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# Overview of Nasal Masses In children

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**ABSTRACT:** **Background**: Nasal masses in children are rare but can cause much diagnostic uncertainty. Presentation varies with age and cause (1). And the approach to management of these masses will be varying according to the diagnosis.

**Aim**: to reveal the clinicopathological profile of nasal masses in children seen during the study period and to draw attention to the most important findings and results of this study.

**Patients and Methods**: A prospective descriptive study of 20 selected pediatric patients with nasal mass seen in ENT department at Al-kadhimain teaching hospital and ENT center in Al- Sulaimaniyah teaching hospital over a period of 12 months (Feb.2014-Mar.2015).

The age of studied group ranging from birth to fifteen years according to definition of Iraqi law to childhood(2, 3).

Direct questioning of patients and/or his parents about the biographic data, chief compliant and duration, other medical or surgical history, drug history and any relevant socio-economic history (attached questionnaire).

Preoperative examinations of the patients were done clinically, radiologically in otorhinolaryngology department at Al-kadhimain teaching hospital and E.N.T. center in Sulaimaniya teaching hospital,Radiological examination includes CT scan of nose and paranasal sinuses for all 20 children in studied group and the MRI done for two patients in addition to CT scan.After reaching the diagnosis, 18 patients underwent different sorts of surgical interventions and all the masses were excised and have been sent for histopathological study to confirm the diagnosis, the other 2 patients were referred to other specialty.Follow up period was for 6 months and depend mainly on history and clinical examination with rigid and fibreoptic nasoendoscope, all of them were normal.All data then analyzed using SPSS (version 21) computer program.

**Results**: the collected data were analyzed and the results are: The age of 70% of the patient was above 7 years, 60% of patients were males and 40% was females, Seventy five percent complained from nasal obstruction, 15% complained from nasal discharge, and only 10% complained from epistaxis. The duration of disease before presentation was 0 to 119 days in 45% of patients, 120 to 239 days in 30% of patients, 240 to 359 in 15% of patients, and 360 days and above in 10% of patients, The most common associated symptoms were obstruction and discharge in 50% of patients, followed by obstruction and periorbital swelling in 20% of patients. Twenty percent of patients had not history of associated signs or symptoms, the most common histopathological findings were antrochoanal polyp in

Natural Resources for Human Health
eISSN: 2583-1194

35% of patients and fungal rhinosinusitis in 35% of patients, and rhinolith in 10%, rhabdomyosarcoma in 5%, chondroma in 5%, hemangioma in 5%, meningocele in 5%.

The modalities of treatment used in this study were: Endoscopic surgery was used in 80% of patients, external or endonasal approach in 10% of patients, and only 10% of patients were referred to other specialty.

CT changes which include bony changes in 60% of the cases, opacity was unilateral in 85% of the cases, 15% was bilateral; the opacity was homogeneous in 35% and heterogeneous in 65% of the cases.

The highest mean age was 10.2 + 3.1 years and 10.1 + 2.7 years in patients of antrochoanal polyp and patients of fungal rhinosinusitis, respectively. The lowest mean age was 6 + 0.0 years in patients of meningocele, the difference was statistically significant ($P< 0.05$).

Most of males and females complained from antrochoanal polyp (41.7% and 25.0%, respectively) and fungal rhinosinusitis (33.3% and 37.5%, respectively). The relationship between gender and histopathological diagnosis was statistically not significant, $P> 0.05$.

**Conclusion**: Nasal masses in children are rare but can cause much diagnostic uncertainty. The clinicopathological profile of nasal mass in children was revealed, Presentation varies with age and cause, and the management is according to the diagnosis.

## INTRODUCTION

Nasal masses in children are rare but can cause much diagnostic uncertainty. Presentation varies with age and cause. They are rarely detected by pre-natal scanning unless part of a larger mass or where there is extensive pathology e.g. a large intracranial anomaly.

In newborns there may be a visible mass projecting from the nasal cavity. They can present as an emergency with respiratory distress due to the fact that newborns tend to be obligate nose breathers. They may become cyanotic on feeding or on crying – cyclical cyanosis. There may be difficulty in passing a suction catheter or nasogastric tubing. An external deformity e.g. splaying of the bones of the mid-face or an obvious bone or soft tissue swelling can also be seen. In older children the symptoms may be more varied. Epistaxis, nasal obstruction, rhinosinusitis and deafness due to otitis media with effusion (OME) have all may occurred.

