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KEY WORDS: childhood, malignant cervical lymphadenopathy, lymphoma, leukemia.

DIAGNOSING MALIGNANT CERVICAL LYMPHADENOPATHY IN CHILDREN: APPROACHES AND TECHNIQUES

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ABSTRACT

Background: Malignant cervical lymphadenopathy in children, though relatively rare as compared to adults, presents a significant clinical challenge due to its potential association with various underlying malignancies like lymphomas (Hodgkin's and non-Hodgkin's lymphoma), leukemia and nasopharyngeal carcinoma. The diagnostic approach typically involves a combination of clinical evaluation, imaging studies and histopathological examination of lymph node biopsies. Advances in imaging technique, such as PET-CT and MRI have improved the accuracy of staging and assessment of disease extent. Effective management requires a multidisciplinary approach to improve outcomes and ensure comprehensive care. **Methods:** This prospective observational study was carried out in the Department of Otorhinolaryngology and Head and Neck Surgery in tertiary care hospital in Guwahati from July 2014 to June 2024. A total of 3651 children were admitted during this period. Each patient with cervical lymphadenopathy and neck masses were thoroughly assessed clinically which was followed by Ultrasonography of neck, Fine Needle Aspiration Cytology (FNAC) and if necessary biopsy for histopathological study to confirm the diagnosis. **Results:** Out of the total 3651 children, 1162 cases were found to be fulfilling the inclusion criteria and on further assessment 64 cases turned out to be malignant. These cases of age group 1-18 years presented with different childhood malignancies with 14 cases of Hodgkin's lymphoma and leukemia each, Nasopharyngeal carcinoma with 11 cases, Non-Hodgkin's lymphoma with 8 cases, Rhabdomyosarcoma with 5 cases, Thyroid carcinoma with 5 cases, Langerhans Cell Histiocytosis with 4 cases, and Salivary gland tumors with 3 cases. **Conclusion**: Accurate diagnosis of malignant cervical lymphadenopathy in children depends on a multidisciplinary approach, integrating clinical assessment, imaging and histopathology. Utilizing these techniques effectively ensures precise identification of malignancies, which is crucial for developing appropriate management strategies and improving patient outcomes.

INTRODUCTION:

According to WHO (2021), an estimated 4,00,000 children (aged 0-19 years) develop cancer worldwide each year[1,2]. 'Nearly 9 out of 10 children live in low- and middle- income countries (LMICs) like India where treatment is often unavailable or unaffordable. As a result, less than 30% of children with cancer in LMICs survive, compared to 80% or more in high-income countries[2,3]. Cancer is the second most common cause of death in childhood after trauma[4]. Approximately 12% to 15% of childhood malignancies present in head and neck[5]. About 73% of these paediatric patients with a head and neck malignancy present with a neck mass and a palpable neck mass which is the most common physical finding(87%)[5]. Paediatric neck masses can present a diagnostic challenge for otolaryngologists, pathologists, and primary care physicians. In order to lower childhood morbidity and death, an early diagnosis is always crucial.

Aims And Objectives:

To do a thorough examination of a child presenting with any unusual lump or swelling in the neck or cervical lymphadenopathy not getting resolved by any primary medical treatment.

MATERIALS AND METHODS:

A ten-year study was conducted in the Department of Otorhinolaryngology and Head & Neck Surgery in Guwahati after receiving approval from the institutional ethics council.

Inclusion Criteria:

1. Patients ≤18 years.
2. Swelling or enlargement of cervical lymph nodes.
3. Presence of unusual lumps/swellings in the neck.
4. Unexplained weight loss.
5. Unexplained fever that does not respond to standard treatments.
6. Unexplained pallor and general weakness associated with cervical lymphadenopathy.
7. History of easy bruising, recurrent nasal bleed, unexplained ear bleeding, persistent serous otitis media associated with cervical lymphadenopathy.

Exclusion Criteria:

1. Adults ≥ 19 years old.
2. Patients not willing to take part in the study.
3. Weight loss and fever due to infective aetiology.
4. Lost to follow up.

Methodology:

The study utilized data from outpatient records, inpatient admissions, emergency care logs, and surgical operation records within the Otorhinolaryngology Department. Each patient was clinically evaluated, and their case files were thoroughly reviewed to gain a comprehensive understanding of their condition. Following clinical assessment, ultrasonography of neck and fine needle aspiration cytology (FNAC) was performed, and if necessary, an ultrasound-guided FNAC followed by biopsy for histopathological analysis was conducted for accurate diagnosis. Blood tests, including a complete blood count, along with imaging studies such as X-rays, CT scans, MRIs, and endoscopic evaluations, were carried out as needed to confirm the diagnosis. Immunohistochemistry (IHC) was done in those conditions where precise identification and classification of the disease was required. All cases were managed according to established treatment protocols.

