ORIGINAL ARTICLE ASIAN JOURNAL OF MEDICAL SCIENCES

Clinicopathological study of neck mass in pediatric age group

Ritam Ray[1], Shaswata Sarkar[2], Aditi Bhattacharyay[3]

[1]Associate Professor, [2]Postgraduate Resident, Department of ENT, Burdwan Medical College, Purba Bardhaman, [3]Postgraduate Resident, Department of Anaesthesiology, Bankura Sammilani Medical College, Bankura, West Bengal, India

Submission: 26-01-2023 Revision: 29-05-2023 Publication: 01-07-2023

ABSTRACT

Background: Neck swellings are common in clinical practice and are of various types – congenital, acquired, inflammatory, neoplastic, and miscellaneous. The workup of a neck mass is different in children and adults, as the etiologies are different. Only 2–15% are malignant. **Aims and Objectives:** To estimate the burden of neck mass in pediatric age group clinicopathological. **Materials and Methods:** This prospective observational study was conducted in the Otorhinolaryngology Department of Burdwan Medical College and Hospital, Burdwan, a rural-based tertiary care hospital in Burdwan for 18 months from April 2021 to September 2022, and 50 patients in pediatric age group presented with neck swelling were included in this study after through history taking and meticulous clinical examination and after getting institutional ethics committee clearance. **Results:** It was found that most of the patients presented with swelling over the right side (26 [52.0%]), but this was not statistically significant (P = 68916) (Z = 0.4). Few patients had (11 [22.0%]) 5 months of duration of symptoms, but it was not statistically significant (P = 63836) (Z = 0.4683). Some of the patients had fever and cough (13 [26.0%]) which was statistically significant (P < 0.00001) (Z = 4.8). **Conclusion**: This study revealed the demographic and clinic-pathological profile of neck mass of various pathologies in pediatric age group.

Key words: Neck swelling; Pediatric patients; Fine needle aspiration cytology; USG; Computed tomography scan

Access this article online

Website: http://nepjol.info/index.php/AJMS

DOI: 10.3126/ajms.v14i7.51796

E-ISSN: 2091-0576

P-ISSN: 2467-9100

INTRODUCTION

Neck swellings in the pediatric age group are very frequently encountered problems in otorhinolaryngology practice and are of various types - congenital, acquired, inflammatory, neoplastic and miscellaneous. It can present as palpable cystic or solid masses, infected masses, draining sinuses or fistulae. The workup of neck mass is different in children and in adults, due to differing etiologies. Only 2–15% are malignant. Owing to the complex anatomy of the neck a comprehensive knowledge of regional anatomy and recognition of the patterns of disease presentation are vital to arrive at a meaningful differential diagnosis. To permit early recognition of neck pathology, detailed anatomic correlation is mandatory. Current imaging permits a detailed analysis of the complex anatomy in this region and is the key to understanding many of its disorders including mass lesions.[1]

Most of the time, detailed history taking and a meticulous physical examination suffice to establish the diagnosis, but when the diagnosis cannot be made, additional radiological, and histopathological analyses are required. Total excision of the mass is often preferred in undiagnosed cases for both diagnostic and therapeutic purposes.[2]

Ultrasound is a useful screening modality because of the lack of ionizing radiation and is non-invasive. USG can define the location, size and extent of the mass, relation to surrounding normal structures, and the internal characteristics of the mass. However, sonography of the neck lacks specificity in certain instances. The differentiation between inflammatory and malignant

Address for Correspondence:
Ritam Ray, Associate Professor, Department of ENT, Burdwan Medical College, Purba Bardhaman, West Bengal, India.
Mobile: +91-9475854916. **E-mail:** drritamray@gmail.com

lymphadenopathy cannot always be made.[3] The advent of color Doppler sonography has added a new dimension to diagnostic sonography. It can be extremely valuable in demonstrating the vascular nature of the neck masses.

