There were 11 patients (44.0%) who presented with 2 or more symptoms. The mean duration of symptoms was 12.44±11.69 months (range: 3 days to 36 months). The mean follow-up time of all patients was 20.95±16.84 months (range: 1-60 months). Table 1 shows the detailed demographic characteristics of all 25 patients. Figure 1 shows the detailed presenting symptoms of the 25 patients.

Table 1: Demographic characteristics of all pediatric patients with UNM’s (n=25).

| Variables                        | Mean (SD) | N  | %   |
|---------------------------------|-----------|----|-----|
| Age (in years)                  | 10.81 (4.53) |    |     |
| Duration of symptoms (in months)| 12.44 (11.69) |    |     |
| Follow-up time (in months)      | 20.95 (16.84) |    |     |
| Gender                          |           |    |     |
| Male                            | 16        | 64.0 |     |
| Female                          | 9         | 36.0 |     |

Figure 1: Presenting symptoms of pediatric patients with UNM (n=25).

Inflammatory nasal polyp was the most common clinical finding by fiberoptic nasal endoscopy (FNE) (n=12, 48.0%) followed by a nasal mass in 8 patients (32.0%). Two patients (8.0%) had unremarkable FNE findings. Radiological findings showed opacification of the paranasal sinuses in 9 patients (36.0%), skull base defect in 4 patients (16.0%), opacification of the maxilla in 3 patients (12.0%) and nasopharyngeal mass in 3 patients (12.0%). Nasal septum deviation was seen in 10 patients (40.0%), seven to the left and 3 to the right. The most common site of origin of the mass was the ethmoid sinus in 6 patients (24.0%), maxillary sinus in 5 patients (20.0%) and sphenopalatine foramen in 4 patients (16.0%). Inflammatory nasal polyp was the most common histological finding in 11 patients (44.0%). Table 2 shows the detailed clinical findings by fiberoptic nasal endoscopy, radiology, and site of origin of UNM’s.
Table 2: Detailed clinical findings by fiberoptic nasal endoscopy, radiology, and site of origin in pediatric patients with UNM’s (n=25).

| Findings                          | N  | %  |
|----------------------------------|----|----|
| **Fiberoptic nasal endoscopy**   |    |    |
| Inflammatory nasal polyp         | 12 | 48.0|
| Nasal mass                       | 8  | 32.0|
| Unremarkable                     | 2  | 8.0 |
| Nasal congestion                 | 1  | 4.0 |
| Nasopharyngeal mass              | 1  | 4.0 |
| Septum mass                      | 1  | 4.0 |
| **Radiological findings**        |    |    |
| Paranasal sinus opacification    | 9  | 36.0|
| Skull base defect                | 4  | 16.0|
| Maxillary opacification          | 3  | 12.0|
| Nasopharyngeal opacification     | 3  | 12.0|
| Nasal cavity opacification       | 2  | 8.0 |
| Septum opacification             | 1  | 4.0 |
| Ethmoid opacification            | 1  | 4.0 |
| Frontal and ethmoid opacification| 1  | 4.0 |
| Soft tissue mass                 | 1  | 4.0 |
| **Site of origin**               |    |    |
| Ethmoid sinus                    | 6  | 24.0|
| Maxillary sinus                  | 5  | 20.0|
| Sphenopalatine foramen           | 4  | 16.0|
| Maxillary, ethmoid and sphenoid sinuses | 3 | 12.0 |
| Osteomeatal complex              | 2  | 8.0 |
| Skull base                       | 2  | 8.0 |
| Frontal sinus                    | 1  | 4.0 |
| Septum                           | 1  | 4.0 |
| Superior attachment of middle turbinates | 1 | 4.0 |
| **Histology**                    |    |    |
| Inflammatory nasal polyp         | 11 | 44.0|
| Angiofibroma                     | 3  | 12.0|
| Rhabdomyosarcoma                 | 3  | 12.0|
| Fungal sinusitis                 | 2  | 8.0 |
| Encephalocele                    | 1  | 4.0 |
| Meningocele                      | 1  | 4.0 |
| Ewing’s sarcoma                  | 1  | 4.0 |
| Nasopharyngeal carcinoma         | 1  | 4.0 |
| NHL-Burkitt’s lymphoma           | 1  | 4.0 |
| Granulomatous inflammation       | 1  | 4.0 |

Nineteen patients (76.0%) had benign conditions (11 patients with inflammatory disease and 8 patients with non-inflammatory conditions), whereas 6 patients (24.0%) had malignant tumors (Figure 2). Three patients (12.0%) were positive for *Aspergillus niger* on culture. Twenty patients (80.0%) had functional endoscopic sinus surgery (FESS), 3 (12.0%) had endoscopic excision with reconstruction of the skull base, one patient (4.0%) had FESS plus abscess drainage and one patient (4.0%) had marsupialization. Seventeen patients (68.0%) had no recurrence of the disease after surgical management, two patients (8.0%) had recurrence 12 months after surgery, and one patient (4.0%) had recurrence six months after surgery. Two patients (8.0%) were lost to follow-up. Of the six patients who had malignant tumor, 3 patients (12.0%) expired from the disease (two patients from rhabdomyosarcoma, and one patient from Ewing’s sarcoma), whereas the other two patients (one with rhabdomyosarcoma and one with NHL Burkitt’s lymphoma) had no residual disease at follow-up (Table 3).

**DISCUSSION**

UNM’s can be a common presentation among adults but are often considered as an ominous display of a more serious underlying pathology in pediatric patients. Because of the considerable diversity in the underlying...
The underlying pathology is often diagnosed by otorhinolaryngologists through direct visualization using fiberoptic scopes with consequent histopathological diagnosis and confirmation of the condition. In most of the cases of UNM’s, the underlying pathology is benign and inflammatory in nature up to 83% of cases. Some studies even reported a higher prevalence of benign histopathological diagnosis of UNM’s of 95.9%. Our study showed 76.0% benign, and the remaining 24.0% were malignant.