However the most common presenting complaint of a nasal mass to the ENT department is with nasal obstruction.

Congenital nasal masses are rare malformations and occur in one in 20,000-40,000 live births in the USA.

There is also a regional variation with fronto-ethmoidalencephaloceles being more common in Southeast Asia, occurring in one in every 5000 births. Therefore due to their rarity, the general Ear Nose and Throat (ENT) surgeon will have little direct experience of these masses(1).

Nasal masses in children are rare and should be treated with suspicion. Unlike adults, inflammatory nasal polyps are unusual in children and if present may raise the suspicion ofmucociliary clearance disorders, such as cystic fibrosis(4).

Nasal cavity contains different kinds of tissues such as the epithelial (squamous, neuroendocrine, olfactory) and the mesenchymal (bone, cartilage, muscle, vascular) ones and all of these may carry the risk for a variety of tumoraldifferentiation. Despite the wide range of diversity, the incidence of the nasal tumors are as low as 1/100.000.Primary nasal malignancies consist of 0.2% - 0.8% of all the malignant tumors and 3.6% of the malignant upper airway tumors (5).

Cancer of the nasal cavity is a rare but serious problem in the pediatric population. Nonspecific symptoms such as nasal congestion and rhinorrhea may persist for months to even years before a nasal mass is suspected.

Although the more frequent use of computed tomography scanning in the evaluation of presumed sinusitis in children is facilitating the diagnosis of these lesions, a high level of suspicion is often required before the appropriate diagnostic imaging tests are ordered or an otolaryngology referral is made. The differential diagnosis relative to benign and malignant etiologies of

a nasal mass in a child is broad, and surgical biopsy for definitive pathologic diagnosis is required. Malignant lesions in this region in children tend to be locally aggressive, often presenting at an advanced stage. An additional dilemma in this age group is the morbidity associated with the adjuvant treatment of malignant disease, including the subsequent increased risk of developing a second primary cancer (6).

The nasal cavity is occasionally the site of symptomatic disease. Anatomic variants include choanal atresia, conchabullosa, paradoxic curvature of the middle turbinate, a wide nasal cavity from a hypoplastic maxillary sinus, and septal deviation. The nasal mucosa of the turbinates' may be asymmetric in thickness because of the normal nasal cycle or as a result of the presence of polyps or inflammation. Obstruction of the osteomeatal complex and other sinuses may occur with benign tumors (antrochoanal polyp, neural tumors, inverting papilloma) or malignant ones (SCC, adenocarcinoma, adenoid cystic carcinoma). If a nasal mass is present, the extent of the mass within the nasal cavity, adjacent sinuses, or orbits or involvement of the cribriform plate can be determined by coronal CECT or sagittal and coronal MRI, and this may affect the surgical approach and postoperative therapy(7).

**PATIENTS AND METHODS**

▪ A prospective descriptive study of 20 selected child patients with nasal mass seen in ENT department at Al-kadhimain teaching medical city and ENT center in Sulaimaniya teaching hospital over a period of 12 months (Feb.2014-Mar.2015).

Inclusion criteria:

1. Patient within pediatric age group (from birth up to 15 years old).
2. Nasal mass originating in nasal cavity.
3. Mass in nasopharynx that extended to nasal cavity
4. Mass originating from paranasal sinuses and extended into nasal cavity.
5. Mass originating from intracranial area extended into nasal cavity

Exclusion criteria:

1. Adenoids
2. Choanal atresia
3. Mass in external nose
4. Septal abscess/ hematoma

▪ Direct questioning of patients and/or his parents about the biographic data, chief compliant and duration, other medical or surgical history, drug history and any relevant socio-economic history (attached questionnaire).

▪ General clinical examinations, ENT, Head and neck examination of the patients were done.

▪ The examination of nose and nasal cavity start by inspecting and palpating the external nose and then examination of nasal cavity.

▪ Radiological examination includes CT scan (axial, coronal, sagital) views of nose and paranasal sinuses for all 20 children in studied group and the MRI done only for one patient in addition to CT scan..