The development of cross-sectional imaging techniques has substantially altered the treatment and management of neck masses. Computed tomography (CT) is now readily available in most of the health institutions and is currently the imaging modality most commonly used for head and neck masses. CT is extremely useful in defining both the osseous and soft-tissue extent of the lesion. With the advent of new-generation multi-detector CT scanners, there have been tremendous improvements in scanning time, tissue resolution, and quality of three-dimensional reconstructions.[4]

Aims and objectives

Aim

To estimate the burden of neck mass in pediatric age group clinicopathological.

Objectives

1. To estimate the prevalence of neck mass and to determine the demographic and clinic-pathological profile of neck mass in the pediatric age group.

MATERIALS AND METHODS

This prospective observational study was conducted in the Otorhinolaryngology Department of Burdwan Medical College and Hospital, Burdwan, a rural-based tertiary care hospital in Burdwan for 18 months from April 2021 to September 2022 and 50 patients in the pediatric age group presented with neck swelling were included in this study after through history taking and meticulous clinical examination after getting institutional ethics committee clearance.

Inclusion criteria

- Patients aged between 0 and 12 years
- Both sexes were included
- Patients with complaints of neck swelling for more than 2 weeks.

Exclusion criteria

- Patients not willing to participate in the study
- Patients with cardiovascular instability
- Patient with bleeding diathesis or deranged coagulation profile
- Patient with subclinical neck swelling.

Written informed consent was taken from the parents or legal guardians of willing participants. A thorough history-taking and systemic examination were done to rule out any other systemic disease. USG of the Neck or CT Scan of the neck with contrast was done in all the patients to assess the swelling radiologically. MRI was done in few cases where CT scan was inconclusive and where better soft-tissue details were required. Following radiological evaluation, all the patients underwent fine-needle aspiration cytology (FNAC). In case of multiple swellings of neck, aspirate was taken from the biggest swelling palpated. The same was done under ultrasound-guided FNAC in case of failed conventional FNAC. At this point of time, the decision was made whether the patient will undergo medical or surgical treatment. The data were recorded on a predesigned pro forma and analyzed statistically.

RESULTS

In our study, 37 (74.0%) patients were ≤5 years of age and 13 (26.0%) patients were ≥5 years of age (Table 1).

Twenty-four (48.0%) patients were female and 26 (52.0%) patients were male. 50 (100.0%) patients had low socioeconomic status. In our study, 24 (48.0%) patients presented with swelling on the left side, 26 (52.0%) patients had Swelling on the right side. 13 (26.0%) patients had 2 months of symptoms, another 13 (26.0%) patients had 4 months of symptoms, 11 (22.0%) patients suffered for 5 months, 13 (26.0%) patients had 6 months of symptoms in duration. 50 (100.0%) patients had no pain. 13 (26.0%) patients had a fever. 13 (26.0%) patients had cough. In our study, 24 (48.0%) patients had level II lymph node palpable, 13 (26.0%) patients had level V lymph node palpable on lymph node examination. In our study, 11 (22.0%) patients had Bronchial Cleft Cyst, 13 (26.0%) patients had Lymphangioma, 13 (26.0%) patients had Lymph proliferative disorder, and 13 (26.0%) patients had suppurative lesion. 13 (26.0%) patients had a benign cystic lesion, 11 (22.0%) patients had a branchial cleft cyst, 13 (26.0%) patients had Non-Hodgkin's Lymphoma (NHL) and 13 (26.0%) patients had TB lymphadenitis (TBL) (Table 2).

11 (29.7%) patients had cystic hygroma, 13 (35.1%) patients had lymphangioma, 13 (35.1%) patients had NHL. 13 (26.0%) patients undergone lymph node biopsy. 11 (22.0%) patients had cystic hygroma, 13 (26.0%) patients had Lymphangioma, 13 (26.0%) patients had NHL and 13 (26.0%) patients had TBL. 24 (48.0%) patients were managed by surgical excision and 26 (52.0%) patients undergone medical management.

