Section: Otorhinolaryngology

Original Research Article

ASSESSMENT AND TREATMENT OF INFECTIVE NECK SWELLINGS IN PEDIATRIC PATIENTS: A CLINICOPATHOLOGICAL APPROACH

Nazmabanu M. Sheliya[1], Jay V. Kothari[2], Yerraguntla Susmitha[3]

[1]*MS ENT, Senior Resident, Department of Otorhinolaryngology, GMERS Medical College, Dharpur, Patna, Gujarat, India.*
[2]*MS ENT, Senior Resident, Department of Otorhinolaryngology, GMERS Medical College Navsari, Gujarat, India.*
[3]*MS ENT, 2nd year DNB Resident, Department of Otorhinolaryngology, GMERS Medical College, Dharpur, Patna, Gujarat, India.*

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Corresponding Author:
Dr. Yerraguntla Susmitha,
Department of Otorhinolaryngology, GMERS Medical College, Dharpur, Patna, Gujarat, India.
Email: ysusmitha09@gmail.com

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ABSTRACT

Background: Pediatric neck masses present diagnostic challenges due to their diverse causes, including infections, congenital anomalies, and tumors. Present study seeks to enhance the understanding of how these conditions present in children, aiming to improve diagnostic accuracy and treatment protocols for better patient outcomes.

Material and Methods: This prospective study included 88 pediatric patients diagnosed with neck masses in a medical hospital in South Gujarat, India, between January and December 2023. Clinical examination, imaging, and FNAC were used for diagnosis, with treatment strategies based on the final diagnosis.

Results: DNSIs were the most common cause, with most cases treated conservatively. A considerable proportion required institutional management, while fewer cases needed surgical interventions.

Conclusion: DNSIs are often managed conservatively, but more severe cases require surgical interventions. Early diagnosis and tailored treatment are crucial to prevent complications.

Keywords: Pediatric neck masses, Deep neck space infections, Conservative management.

INTRODUCTION

Neck masses in pediatric patients are a common clinical finding, often presenting a diagnostic challenge due to the diverse range of potential underlying causes. These masses may result from infections, inflammatory conditions, congenital anomalies, or tumors, each requiring different approaches to management.[1,2] Infections, such as those caused by bacterial or viral pathogens, are the most frequent cause of neck swelling in children, but it is essential to differentiate them from other, more serious conditions, such as neoplastic growth or congenital cysts.[3,4] An accurate and timely diagnosis is critical, as it directly influences treatment choices and outcomes.[5]

The complexity of diagnosing neck masses in children is compounded by factors such as age, immune status, and anatomical variations, which may obscure the clinical picture. Thus, comprehensive clinical evaluation combined with advanced diagnostic tools such as imaging and biopsy techniques is crucial.[6] These approaches allow healthcare professionals to differentiate between the various etiologies and choose the most effective treatment strategies.[7]

In light of these challenges, the primary aim of the study was to systematically evaluate and characterize neck masses in pediatric patients, with a focus on diagnosing the underlying causes and assessing the treatment outcomes.[1] By examining the clinicopathological features of these masses, the study seeks to enhance the understanding of how these conditions present in children, aiming to improve diagnostic accuracy and treatment protocols for better patient outcomes.

MATERIALS AND METHODS

Study Design and Setting

The current study is a prospective clinical study conducted among pediatric patients attending the

outpatient department (OPD) of a medical hospital in Gujarat, India, from January 2023 to December 2023. The study was designed to evaluate and diagnose pediatric neck masses and assess their treatment outcomes.

Study Population:

The study included a total of 88 pediatric patients diagnosed with neck masses during the study period. These patients were selected through a simple random sampling method, ensuring both male and female participants were included. Inclusion and exclusion criteria were established to ensure the proper selection of participants.

The study adhered to ethical guidelines for clinical research. Informed consent was obtained from the guardians of the pediatric patients, and assent was sought from children when appropriate. Confidentiality of patient information was maintained throughout the study. The study protocol was approved by the hospital's ethical review board.

Inclusion Criteria:

1. Pediatric patients aged 1 to 16 years.
2. Patients presenting with neck masses at the hospital's OPD during the study period.
3. Patients who were willing to participate in the study provided informed consent (or assent, in the case of minors).
4. Both male and female patients.

Exclusion Criteria:

1. Patients with known chronic systemic illnesses (e.g., cardiovascular or metabolic diseases) that could interfere with the evaluation of neck masses.
2. Patients with neck masses that had already been surgically removed or treated before the study.
3. Patients with incomplete medical records or failure to comply with follow-up appointments.