▪ Rigid nasoendoscope done for 18 patientspreoperatively and the other 2 patients underwent this type of examination intraoperatively due to difficulty in doing this procedure under local anesthesia in children.

▪ Technique of nasal endoscopic examination:

▪ Preparation and Examination

▪ Since all patients were children, the nasal endoscopic examination was challenging and difficult, and it was impossible in few of them.

Natural Resources for Human Health
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▪ Once the patient is properly positioned and the equipment is prepared, local anesthesia was used by applying xylocain – oxymetazolin soaked nasal packs and the endoscopy is started.

▪ An organized nasal endoscopy was accomplished in thestandard three passes that facilitate a thorough, detailed examination, using zero, 30 degree, 2.7mm, rod Hopkins rigid nasoendoscopes.

▪ The first pass is along the floor of the nose. An initial impression should be obtained regarding the health of the sinonasal mucosa, changes with decongestion and the overall anatomy of the sinonasal cavity. The inferior meatus is the first area to inspect After examination of the inferior meatus, the inferior part of the inferior turbinate and the nasal septum was examined , The scope is advanced through the nasal cavity toward thenasopharynx. The Eustachian tube orifices, torus tubarius, adenoid pad (if present) and entire nasopharynx was visualized.

▪ In the Second pass the endoscope is reinserted between the inferior and middle turbinates. While advancing in a posterior direction, the inferior portion of the middle turbinate and middle meatus, the fontanelles and any accessory maxillary ostia are examined.

▪ The Third pass occurs while withdrawing the endoscope. The scope is rotated laterally beneath the posterior aspect of the middle turbinate to gain access to the deeper areas of the middle meatus .

After reaching the diagnosis, the patients were prepared for surgical intervention under general anesthesia.

▪ The preparation includes general investigations as requested by anesthetist.

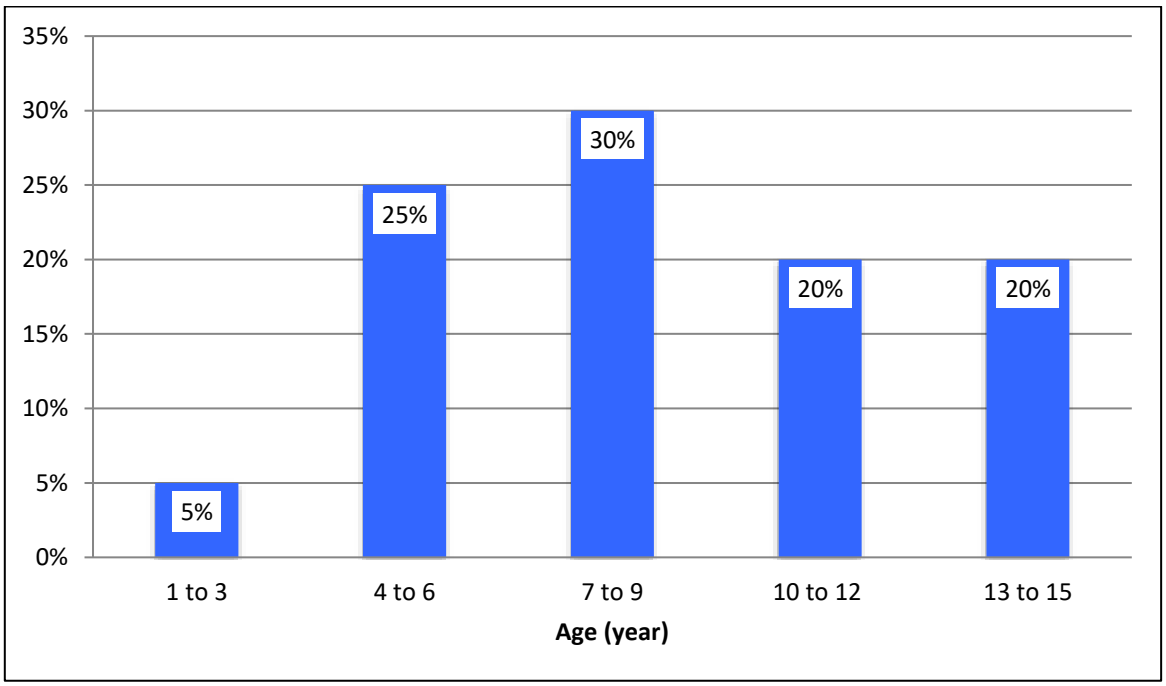
▪ All patients were fit for general anaesthsia

▪ 18 patients underwent surgical interventions and all the masses were excised and have been sent for histopathological study to confirm the diagnosis.

