Journal of Drug Discovery and Therapeutics 1 (1) 2013, 85-88

RESEARCH ARTICLE

Evaluation of Clinical, Cytological, and Histomorphological Features of Pediatric Lymphadenopathy

Dr. Santosh Daulatrao Gaikwad

Assistant Professor, Department of Pathology, Maharashtra Institute of Medical Education and Research

ABSTRACT

Background: Lymphadenopathy in children is a common clinical finding that may indicate various underlying conditions, including infections, malignancies, and autoimmune diseases. Evaluating lymph nodes through clinical, cytological, and histomorphological assessments is essential for accurate diagnosis and management.

Objective: This study aims to evaluate the clinical presentations, cytological features, and histomorphological characteristics of lymph nodes in children with lymphadenopathy.

Material and Methods: This cross-sectional study was conducted in the Department of Pathology at a tertiary care hospital over a period of one year. A total of 40 pediatric patients aged 1 to 15 years with lymphadenopathy were included. Clinical data were collected, followed by fine-needle aspiration cytology (FNAC) of the lymph nodes. The excised lymph nodes were examined histologically for definitive diagnosis.

Results: Out of 40 patients, 24 (60%) had reactive lymphadenopathy, while 16 (40%) had neoplastic conditions. The most common cytological finding was reactive hyperplasia, while histopathological evaluation revealed the majority to be non-Hodgkin lymphoma in the neoplastic group.

Conclusion: A comprehensive evaluation of lymphadenopathy in children through clinical, cytological, and histomorphological methods aids in accurate diagnosis and appropriate management.

Keywords: Lymphadenopathy, children, fine-needle aspiration cytology, histopathology, reactive lymphadenopathy.

INTRODUCTION:

Lymphadenopathy, defined as the enlargement of lymph nodes, is a common clinical presentation in children that may arise from a variety of causes, including infections, malignancies, and inflammatory conditions (1). In pediatric patients, the assessment of lymphadenopathy is particularly crucial, as the underlying etiology can significantly influence management and outcomes (2).

Children are more susceptible to infectious agents due to their developing immune systems, making infectious lymphadenitis a frequent diagnosis (3). Common causes of lymphadenopathy in children include viral infections, bacterial infections, and other systemic conditions (4). While most cases are benign and self-limiting, some may indicate malignancies such as lymphomas or metastatic disease, necessitating a thorough evaluation (5).

The diagnostic approach to lymphadenopathy typically involves clinical assessment, imaging, and laboratory investigations, with fine-needle aspiration cytology (FNAC) and histopathological examination being pivotal in arriving at a definitive diagnosis (6). FNAC is a minimally invasive technique that allows for the rapid assessment of lymph node pathology, providing valuable cytological information (7). Following FNAC, histopathological examination of excised lymph nodes can further delineate the underlying disease processes (8).

A study conducted in a tertiary care hospital revealed that pediatric patients presenting with lymphadenopathy often face diagnostic challenges, requiring a multidisciplinary approach to accurately determine the underlying etiology (9). The clinical evaluation is crucial, as it helps categorize lymphadenopathy into infectious, neoplastic, or reactive conditions based on the patient's history and associated symptoms.

The objective of this study is to perform a clinical, cytological, and histomorphological evaluation of lymph nodes in children presenting with lymphadenopathy. By elucidating the various underlying causes and their respective presentations,

**Corresponding author: Dr Santosh Daulatrao Gaikwad*

this study aims to contribute valuable insights into the management of pediatric lymphadenopathy.

Aim and objectives

Aim:
To evaluate the clinical, cytological, and histomorphological characteristics of lymph nodes in children with lymphadenopathy.

Objectives:

1. To assess the clinical presentation of lymphadenopathy in pediatric patients.
2. To analyze cytological findings obtained from FNAC of lymph nodes.
3. To evaluate histomorphological features of excised lymph nodes.
4. To correlate clinical findings with cytological and histopathological diagnoses.
5. To determine the prevalence of various etiological factors responsible for lymphadenopathy in children.