Sampling Technique

The study utilized a simple random sampling method to select participants, ensuring unbiased representation of all genders and a diverse range of clinical conditions. The random sampling process was conducted by assigning a number to each eligible patient and using a computer-generated random number table to select the study participants.

Data Collection

Data was collected through a structured questionnaire and clinical examination of the selected patients. The clinical evaluation involved:

1. Detailed medical history to identify any risk factors, symptoms, and duration of the neck mass.
2. Physical examination to determine the size, location, consistency, and mobility of the neck mass.
3. Imaging studies, such as ultrasonography and CT scans, were conducted to assess the characteristics of the mass and to rule out malignancies.
4. Fine-needle aspiration cytology (FNAC) and biopsy were performed, when necessary, to obtain histopathological confirmation of the mass.

Diagnostic Evaluation:

1. **Clinical Examination**: A thorough clinical assessment was conducted by pediatricians specializing in ENT. This included inspection and palpation of the neck to determine the size, shape, and consistency of the mass.
2. **Imaging**: Depending on the clinical suspicion, ultrasound, CT scans, and MRI were used to evaluate the neck mass and assess its characteristics (e.g., solid or cystic).
3. **Histopathological Examination**: In cases where malignancy or specific pathological conditions were suspected, FNAC or biopsy was performed, and the samples were sent for laboratory analysis to confirm the diagnosis.

Statistical Analysis

Data was entered into a computerized database for statistical analysis. The demographic characteristics, clinical features, diagnostic methods, and treatment outcomes were analyzed using appropriate statistical methods. Descriptive statistics were used to summarize the data, and the frequency distribution of diverse types of neck masses was presented. Statistical significance was set at a p-value of <0.05. The analysis was conducted using SPSS software.

Follow-up and Treatment

Patients diagnosed with neck masses were treated according to the underlying cause identified during the diagnostic workup. For infections, appropriate antibiotics or antiviral medications were administered. For benign masses, conservative management or surgical intervention was considered, depending on the size and impact on the patient. Malignant masses were referred for further management, including surgical removal and oncological treatments such as chemotherapy or radiation.

RESULTS

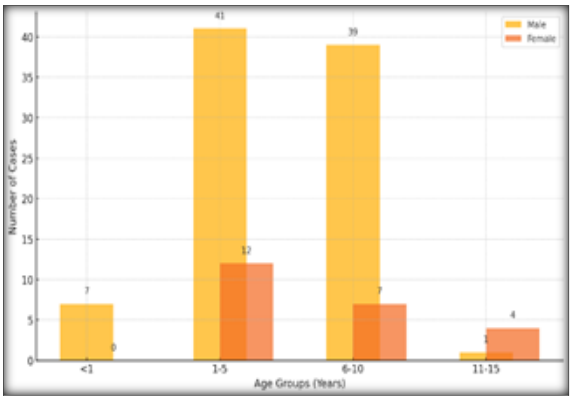

Figure 1: Age and gender distribution of infective neck swellings

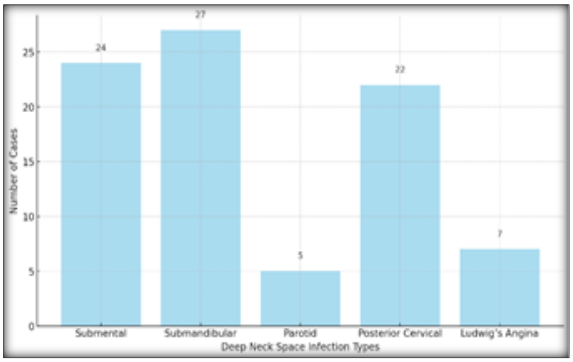

Figure 2: Distribution of deep neck space infections according to age groups

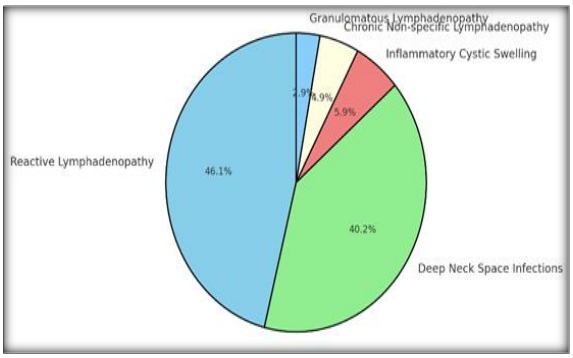

Figure 3: Distribution of infective neck swellings according to final diagnosis

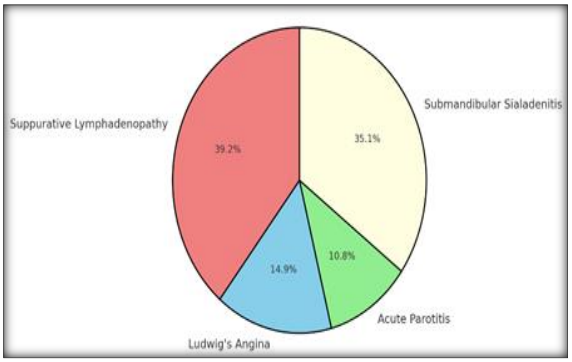

Figure 4: Distribution of deep neck space infections according to final diagnosis

This prospective clinical study was conducted among 88 pediatric patients with neck masses attending the outpatient department (OPD) of a medical hospital in South Gujarat, India, from January to December 2023.