▪ Follow up period was for 6 months and depend mainly on history and clinical examination with rigid nasoendoscope, all of them were normal.

**RESULTS**

Figure(1), shows the age distribution of patients. The age of most of patients was between 7 to 9 years old.




**Figure(1).** Age of studied group.

Sixty percent of patients was males and 40% was females, Table 1.

**Table (1)** . Gender of studied group.

| Age (year) | Number | Percentage |
|---|---|---|
| Male | 12 | 60 |
| Female | 8 | 40 |
| Total | 20 | 100 |

Most of patients (75%) were living in Baghdad and only 25% were living in Sulaimaniyah as shown in figure(2).

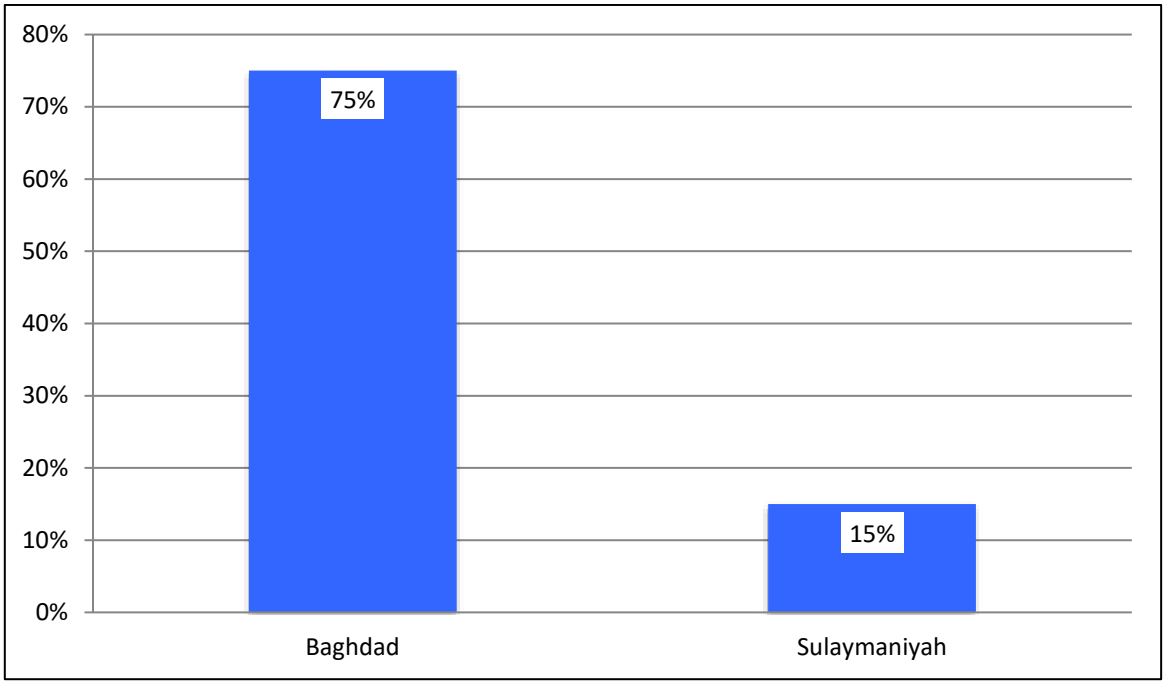



Table 2 shows the chief complains of studied patients. Seventy five percent complained from nasal obstruction, 15% complained from nasal discharge, and only 10% complained from epistaxis.

