International Surgery Journal
*Batikhe MY et al. Int Surg J. 2019 Feb;6(2):503-507*
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20190392

**Original Research Article**

# Surgical causes of neck masses in pediatrics: management and outcome

**Mohamed Y. Batikhe*, Tarek T. Harb**

Department of Surgery, Pediatric Surgery Unit, Sohag University, Sohag, Egypt

**Received:** 23 November 2018
**Accepted:** 01 January 2019

***Correspondence:**
Dr. Mohamed Y. Batikhe,
E-mail: mohkhezawy@yahoo.com



## ABSTRACT

**Background:** Neck masses are common pathologies in pediatrics, surgery is considered the only line of treatment in most of neck lesions, and usually early intervention is recommended to avoid complications, The aim of our study is to evaluate the clinical and radiological presentations, the pathological findings, and the surgical outcome of neck lesions operated in our institution in pediatric age group.
**Methods:** All pediatric patients presented at our pediatric surgery unit in the period from January 2017 to January 2018 by neck masses were included in this study, Patients with fistulae without underlying swellings and those with inflammatory lesions who responded to medical treatment and surgery wasn't indicated were excluded from this study. History taking, clinical evaluation, routine laboratory investigations and neck ultrasound were done in all cases, and Imaging studies (CT, MRI) were done in selected cases, all resected specimens were sent for histopathological examination, demographic data, duration of surgery, using of haemostatic devices, need of blood transfusion, duration of hospital stay, morbidity and mortality all were recorded and statistically analyzed.
**Results:** In the majority of cases swelling was cystic in nature (69.4%), with lateral position in most of the lesions (61.2%), thyroglossal cyst proved to be the commonest (30.6%), followed by branchial cyst (22.4%). Clinical diagnosis with neck ultrasound was sufficient for diagnosis in most of the cases (55.1 %). Follow up of patients for 3 months in all cases with no mortality recorded and very low incidence of morbidity (6.1%).
**Conclusions:** Neck swellings in pediatric population is common with wide range of differential diagnosis, with respecting anatomical and pathological backgrounds surgery has excellent outcome with very low incidence of morbidity.

**Keywords:** Neck masses, Congenital neck swellings, Neck malformations

## INTRODUCTION

The majority of neck swellings in pediatric age group are benign nature and clinical course, and usually are classified into three categories: developmental (thyroglossal duct remnants, branchial cleft anomalies, dermoid cysts, vascular malformations, and hemangiomas) inflammatory (cellulitis, lymphadenitis), or neoplastic (benign and malignant).[1-5] Clinical and radiographic evaluation by Ultrasonography as the preferred imaging study is usually sufficient for evaluation of palpable mass. Further imaging studies (Computed tomography or Magnetic resonance) is indicated for evaluating the nature and extension of some swellings and is usually enough to establish diagnoses in pediatric neck swellings however open biopsy is sometimes required to confirm definitive diagnosis when all previous measures don't reach final diagnosis (e.g. suspicious lymphadenopathy).[6]

Surgical excision is almost always the best choice of treatment in neck lesions, for cosmetic reasons, to prevent recurrent attacks of infections in addition to the actual potential risk of malignancy.[7] The commonest congenital

pediatric neck lesions are thyroglossal duct anomalies, followed by branchial cleft remnants.[4,8]

The aim of present study is to evaluate the clinical and radiological presentations, the pathological findings, and the surgical outcome of neck lesions operated in our institution in pediatric age group.

## METHODS

All pediatric patients (with age less than 16 years) presented at our pediatric surgery unit in the period from January 2017 to January 2018 by neck masses were included in this study, Patients with fistulae without underlying swellings and those with inflammatory lesions who responded to medical treatment and surgery wasn't indicated were excluded from this study (e.g. lymphadenitis, cellulitis, sternomastoid tumour).

Careful history taking, clinical evaluation, routine laboratory investigations and neck ultrasound as a primary imaging study were done in all cases, and further Imaging studies (CT, MRI) were done only in selected cases when previous primary measures don't reach final diagnosis and to evaluate the anatomical relations and extension of the swellings.