Table 1: Age distribution

Age (years)	Frequency (%)
≤5	37 (74.0)
≥5	13 (26.0)
Total	50 (100.0)

Table 2: Distribution of cytological diagnosis

FNAC	Frequency (%)
Benign cystic lesion	13 (26.0)
Branchial cleft cyst	11 (22.0)
NHL	13 (26.0)
TBL	13 (26.0)
Total	50 (100.0)

NHL: Non-Hodgkin's lymphoma, TBL: Tuberculosis lymphadenitis, FNAC: Fine needle aspiration cytology

DISCUSSION

In our study, out of 50 patients, most of the patients were ≤5 years of age (37 [74.0%]) which was statistically significant (P<0.00001). (Z=4.8) the mean age of patients was (5.3000±1.6690).

Khiavi et al.,[5] observed that head and neck masses are common in infants, children, and adolescents. Of 594 children, 63.3% were males and 36.7% were females (male-to-female ratio of 1.7:1, P<0.001). The mean age was 6.5 years (range 2 years and 2 months to 12 years). The highest prevalence belonged to inflammatory/reactive/infectious lesions (41.7%) followed by neoplastic lesions (35.7%) and congenital/developmental lesions (22.6%). In the neoplastic group, malignant and benign lesions had 26.6% and 9.1% prevalence, respectively. Lymphoma (22.4%; 16.3% Hodgkin and 6.1% non-Hodgkin), lymphadenitis (16.2%), and thyroglossal cyst (11%) were the most prevalent lesions.

Male population (26 [52.0%]) was higher than the female population (24 [48.0%]) but this was not statistically significant (P=68916). (Z=0.4). All patients were from low socio economic status.

Rao et al.,[6] found that pediatric neck masses are one of the most common presenting problems in ENT practice. A total of 226 patients were enrolled in their study. Of them, 132 were males and 94 female. Inflammatory swelling was the most common etiology (76.1%) followed by congenital (16.3%) and neoplastic (7.5%). In most cases of pediatrics neck masses, diagnosis is made based on a detailed history and the findings of the physical examination.

Most of the patients had right-sided swelling (26 [52.0%]) but this was not statistically significant (P=68916) (Z=0.4). Moreover, less number patients had (11 [22.0%]) 5 months duration of symptoms though it was not statistically significant (P=63836) (Z=0.4683). Few patients had fever and cough (13 [26.0%]) which were statistically significant (P<0.00001) (Z=4.8).

Rahman et al.,[7] showed that masses in the neck are very common and these may range from inflammatory to neoplastic lesions. Among these 60.6% were female and 39.4% were male with male to female ratio of 1:1.54. The age of the patients ranged from 10 months to 85 years with a mean age of 32.52±17.01 years. Of the 526 cases, 341 (64.8%) were from lymph nodes, 127 cases (24.2%) from thyroid glands, 32 cases (6.1%) from salivary glands, 14 cases (2.7%) from cysts, and 12 cases (2.2%) from soft tissues. FNAC revealed that 86.2% of the lesions were non-malignant which included 60.5% of inflammatory lesions and 25.7% of other benign lesions.

Osifo and Ugiagbe[8] examined that neck masses are common in children; they could present diagnostic challenges, and some may be malignant. A total of 35 children who were aged between 1 month and 16 years (mean, 8.1±2.6 years) with a male: female ratio of 1.9:1 (23 males to 12 females) were managed with 26 (74.3%) acquired and nine (25.7%) congenital neck masses. The masses were located in the anterior triangle in 14 (40%) cases, right side of the neck in 12 (34.3%), and left side of the neck in seven (20%), with two (5.7%) bilateral/confluent. Twelve (34.3%) cases were enlarged lymph nodes; five (41.7%) of them were due to malignant lesions. Except for the neck mass, 16 (45.7%) of the children enjoyed clinically stable health on presentation.