**Table (2).** Chief complains in studied group.

| **Chief complains** | **Number** | **Percentage** |
|---|---|---|
| Nasal obstruction | 15 | 75 |
| Nasal discharge | 3 | 15 |
| Epistaxis | 2 | 10 |
| Total | 20 | 100 |

The duration of disease was 0 to 119 days in 45% of patients, 120 to 239 days in 30% of patients, 240 to 359 in 15% of patients, and 360 days and above in 10% of patients, Table 5. The minimum duration of disease was 7 days and maximum duration of disease was 365 days. as shown in table 3.

Natural Resources for Human Health
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**Table (3).** Duration of chief complains in studied group.

| Duration (days) | Number | Percentage |
|---|---|---|
| 0 – 119 | 9 | 45 |
| 120 – 239 | 6 | 30 |
| 240 – 359 | 3 | 15 |
| 360 & above | 2 | 10 |
| Total | 20 | 100 |

The most common associated symptoms were nasal obstruction and discharge in 50% of patients, followed by obstruction and periorbital swelling in 20% of patients. Twenty percent of patients had not history of associated signs or symptoms, Figure 3.

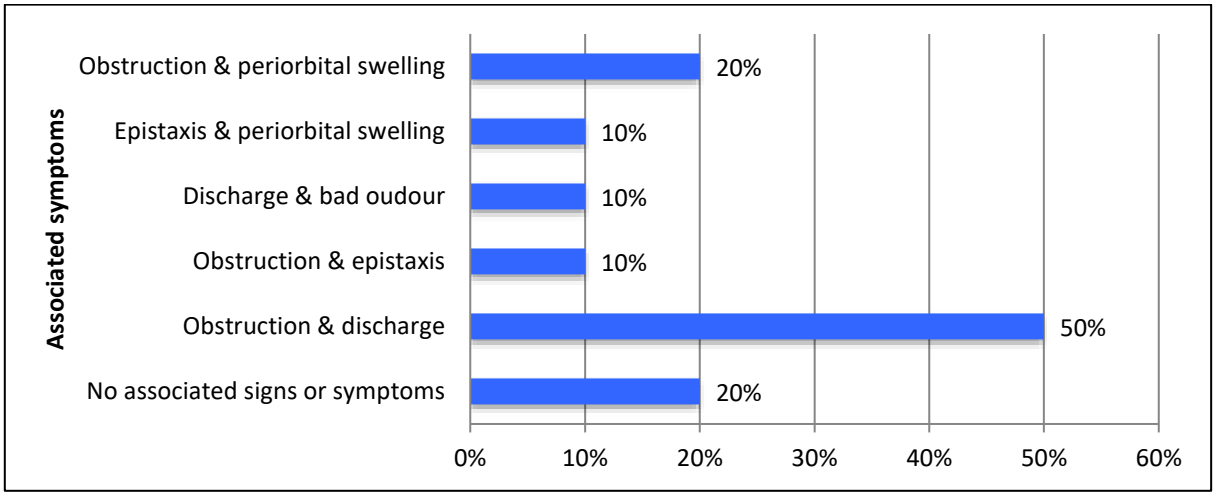



**Figure (3).** Associated symptoms in studied group.

The most common histopathological findings were antrochoanal polyp (ACP) in 35% of patients and fungal rhinosinusitis (FRS) in 35% of patients, Table 4.

**Table 4.** Histopathological diagnosis in studied group.

| Histopathological diagnosis | Number | Percentage |
|---|---|---|
| Antrochoanal polyp(ACP) | 7 | 35 |
| Fungal rhinosinusitis(FRS) | 7 | 35 |
| Rhinolith | 2 | 10 |
| Rhabdomyosarcoma | 1 | 5 |
| Chondroma | 1 | 5 |
| Haemangioma | 1 | 5 |
| Meningocele | 1 | 5 |
| Total | 20 | 100 |