Figure 1 illustrates the distribution of infective neck swellings across different age groups and genders. The chart shows that the majority of cases occurred in the 1-5- and 6-10-years age groups, with a higher prevalence in males. The number of cases in the <1 year and 11-15 years age groups was comparatively low. The male population had a larger number of cases across all age groups compared to females, with the most significant difference observed in the 1-5 years group.

Figure 2 shows the distribution of Deep Neck Space Infections (DNSIs) across different infection types. The most common DNSI was Submandibular, with 27 cases, followed by Submental with 24 cases. Parotid, Posterior Cervical, and Ludwig's Angina had fewer cases, with 5, 22, and 7 cases, respectively. This chart highlights the varying frequency of different DNSI types in the pediatric population during the study period.

Figure 3 illustrates the distribution of infective neck swellings according to the final diagnosis. The majority of cases were classified as Reactive Lymphadenopathy (53.4%), followed by Deep Neck Space Infections (46.6%). Smaller proportions of cases were attributed to Inflammatory Cystic Swelling (6.8%), Chronic Non-specific Lymphadenopathy (5.7%), and Granulomatous Lymphadenopathy (3.4%). This chart highlights the prevalence of several types of infective neck swellings in the pediatric population during the study period.

The pie chart in Figure 4 illustrates the distribution of deep neck space infections according to their final diagnosis. Suppurative Lymphadenopathy represents the largest proportion of cases at 39.2%, followed by Submandibular Sialadenitis at 35.1%. Acute Parotitis and Ludwig's Angina make up 10.8% and 14.9%, respectively. This distribution highlights the prevalence of each infection type in the sample.

Table 1 displays the distribution of treatment modalities for deep neck space infections according to the site of infective neck swellings in pediatric patients. The majority of cases were treated conservatively (88 cases), followed by aspiration (11 cases) and incision & drainage (17 cases). The table also shows the distribution of these treatments across different swelling sites: right, left, bilateral, and midline.

Table 1: Modality of treatment with respect to site of infective neck swellings in pediatric patients

Treatment	Right	Left	Bilateral	Midline	Total
Conservative	27	30	17	14	88
Aspiration	6	4	0	1	11
Incision & Drainage	9	5	0	3	17

Chi square test $p<0.01$, (significant)

DISCUSSION

This study aimed to evaluate the clinical profile, diagnostic methods, and treatment strategies for pediatric neck masses, with a particular focus on deep neck space infections (DNSIs). It was observed that DNSIs are most commonly managed conservatively, but in certain cases, more invasive interventions such as incision and drainage or aspiration are necessary. The majority of infections

occurred unilaterally, with a sizable proportion requiring institutional management. The study highlights the importance of early and accurate diagnosis, the need for appropriate imaging techniques, and the importance of individualized treatment strategies based on the nature of the infection.[1,8]

The study's findings emphasize that timely interventions, whether conservative or surgical, are essential in preventing complications like airway obstruction and sepsis, which are common risks associated with DNSIs in pediatric patients. Given the potential severity of DNSIs, particularly those that require hospitalization, the results underscore the necessity of effective hospital-based care for the more complicated cases.[9]

While the study was limited by its retrospective nature and sample size, it provides important insights into the management of pediatric neck masses and highlights the need for further research with larger, multi-center studies to validate and expand these findings. Future studies could also look into long-term follow-up data to assess recurrence rates and complications following treatment.[10,11]

CONCLUSION

In conclusion, this study provides valuable insights into the clinical evaluation, diagnosis, and management of pediatric neck masses, with a particular emphasis on deep neck space infections (DNSIs). It highlights that DNSIs are most commonly managed conservatively, although more invasive interventions may be necessary in certain cases. The study also emphasizes the importance of early and accurate diagnosis, appropriate imaging, and timely treatment to prevent serious complications such as airway obstruction and sepsis. The findings underline the significance of individualized treatment approaches based on the nature of the infection and the patient's clinical presentation. While the study is limited by its sample size, it serves as a major step toward improving the management of pediatric neck masses and lays the groundwork for future research that can validate and expand these findings.

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