After acceptance of the scientific and ethical committee of our institution, operative details, risk, and possible complications of anesthesia and surgery all were discussed with the parents and written informed consent was obtained in all cases.

All patients were operated under general anesthesia with neck extended in most cases, demographic data, pathological findings (all resected specimens were sent for histopathological examination), duration of surgery, using of haemostatic devices, need of blood transfusion, using drain, duration of hospital stay, and postoperative complications all were recorded and statistically analyzed.

### *Statistical analysis*

Data was analyzed using IBM SPSS Statistics for Windows version 22. Quantitative data was expressed as means±standard deviation, median and range. Qualitative data was expressed as number and percentage.

## RESULTS

This prospective study included 49 pediatric patients presented to authors' unit with neck masses that needed surgical intervention in the period from January 2017 to January 2018, patients were male in 53.1%, with median age 21 months (Table 1).

The mean age in cases of branchial cysts was 8±11.35, in thyroglossal cysts 35.8±22.12, in lymphatic malformations 14.88±16.09, in goiter 189±4.34 and in cervical teratomas it was 0.05±0.03 (Table 2).

**Table 1: Distribution of patients by socio-demographic criteria (N =49).**

| Characteristics | | Summary statistics |
|---|---|---|
| Gender | Female | 23 (46.9%) |
| | Male | 26 (53.1%) |
| Age (months) | Mean ± SD | 34.51±42.21 |
| | Median (range) | 21 (0.03 - 192) |

**Table 2: Age (months) distribution according to the etiology.**

| Etiology | Mean age±SD | Median (range) |
|---|---|---|
| Branchial cyst | 8±11.35 | 4 (1-40) |
| Cervical teratoma | 0.05±0.03 | 0.05 (0.03 -0.07) |
| Cystic hygroma | 14.88±16.09 | 8 (1-48) |
| Goiter | 189±4.34 | 189 (186-192) |
| Hemangioma | 29.5±16.36 | 31.5 (3-50) |
| Lymphadenopathy | 78.4±29.54 | 66 (50-120) |
| Thyroglossal cyst | 35.8±22.12 | 28 (8-72) |

**Table 3: Sex distribution according to the etiology.**

| Etiology | Female | Male |
|---|---|---|
| Branchial cyst | 6 (54.5%) | 5 (45.5%) |
| Cervical teratoma | 0 (0.0%) | 2 (100%) |
| Cystic hygroma | 2 (25%) | 6 (75%) |
| Goiter | 0 (0.0%) | 2 (100%) |
| Hemangioma | 3 (50%) | 3 (50%) |
| Lymphadenopathy | 3 (60%) | 2 (40%) |
| Thyroglossal cyst | 9 (60%) | 6 (40%) |

**Table 4: Distribution of the patients by disease related criteria (N =49).**

| Characteristics | Summary statistics |
|---|---|
| **Nature** | |
| Cystic | 34 (69.4%) |
| Solid | 13 (26.5 %) |
| Combined | 2 (4.1%) |
| **Site** | |
| Lateral | 30 (61.2%) |
| Middle | 19 (38.8%) |
| **Number** | |
| Multiple | 5 (10.2%) |
| Solitary | 44 (89.8%) |
| **Clinical diagnosis** | |
| Branchial cyst | 11 (22.4%) |
| Cervical teratoma | 2 (4.1%) |
| Cystic hygroma | 8 (16.3%) |
| Goiter | 2 (4.1%) |
| Hemangioma | 6 (12.3%) |
| Lymphadenopathy | 5 (10.2%) |
| Thyroglossal cyst | 15 (30.6%) |

As regards sex distribution according to etiology, there was female predominance in cases of throglossal cysts (60%), and in branchial cysts (54.5%), while in cases of goiter, and cervical teratomas there was male predominance (100%) (Table 3).