Natural Resources for Human Health
eISSN: 2583-1194

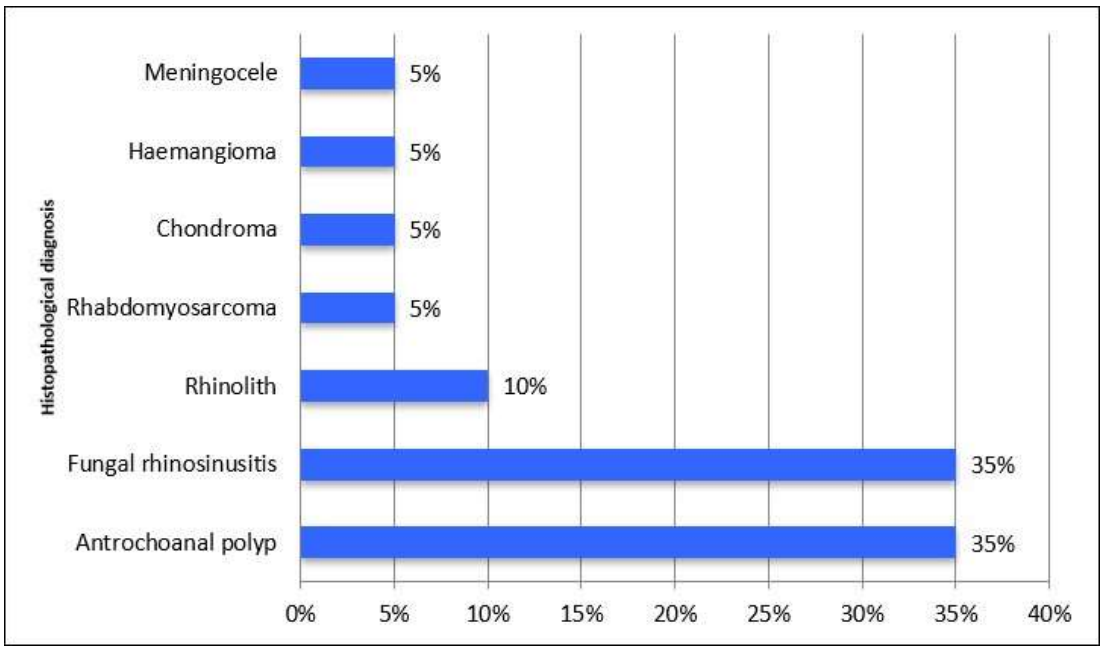



**Figure 4.** Histopathological diagnosis in studied group.

**Table (4)** shows CT findings (bony changes)

| **Bone changes** | **Number** | **percentage** |
|---|---|---|
| Destruction | 1 | 5 |
| Bowing | 6 | 30 |
| Sclerosis | 5 | 25 |
| Total | 12 | 60 |

**Table (6)** shows CT findings (laterality)

| **Laterality** | **Number** | **percentage** |
|---|---|---|
| Right side | 9 | 45 |
| Left side | 8 | 40 |
| Bilateral | 3 | 15 |
| Total | 20 | 100 |

**Table (7)** shows CT findings (appearance of the mass)

| **Appearance** | **Number** | **percentage** |
|---|---|---|
| Homogenous | 7 | 35 |
| Heterogeneous | 13 | 65 |
| Total | 20 | 100 |

Natural Resources for Human Health
eISSN: 2583-1194

**Table(8).** Modality treatment in studied group.

| Modality treatment | Number | Percentage |
|---|---|---|
| Endoscopic surgery | 15 | 75 |
| Non-endoscopic surgery | 3 | 15 |
| Referred to other speciality | 2 | 10 |
| Total | 20 | 100 |

**Table(9).** Mean age (year) according to histopathological diagnosis in studied group.

| Histopathological diagnosis | Age (year) | | P value |
|---|---|---|---|
| | Number | Mean ± SD | |
| Antrochoanal polyp | 7 | 10.2 ± 3.1 | 0.039* |
| Fungal rhinosinusitis | 7 | 10.1 ± 2.7 | |
| Rhinolith | 2 | 4.5 ± 0.7 | |
| Rhabdomyosarcoma | 1 | 4.3 ± 0.0 | |
| Chondroma | 1 | 7.0 ± 0.0 | |
| Haemangioma | 1 | 6.0 ± 0.0 | |
| Meningocele | 1 | 1.0 ± 0.0 | |

* P< 0.05

Table 10 shows the relationship between gender and histopathological diagnosis. Most of males and females complained from antrochoanal polyp (41.7% and 25.0%, respectively) and fungal rhinosinusitis (33.3% and 37.5%, respectively). The relationship between gender and histopathological diagnosis was statistically not significant, P> 0.05.