A higher number of patients had involvement of Level II lymph node (24 [48.0%]), it was statistically significant (P=0226) (Z=2.2784). None of the patients had (13 [26.0%]) positive findings in Sputum AFB, those patients were treated with antitubercular therapy (ATT) in Medical MX which was statistically significant (P<0.00001) (Z=4.8). Majority number of patients had [13 (26.0%)] Lymphangioma and Lymph proliferative disorder. Other lesions diagnosed were suppurative lesion, TB Lymphadenitis, benign cystic lesion. But it was not statistically significant (p.63836) (Z=0.4683).

Majumdar et al.,[9] observed that FNAC is well accepted as a useful diagnostic technique in the management of adult patients with head and neck lumps. Fine needle aspirations were performed by Leishman-Giemsa staining. The most common nonneoplastic neck swelling seen in children were an enlarged lymph node due to inflammation 38 (42.2%) i.e., reactive lymphadenitis. Others were TBL 25 (27.8%), non-TB granulomatous lymphadenitis 2 (2.22%), chronic sialadenitis 2 (2.22%), branchial cyst 4 (4.44%), and epidermal cyst 3 (3.33%) cases. Overall sensitivity, specificity, positive predictive value and negative predictive

value of FNAC in their cases are 93.06%, 72.22%, 93.06%, and 72.22%. FNA is a valuable diagnostic tool in the management of children with the clinical presentation of a suspicious neck mass.

Al-Mayoof[10] showed that pediatric neck mass is a frequent cause for surgical consultation. Neck masses can be simply classified into congenital, inflammatory, and neoplastic. The inflammatory group represents 57% of the cases, while the malignant neoplasm accounts for approximately 10% of the conditions mainly due to lymphoma 5 (7.8%). Sixteen patients (25%) fall in the congenital group, in which the thyroglossal duct cyst was the commonest type. Wound infection developed in two patients, while one patient with cystic hygroma showed recurrence.

Less number of patients had a branchial cleft cyst, cystic hygroma (11 [22.0%]) but this was not statistically significant (P=63836) (Z=0.4683). Only 13 patients had undergone their lymph node biopsy. A greater number of patients was medically managed (26 [52.0%]) though it was not statistically significant (P=68916) (Z=0.4).

Brown and Harave[11] found that neck masses are frequently encountered in pediatric medicine, and can present a diagnostic dilemma for the clinicians involved. This pictorial review describes the diagnostic imaging of congenital and developmental Pathologies, including thyroglossal duct cyst, branchial cleft cyst, cystic hygroma, dermoid cyst, thymic cyst and ectopic thymus, neoplastic lesions.

Abdulkader and Mukhtar[12] observed that masses of the head and neck are common in the pediatric population, with the vast majority of the lesions ultimately proven to be benign, either being inflammatory or congenital in nature. Often congenital cysts require surgical removal. Fortunately, malignant tumors of the head and neck are rare in children.

Limitations of the study

Sample size was small. The study was done in a single center.

CONCLUSION

In our study, out of 50 patients, most of the patients were ≤5 years of age which was statistically significant the mean age of patients was (5.3000±1.6690). We found that male population was higher than the female population and male: female ratio was 1.08:1 but this was not statistically significant. All patients had low socio-economic Status. It was found that, most of the patients had Right sided Swelling but this was not statistically significant. And less number of patients had 5 months of Duration of symptoms, it was not statistically significant. Less number of patients had fever, cough which was statistically significant. Our study showed that a higher number of patients had Level II and Lymph Node palpable, it was statistically significant. All TBL cases were tested Negative in Sputum AFB Test, ATT in Medical MX which was statistically significant. Majority number of patients had Lymphangioma, Lymphoproliferative disorder, suppurative lesion, NHL, TBL, though it was not statistically significant. We showed that, lower number of patients had branchial cleft cyst, cystic hygroma by cytological diagnosis but this was not statistically significant. Only 13 patients have undergone Lymph Node Biopsy. Patients less commonly opted for excision as Surgical Management though it was not statistically significant. We observed that the mean duration of patients was (4.2200±1.5158), level of lymph node of patients was (2.2600±1.8385), HB % of patients was (12.9600±1.6157), and ESR of patients was (23.2000±8.1766).