**Figure 1: Huge thyroglossal cyst (preoperative).**

**Figure 2: Huge thyroglossal cyst (intraoperative).**

**Figure 3: Intraoperative of cavernous hemangioma).**

**Figure 4: Lymphatic malformation (Intraoperative).**

**Figure 5: Preoperative picture of cervical teratoma.**

**Table 5: Surgical procedures and results of histopathological examination.**

| Diagnosis | Operation | Incidence |
|---|---|---|
| Suspicious lymphadenopathy | Biopsy | 5 (10.2%) |
| Branchial, lymphatic malformation, hemangioma, teratoma | Excision | 27 (55.1%) |
| Thyroglossal cyst | Sistrunk operation | 15 (30.6%) |
| Goitre | Total thyroidectomy | 2 (4.1%) |
| **Clinical diagnosis** | **Histopathology** | **Incidence** |
| Branchial cyst | Branchial cyst | 11 (22.4%) |
| Hemangioma | Cavernous hemangioma | 6 (12.3%) |
| Generalized lymphadenopathy | Hodgkin lymphoma | 2 (4.1%) |
| Cystic hygroma | Lymphatic malformation | 8 (16.3%) |
| Cervical teratoma | Mature teratoma | 2 (4.1%) |
| Goiter | Papillary carcinoma | 2 (4.1%) |
| Cervical lymphadenopathy | T.B lymphadenitis | 3 (6.1%) |
| Thyroglossal cyst | Thyroglossal cyst | 15 (30.6%) |

The majority of cases were cystic in nature, with lateral position in most of the lesions and in our study thyroglossal cyst proved to be the commonest (30.6%) (figure1, 2), followed by branchial cyst (22.4%), lymphatic malformation (16.3%) (Figure 4), vascular malformation (12.3%)(figure 3), cervical teratoma (4.1%) (Figure 5 and Table 4).

Clinical diagnosis and neck ultrasound were sufficient for diagnosis in most of the cases with CT was indicated in 22 cases to ensure diagnosis and evaluate the nature, anatomical relations and extension of the swelling 11 cases proved to be branchial cysts, 8 lymphatic malformation, 2 cervical teratoma, and one case of hemangioma.

Surgical intervention was done in all cases after informed consent from the parents and in all cases done under general anesthesia with the neck extended in most of cases. The type of procedure was sistrunk operation done in all cases of thyroglossal cysts, total thyroidectomy in all suspicious goiters, lymph node biopsy in suspicious lymphadenopathy, and excision in branchial cysts, and hemangiomas (Table 5).

Blood transfusion was indicated in 7 cases (14.3%): 3 cases of lymphatic malformation, 2 cases of vascular malformations, and 2 cases of cervical teratoma.

All resected specimens were sent for histopathological examination for final pathological diagnosis and to evaluate the need for further management plans, patients proved to have malignancy (2 cases of Hodgkin lymphoma, and 2 cases of papillary carcinoma) were referred to the pediatric oncology department for further evaluation and management, the 3 patients with tuberculous lymphadenitis had anti tuberculous drugs prescribed with follow up in the pediatric department clinic (Table 5).

Follow up of patients was done in the outpatient clinic for 3 months in all cases with no mortality recorded and very low incidence of morbidity: keloid occurred in 2 cases (4.1%): one case was lymphatic malformation, and one was cervical teratoma., in one case (branchial cyst) minimal wound infection occurred and responded to daily dressing and antibiotic therapy, no other complication was recorded.

## DISCUSSION

Neck swellings are among the most frequent problems in the practice of pediatric surgery. Though most have a congenital etiology, it is essential to exclude malignancies because 12% of all malignant masses in pediatrics has been detected in the head and neck, in this study the lesions were benign in (91.9%) and malignancy was detected in 4 cases (8.1%): 2 cases with Hodgkin lymphoma in cervical lymphadenopathy and 2 cases papillary carcinoma of thyroid gland.[9]

In present study and after exclusion of inflammatory lymphadenitis congenital neck swellings were the commonest (85.7%), this is similar to other studies.[5,10] The commonest of neck swellings was thyroglossal cysts (30.6%), 40% of thyroglossal cyst patients were male followed by branchial cyst (22.4%), 45.5% of branchial cyst patients were males, no sex predilection was detected by other authors with same lesions in other localities.[11,12]

Many authors recommended that the diagnosis should be based on clinical history and physical examination, avoiding excess complementary examinations, often not tolerated in this age group, and biopsy is essential for definitive diagnosis and should be sought in cases of persistent and suspicious lesions.[13,14] In present study clinical diagnosis associated with soft tissue neck ultrasound was sufficient for the diagnosis in 55.1% while further imaging (CT) was indicated in 44.9% of cases, and all resected specimens were sent for histopathological examination to confirm diagnosis.