**Table (10).** The relationship between gender and histopathological diagnosis.

| Histopathological diagnosis | Gender No. (%) | | P value |
|---|---|---|---|
| | Male | Female | |
| Antrochoanal polyp | 5 (41.7) | 2 (25.0) | 0.567 |
| Fungal rhinosinusitis | 4 (33.3) | 3 (37.5) | |
| Rhinolith | 1 (8.3) | 1 (12.5) | |
| Rhabdomyosarcoma | 1 (8.3) | 0 (0.0) | |
| Chondroma | 0 (0.0) | 1 (12.5) | |
| Haemangioma | 1 (8.3) | 0 (0.0) | |
| Meningocele | 0 (0.0) | 1 (12.5) | |

Statistical analysis

All data then analyzed using SPSS (version 21) computer program. Statistical analysis included descriptive statistics like: a tables and figures. Univariate analysis included ANOVA test for quantitative variables, and Chi-square test for qualitative variables. In this analysis, the statistical significant association was determined. All p values were based on 2-sided tests, and $P < 0.05$ was considered statistically significant.

**DISCUSSION**

Age of the patients

In our study, most of patients (70%) aged above 7 years and 30% of them located between 7 to 9 years, this result consistent with result of study done by Benoit et al(2007)(6) which revealed the median age of 7 years, with a mean of 9.7 years and a range of 7 months to 17 years,

This result can be explained by ability of older children to express their problem and complain more than younger children and they can ultimately draw attention to their symptoms and/or signs

Gender of the patients

The sex distribution in this study shows male predominance (60%) with (40%) for females,

This result goes with A.lathi et al study (2011)(14) result which revealed a male who have (60.7%) and female (39.2%), it stated: Sinonasal masses had predilection for males, demonstrating a male to female ratio of 1.5:1. it was higher (male-to female ratio of 1.7:1) in the study by Zafar et al. from india. While a study from Nigeria by Bakari et al(2010)(15)( revealed an opposite ratio showing female preponderance (M:F ratio of 1:1.2). A British review of nasal polyposis reported a ratio at 2:1 (M:F)

Benoit et al (6) shows also results representing male gender of (56.2%) and (43.7%),

All these percents which show male dominance may reveal that nasal tumors are more common in males except some entities like esthesioneuroblastoma and hemangiopericytoma

Presentation of the patients

The current study shows different types or modalities of presentation s, nasal obstruction is the most common type of presentation in 75% of the patients followed by nasal discharge which represent 15% and 10% was with epistaxis.

Bakari et al(15) show the main presenting symptoms are nasal blockage 97.4% and rhinorrhea 94.7%.

The most common clinical complaints were unilateral nasal obstruction (9 patients out of 16 ) and ophthalmologic manifestations (8 patients), including proptosis, diplopia, lid discoloration, and loss of vision. Additional signs and symptoms included epistaxis, headache, weight loss, lethargy, obstructive sleep apnea, anosmia, foul nasal discharge, and cervical lymphadenopathy according to Benoit et al(6).

A.lathi et al(14) stated: nasal obstruction was the most common (97.3% cases) presenting complaint. rhinorrhoea (49.1%), hyposmia (31.3%), intermittent epistaxis (17.9%), headache (16.9%), swelling over face (11.6%) and eye related symptoms (10.7%) were other common symptoms. Facial pain (3.9%) and external nasal deformity (1.8%) were demonstrated in a minority of patients which is consistent with our study.

D. Yildirim et al(2012)(5) result also show that all cases had varying degrees of nasal obstruction.

Duration of symptoms

Most of the patients presented within 4 months as duration of chief complaint and not more than 8 months in 75% of patients, this period is short if we compared it to Bakari et al(8) which show the result of 40 months as mean duration.

This difference may be attributed to the ability of adult patients in Bakari et al(8) study to self-treatment of their symptoms and it will leading to prolongation of chief complaint duration not like the child patient were their parents usually taking care of them urgently.

Histopathological diagnosis

The most common histopathological diagnosis were antrochoanal polyp in 35% of patients and fungal rhinosinusitis in 35% of patients, it mean that the most common type of mass in child nasal cavity was non-neoplastic masses and these represent 95% of the masses in our study, these results are consistent with A.lathi et al study(9).