RESULTS AND OBSERVATION:

Over a 10 year period from July 2014 to June 2024, a total of 3651 children were admitted. Among these, 64 patients were

diagnosed with various childhood malignancies, with a male to female ratio of 2:1. Of these 64 cases, 73% were diagnosed after the age of 5 years. The study revealed that malignancies were most prevalent in the 11-18 year age group(51.56%), followed by the 1-5year group(23.44%), the 6-10 year group (21.88%) and the 0-1 year group(3.12%).

The study identified several types of malignancies including Hodgkin's lymphoma, Non-Hodgkin's lymphoma, leukemia, thyroid carcinoma, nasopharyngeal carcinoma, Langerhans cell histiocytosis, rhabdomyosarcoma, and salivary gland neoplasms.

Figure 1

Figure 1: showing a 7-year-old male child with Leukemia who presented with multiple right-sided cervical lymphadenopathy. He also gave history of frequent bruising.

Table 1: Distribution of cases based on gender'

GENDER	Total number of cases	Cases fulfilling inclusion criteria	Malignant Lesions
Male	1664	696	43
Female	1987	466	21

Table 2: Distribution of childhood malignancy cases based on age.

AGE	Number of cases	Percentage
0-1 years	2	3.13%
1-5 years	15	23.44%
6-10 years	14	21.88%
11-18 years	33	51.56%

Table 3:Distribution of malignancy associated with cervical neck swelling.

Type of Malignancy	Number (%)
Leukemia	14 (21.88%)
Hodgkin's Lymphoma	14 (21.88%)
Nasopharyngeal carcinoma	11 (17.19%)
Non Hodgkin's Lymphoma	8 (12.5%)
Rhabdomyosarcoma	5 (7.81%)
Thyroid carcinoma	5 (7.81%)
Langerhans Cell Histiocytosis	4 (6.25%)
Childhood Salivary Gland tumors	3 (4.69%)

Table 4: Most common Head and Neck Malignancies associated with cervical lymphadenopathy as per age

AGE GROUP	Type of Head and Neck Malignancy	Prevalence
0-1 years	Leukemia	1
	Rhabdomyosarcoma	1
1-5 years	Leukemia	8
	Hodgkin's Lymphoma	2
	Non-Hodgkin's Lymphoma	1
	Rhabdomyosarcoma	1
	Langerhans Cell Histiocytosis	3
6-10 years	Leukemia	5
	Hodgkin's Lymphoma	3
	Non-Hodgkin's Lymphoma	3
	Rhabdomyosarcoma	1
	Thyroid Carcinoma	1
	Langerhans Cell Histiocytosis	1
11-18 years	Hodgkin's Lymphoma	8
	Non-Hodgkin's Lymphoma	5
	Rhabdomyosarcoma	2
	Thyroid Carcinoma	4
	Nasopharyngeal Carcinoma	11
	Salivary Gland Neoplasm	3

DISCUSSION:

Childhood malignancies are relatively rare as compared to adults comprising about 1% of the total cancer cases[6]. Worldwide, approximately, 215,000 cancers are diagnosed per year in those younger than 15 years with an estimated 80,000 cancer-related deaths in these annually[7]. Survival rates of childhood rates are high and around 80% in high income countries[8]. However, they are the second leading cause of death in children in developed countries like United States surpassed only by accidents[9]. In India, cancer is the 9th common cause for the deaths among children between 5 and 14 years of age[10]. Between 2012 and 2014, the proportion of childhood cancers relative to all cancers across age groups ranged from 0.7% to 4.4%[11]. This is slightly lower than the previously reported range of 0.5% to 5.8% for the years 2006-2011[12]. The Delhi Population-Based Cancer Registry (PBCR) reported the highest relative proportion of childhood cancers among boys at 5.4%, while the newly established PBCR in Naharlagun, Arunachal Pradesh, reported the highest proportion among girls at 3.5%[11]. Cancer incidence rates for childhood cancers are typically expressed per million children[13]. During 2012-2014, the age adjusted incidence rates (AARs) per million were highest at PBCR Delhi, with 235.3 for boys and 152.3 for girls. This was followed by PBCR Chennai (156.7 for boys and 85.6 for girls) and Aizawl district (136.1 for boys and 88.7 for girls)[12]. The unusually high incidence of childhood cancers reported at PBCR Delhi may be attributed to environmental risk factors such as carcinogenic pollutants or ionizing radiation in the atmosphere, or to under ascertainment of cases in other registries. Among childhood cancers, leukemia exhibited the highest incidence rates across all PBCRs followed by lymphoma[14].