Osifo et al, in a similar study recorded that Surgical excision was curative in (34.3%) of cases, but others required additional chemo and/or radiotherapy, with two (5.7%) mortality recorded due to late referral of children with Hodgkin's lymphoma, in our study no mortality was recorded in the short term follow up period (6 months) with very low incidence of morbidity :keloid formation in 2 cases and wound infection in 1 case.[15]

## CONCLUSION

Neck swellings in pediatric population is common with wide range of differential diagnosis, most of swellings are developmental in origin, thyroglossal duct remnant is the commonest followed by branchial remnants, with respecting anatomical and pathological backgrounds surgery has excellent outcome with very low incidence of morbidity.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Turkington JR, Paterson A, Sweeney LE, Thornbury GD. Neck masses in children. Br J Radiol. 2005;78:75-85.
2. Tracy TF, Jr, Muratore CS. Management of common head and neck masses. Semin Pediatr Surg. 2007;16:3-13.
3. Maharjan M, Hirachan S, Kafle PK, Bista M, Shrestha S, Toran KC, et al. Incidence of tuberculosis in enlarged neck nodes, our experience. Kathmandu University Med J. 2009 Jan;7(1):54-8.
4. Al-Khateeb TH, Al Zoubi F. Congenital neck masses: A descriptive retrospective study of 252 cases. J Oral Maxillofac Surg. 2007;65:2242-7.
5. Ayugi JW, Ogeng'o JA, Macharia IM. Pattern of congenital neck masses in a Kenyan paediatric population. Int J Pediatr Otorhinolaryngol. 2010;74:64-6.
6. Hopewell B, Schneider R, Gov-Ari E. Accuracy of preoperative diagnosis of pediatric neck masses. Am

Acad Otolaryngol Head Neck Surg Otolaryngol Head Neck Surg. 2012;147(Suppl):227-1.
7. Erikci V, Hosgör M. Management of congenital neck lesions in children. J Plast Reconstr Aesthet Surg. 2014;67:e217-22.
8. Foley DS, Fallat ME. Thyroglossal duct and other congenital midline cervical anomalies. Semin Pediatr Surg. 2006;15:70-5.
9. Albright JT, Topham AK, Reilly JS. Pediatric head and neck malignancies: US incidence and trends over 2 decades. Arch Otolaryngol Head Neck Surg. 2002;128:655-9.
10. Rajesh KP, Channa RS, Varshney PK, Naim M. Head and neck masses in children: A clinicopathological study. Indian J Otolaryngol Head Neck Surg. 2002;54(4):268-71.
11. Maitra A, Abbas AK. Thyroid gland. In: Kumar V, Abbas AK, Fausto N, Aster JC, eds. Robins and Cotran Pathologic Basis of Diseases. 7th ed. Philadelphia: Elsevier Saunders; 2004:1155-1226.
12. Thyroid and Parathyroid glands. In: Badoe EA, Archampong EQ, da Rocha-Afodu JT, eds. Principles and Practice of Surgery in the Tropics. 3rd ed. Accra: Ghana Publishing Co.;2000:315334.
13. Lee J, Fernandes R. Neck masses: evaluation and diagnostic approach. Oral Maxillofac Surg Clin North America. 2008;20(3):321-37.
14. Celenk F, Baysal E, Aytac I, Durucu C, Sari I, Mumbuc S, et al. Incidence and predictors of malignancy in children with persistent cervical lymphadenopathy. Int J Pediatr Otorhinolaryngol. 2013;77(12):2004-7.
15. Osifo OD and Ugiagbe EE. Neck masses in children: etiopathology in a tertiary center. Niger J Clin Pract. 2011 Apr-Jun; 14(2):232-6.

**Cite this article as:** Batikhe MY, Harb TT. Surgical causes of neck masses in pediatrics: management and outcome. Int Surg J 2019;6:503-7.