ACKNOWLEDGMENT

None.

REFERENCES

1. Williams DW 3rd. An imager's guide to normal neck anatomy. Semin Ultrasound CT MR. 1997;18(3):157-181.
https://doi.org/10.1016/s0887-2171(97)90018-4
2. Gov-Ari E and Hopewell BL. Correlation between pre-operative diagnosis and post-operative pathology reading in pediatric neck masses--a review of 281 cases. Int J Pediatr Otorhinolaryngol. 2015;79(1):2-7.
https://doi.org/10.1016/j.ijporl.2014.11.011
3. Koischwitz D and Gritzmann N. Ultrasound of the neck. Radiol Clin North Am. 2000;38(5):1029-1104.
https://doi.org/10.1016/s0033-8389(05)70219-0
4. Miller EM and Norman D. The role of computed tomography in the evaluation of neck masses. Radiology. 1979;133(1): 145-149.
https://doi.org.10.1148/133.1.145
5. Khiavi MM, Haghi-Ashtiani MT, Kharazi-Fard MJ and Kalantar R. Frequency of head and neck masses in Iranian children during a 21-year period. Iran J Pediatr. 2018;28(6):e64087.
https://doi.org/10.5812/ijp.64087
6. Rao SS, Ramesh S, Ramesh H, Pradep KJ, Bakshi SS and Das S. Pediatric neck masses: A clinicopathological study. Int J Otorhinolaryngol Head Neck Surg. 2019;5(5):1275.
https://doi.org/10.18203/issn.2454-5929.ijohns20193869
7. Rahman MA, Biswas MM and Sikder AM. Scenario of fine needle aspiration cytology of neck masses in a tertiary care hospital. J Enam Med Coll. 2011;1(1):8-14.
https://doi.org/10.3329/jemc.v1i1.11131
8. Osifo OD and Ugiagbe EE. Neck masses in children: Etiopathology in a tertiary center. Niger J Clin Pract. 2011;14(2):232-236.

https://doi.org/10.4103/1119-3077.84027

9. Majumdar A, Jana A, Biswas S, Bhattacharyya S and Jana A. Spectrum of cytological findings in paediatric non-thyroidal neck swelling-experience in a tertiary care children hospital. Iran J Pathol. 2014;9(3):193-198.
https://doi.org/10.4103/1119-3077.84027
10. Al-Mayoof AF. Neck masses in paediatric population: An experience with children attended the central teaching hospital of pediatrics in Baghdad 2008-2009. Afr J Paediatr Surg. 2015;12(2):136-139.
https://doi.org/10.4103/0189-6725.160364
11. Brown RE and Harave S. Diagnostic imaging of benign and malignant neck masses in children-a pictorial review. Quant Imaging Med Surg. 2016;6(5):591-601.
https://doi.org/10.21037/qims.2016.10.10
12. Abdulkader F and Mukhtar NE. Evaluation of pediatric head and neck masses. In: Textbook of Clinical Otolaryngology. Cham: Springer; 2021. p. 663-669.

Authors' Contributions:
RR- Concept and design of the study, prepared the first draft of manuscript; **SS-** Interpreted the results; reviewed the literature and manuscript preparation; **AB-** Concept, coordination, statistical analysis and interpretation, preparation of manuscript and revision of the manuscript.

Work attributed to:
Burdwan Medical College, Burdwan, Purba Bardhaman, West Bengal, India.

Orcid ID:
Dr. Ritam Ray - https://orcid.org/0000-0003-3919-7587
Dr. Shaswata Sarkar - https://orcid.org/0000-0002-0166-500X
Dr. Aditi Bhattacharyay - https://orcid.org/0000-0001-5046-8232

Source of Support: Nil, **Conflicts of Interest:** None declared.