The malignancies that were recorded in this study were leukemia, lymphoma, nasopharyngeal carcinoma, thyroid carcinoma, Langerhans cell histiocytosis, Rhabdomyosarcoma, and salivary gland malignancies.

Figure 2

Figure 2: showing a 10-year-old female patient diagnosed with Hodgkin's lymphoma presented with right cervical swelling. Ultrasound of the neck indicated cervical lymphadenopathy. An excisional biopsy of the right cervical lymph node was performed, confirming the diagnosis of Hodgkin's lymphoma on histopathological examination. Diagnosis was further supported on immunohistochemical (IHC) analysis.

Figure 3

Figure 3: A 17-year-old male patient presented with swelling in the right cervical region. Ultrasound examination of the neck revealed cervical lymphadenopathy. An excisional biopsy of the right cervical lymph node was conducted, and histopathological analysis suggested a diagnosis of Non Hodgkin's lymphoma. This diagnosis was further corroborated through immunohistochemical (IHC) analysis.

Figure 4(a)

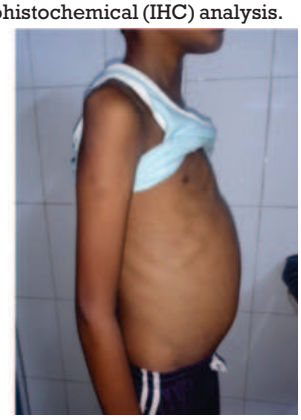

Figure 4(b)

Figure 4 (a): A 12-year-old male patient diagnosed with Hodgkin's lymphoma presented with swelling in the left cervical region.

Figure 4(b): The patient also exhibited hepatosplenomegaly, accompanied by a clinical history of fever and weight loss.

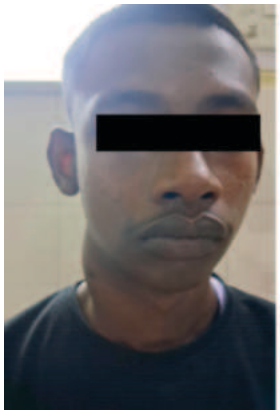

Figure 5 (a)

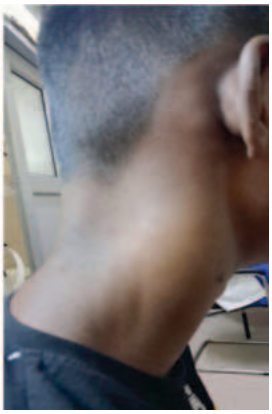

Figure 5 (b)

Figure 5 (a) and (b): A 16-year-old male patient presented with swelling in the right cervical region. Ultrasound examination of the neck revealed cervical lymphadenopathy. An excisional biopsy of the right cervical lymph node was conducted, and histopathological analysis suggested a diagnosis of Hodgkin's lymphoma. This diagnosis was further corroborated through immunohistochemical (IHC) analysis.

CONCLUSION:

The incidence of head and neck cancers in children is notably low, comprising just 1.75% of paediatric patients seen in ENT Department over a period of 10 years. While cervical lymphadenopathy in children is typically due to infections, malignancy should be considered if accompanied by systemic symptoms like fever, night sweats, unexplained weight loss, fixed or asymptomatic nodes, resistance to antibiotic treatment, and lymph nodes involvement of multiple sites. Leukemia and Hodgkin's Lymphoma are the most common malignant lesions in this study. Malignant lesions are most commonly present in individuals older than 10 years. This study also shows a general male predominance with a male-to-female ratio of 2:1. Early diagnosis is crucial, as childhood cancers are treatable with timely intervention. Awareness of potential malignancies in children with concerning head and neck symptoms is essential for prompt clinical follow-up and diagnosis. Effective treatment often requires a combination of surgery, radiotherapy and chemotherapy along with comprehensive supportive and psychological care.

Declarations:

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Conflict Of Interest: None declared

Ethical Approval: The study was approved by the Institutional Ethics Committee.

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