The two cases which came out unremarkable with FNE were a case of right meningocele and a case of orbital osteoma, which both presented as nasal obstruction. Probably, the FNE was not able to assess the extent of the lesion since there were cases wherein a combined external and endoscopic approach to assess the size and extensions of meningocele, encephalcele and anterior skull base effects. The use and selection of imaging modality particularly in the pediatric population should be carefully considered because of the potential risk of carcinogenesis from ionizing radiation.

In this study, we found that the propensity of having a malignant condition among patients presenting with a UNM is 24% (6 patients), which resulted into death of three patients. Our rate is significantly higher than the 17% reported in two studies conducted by Yaman et al and Nair et al. This proves the varying differences in the diagnosis of pediatric patients that presents with an UNM, thus warrants a histologic diagnosis. Because of this, the importance of clinico-histopathologic and radiologic investigation of patients presenting with an UNM is very essential, not only for the diagnosis of the condition, but for the appropriate management and prognosis of the patient.

The limitation of the study was its small sample size. The main reason was because of the rarity of patients that came to our institution presenting as UNM in a period of 4 years. However, despite the small sample size, we were able to show and deduce some information on the clinico-histopathological and radiological features of patients. Furthermore, this denotes that the risk of having a malignant condition with UNMs should not be overlooked. Furthermore, this study also showed and highlighted that a neoplastic disease can occur even among the pediatric population and may present with varied symptoms that may seemed unlikely for a malignant process.

**CONCLUSION**

Pediatric patients with a UNM may present with varied symptoms. Nasal endoscopic diagnosis may show unremarkable results particularly among conditions like meningocele and osteoma. However, a histopathologic diagnosis is warranted to confirm the diagnosis since the propensity of having a malignant process is very possible to as much as 24%. A larger similar study is needed to confirm our findings.

**Funding:** No funding sources  
**Conflict of interest:** None declared  
**Ethical approval:** The study was approved by the Institutional Review Board (IRB) of KFSH, Dammam, Saudi Arabia

**REFERENCES**

1. Pradhananga RB, Thapa PA, Shrestha A, Pradhan B. Overview of nasal masses. J Inst Med. 2009;31(1).
2. Habesoglu TE, Habesoglu M, Surmeli M, Uresin T, Egeli E. Unilateral sinonasal symptoms. J Craniofac Surg. 2010;21(6):2019-22.
3. Pauna HF, Carvalho GM, Guimarães AC, Maunsell RC, Sakano E. Schwannoma of the nasal septum: evaluation of unilateral nasal mass. Braz J Otorhinolaryngol. 2013;79(3):403.
4. Jackson LE, Rosenberg SI. Pleomorphic adenoma of the lateral nasal wall. Otolaryngol Head Neck Surg. 2002;127(5):474-6.
5. Mackle T, Zahirowic A, Walsh M. Pleomorphic adenoma of the nasal septum. Ann Otol Rhinol Laryngol. 2004;113(3):210-1.
6. Tritt S, McMains KC, Kountakis SE. Unilateral nasal polyposis: clinical presentation and pathology. Am J Otolaryngol. 2008;29(4):230-2.
7. Benoit MM, Bhattacharyya N, Faquin W, Cunningham M. Cancer of the nasal cavity in the pediatric population. Pediatrics. 2008;121(1):141-5.
8. Yaman H, Alkan N, Yilmaz S, Koc S, Belada A. Is routine histopathological analysis of nasal polyposis specimens necessary? Eur Arch Oto-Rhino-Laryngol. 2011;268(7):1013-5.
9. Nair S, James E, Awasthi S, Nambiar S, Goyal S. A review of the clinico pathological and radiological features of unilateral nasal mass. Indian J Otolaryngol Head Neck Surg. 2013;65(2):199-204.
10. Keck T, Liener K, Strüter J, Rozsasi A. Rhinolith of the nasal septum. International J Pediatr Otorhinolaryngol. 2000;53(3):225-8.
11. Adil E, Huntley C, Choudhary A, Carr M. Congenital nasal obstruction: clinical and radiologic review. European J Pediatr. 2012;171(4):641-50.

12. Özcán C, Apa DD, Görür K. Pediatric lobular capillary hemangioma of the nasal cavity. Eur Arch Oto-Rhino-Laryngol Head Neck. 2004;261(8):449-51.

13. Van der Lee JH, Wesseling J, Tanck MW, Offringa M. Efficient ways exist to obtain the optimal sample size in clinical trials in rare diseases. J Clin Epidemiol. 2008;61(4):324-30.

14. Rodriguez DP, Orscheln ES, Koch BL. Masses of the nose, nasal cavity, and nasopharynx in children. Radiographics. 2017;37(6):1704-30.

15. Belli S, Yıldırım M, Eroğlu S, Emre FK. Single-sided sinonasal mass: A retrospective study. Northern Clin Istanbul. 2018;5(2):139.

16. Di Rocco F, Coulouigner V, Dastoli P, Sainte-Rose C, Zerah M, Roger G. Treatment of anterior skull base defects by a transnasal endoscopic approach in children. J Neurosurg Pediatr. 2010;6(5):459-63.

Cite this article as: Alanazi ER, Almomen AA, Aljafer HM, Alazzeh GM, Alkhatib AM. Clinicopathologic and radiologic features of pediatric unilateral nasal masses at a tertiary hospital. Int J Otorhinolaryngol Head Neck Surg 2020;6:1434-8.