D. Yildirim et al(5) study of 66 patients also shows that more than 72% of nasal cavity mass(n=48) are benign in nature including nasal alar hemangioma (n = 1), nasal angiofibroma (n = 1), columellar dermoid cyst (n = 1), fibrous dysplasia of the maxillary sinus (n = 5), pleomorphic adenoma (n = 1), antrochoanal polyp (n = 4), sphenochoanal polyp (n = 1), inverted papilloma (n = 6), complicated concha bullosa (n = 6), rhinolith (n = 4), mucocele (n = 6), atypical retention cyst (n = 4), fungal destructive sinusitis (n = 3), nasoethmoid encephalocele (n = 4), nasal paraganglioma (n = 1). Malignant cases (n = 18) consisted of lethal midline granuloma (n = 3), sinonasal lymphoma (n = 5), chondrosarcoma (n = 2), squamous cell carcinoma (n = 4), melanoma (n = 1), adenoid cystic carcinoma (n = 1), esthesioneuroblastoma (n = 1), sinonasal Ewing sarcoma (n = 1).

Histological diagnosis showed that 59 (77.6%) were benign, 2 (2.6%) were malignant. 15 (19.7%) patients did not have a histological diagnosis as they were either treated medically or lost to follow up according to Bakari et al(8) which is also consistent with our study.

Approach of treatment

In our study, the treatment modality was surgical excision in 90% (75%) as endoscopic surgical excision and 15% as endonasal approach, this result consistent with Bakari et al which offered the surgical treatment in about 72%

A.lathi et al(9) stated that: Surgery is the treatment of choice for benign lesions, while a combination of surgery and radiotherapy is helpful in malignant conditions.

A meta-analysis of functional endoscopic sinus surgery (FESS) results in the pediatric population has demonstrated efficacy in reducing symptoms with an 88% success rate and a low incidence of complications. This approach typically yields significant improvements in nasal obstruction (91%), rhinorrhea (90%), postnasal drip (90%), headache (97%), hyposmia (89%), and chronic cough (96%) (7).

Age and histopathological diagnosis

In this study, mean age according to histopathological diagnosis in studied group. The highest mean age was 10.2 + 3.1 years and 10.1 + 2.7 years in patients of antrochoanal polyp and patients of fungal rhinosinusitis, respectively. These results goes with the fact that these two entity are common in late childhood and young adulthood and teenagers as stated in the paragraph below:

Ethnic and geographic differences may impact the incidence of the various forms of nasal polyp disease.Allergic fungal rhinosinusitis (AFRS), which may represent 5% to 10% of chronic rhinosinusitis with nasal polyp cases taken to surgery. Appears to be more common in warm or humid climates, and is predominantly a disease of teens and young adults.

Antrochoanal polyps account for approximately 5% of polyp cases and present more commonly in young adults (10).

Computed tomography findings

The bony changes in our study was in 60 percent of cases, these changes were suspected with resulted histopathological diagnosis, this result agrees the facts by D. Farina et al(11)(2005) that bone changes in both fungus balls and eosinophilic fungal rhinosinusitis follow the same model exhibited by chronic rhinosinusitis and nasal polyposis. Mechanical pressure and osteoclastic activity result in bone demineralization, whereas sclerotic thickening is observed in the case of prevalent osteoblastic activity.

The other CT finding was the laterality of opacification, there were unilateral in 85% and the remaining 15% was bilateral, these results were opposite to the results of study done by A.lathi et al (9) which revealed 47.7% of cases were with unilateral nasal masses and the remaining patients had bilateral nasal masses. The difference may be attributed to difference in age of studied group and to the type of histopathological diagnosis.

The nature of the masses was heterogeneous in 65 percent and homogeneous in 35%, this result goes with the fact that allergic fungal rhinosinusitis(10), chondroma, rhinolith and some cases of antrochoanal polyps appear as heterogeneous opacity on CT scan,

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## CONCLUSION

The presentation of nasal mass in children varies with age and cause.

Most of the nasal masses in children occur after age of 7 years old. There is no significant gender difference in studied group. The most common presenting symptom is nasal obstruction. The most common histopathological diagnosis was antrochoanal polyps and fungal rhinosinusitis. There were significant association between the age and histopathological diagnosis.

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