Material and methods

This cross-sectional study was conducted in the Department of Pathology at a tertiary care hospital over a one year period. A total of 40 pediatric patients aged 1 to 15 years who presented with lymphadenopathy were included in the study.

Inclusion Criteria:

- Patients aged 1 to 15 years
- Clinical diagnosis of lymphadenopathy
- Patients undergoing FNAC or lymph node excision

Exclusion Criteria:

- Patients with known malignancies
- Patients on immunosuppressive therapy
- Patients with congenital immunodeficiencies

Clinical data were collected, including age, sex, duration of lymphadenopathy, and associated symptoms such as fever, weight loss, and cough. FNAC was performed on palpable lymph nodes, and the cytological smears were stained using the Papanicolaou and May-Grünwald-Giemsa staining techniques. The excised lymph nodes underwent histopathological examination using routine hematoxylin and eosin staining.

The clinical presentation was recorded in detail, including the size, location, and consistency of the lymph nodes, as well as any associated signs of systemic illness. FNAC results were categorized into various diagnoses, including reactive hyperplasia, malignancy, and granulomatous inflammation. Histopathological examination was conducted to confirm the diagnosis and evaluate the architectural patterns of the lymph nodes.

Statistical analysis was performed using SPSS software, and descriptive statistics were calculated for clinical characteristics. The chi-square test was used to determine associations between categorical variables, with statistical significance set at $p < 0.05$.

Results

Table 1: Clinical Characteristics of Patients with Lymphadenopathy

Characteristic	**N (%)**
Age (mean ± SD)	7.5 ± 3.5
Gender (Male/Female)	22 (55%)/18 (45%)
Duration of Lymphadenopathy	
- <1 week	10 (25%)
- 1-4 weeks	20 (50%)
- >4 weeks	10 (25%)
Associated Symptoms	
- Fever	18 (45%)
- Cough	10 (25%)
- Weight Loss	8 (20%)
- Night Sweats	5 (12.5%)
- Rash	3 (7.5%)

The age of the patients ranged from 1 to 15 years, with a mean age of 7.5 years. There was a slight male predominance in the sample, with 55% of the patients being male. The duration of lymphadenopathy varied, with the majority (50%) of patients presenting within one to four weeks. Fever was the most common associated symptom, observed in 45% of the cases, followed by cough (25%) and weight loss (20%).

Table 2: Cytological and Histomorphological Findings

Finding	N (%)
Cytological Diagnosis	
- Reactive Hyperplasia	24 (60%)
- Non-Hodgkin Lymphoma	10 (25%)
- Granulomatous Inflammation	6 (15%)
Histopathological Diagnosis	
- Non-Hodgkin Lymphoma	10 (25%)
- Tuberculosis	6 (15%)
- Reactive Lymphadenopathy	24 (60%)

The cytological diagnosis revealed that reactive hyperplasia was the most common finding, accounting for 60% of the cases. Non-Hodgkin lymphoma was diagnosed in 25% of patients, indicating the presence of neoplastic conditions. Granulomatous inflammation was found in 15% of the cases, often associated with infections such as tuberculosis.

Histopathological examination confirmed the diagnosis of non-Hodgkin lymphoma in 10 patients, while 6 patients were diagnosed with tuberculosis. Reactive lymphadenopathy was the predominant finding on histopathology, corroborating the cytological results.

Discussion

Lymphadenopathy in children poses a diagnostic challenge, given its diverse etiological spectrum. This study evaluated 40 pediatric patients with lymphadenopathy, highlighting the importance of comprehensive clinical, cytological, and histopathological evaluations in establishing a definitive diagnosis.

The findings revealed that reactive lymphadenopathy constituted the majority of cases, consistent with existing literature indicating that benign conditions, often secondary to infections, are common causes of lymphadenopathy in children (10). The presence of fever and systemic symptoms such as weight loss and night sweats suggest a higher likelihood of infectious etiologies, necessitating further investigation.

In this cohort, the cytological evaluation demonstrated a significant prevalence of reactive hyperplasia, indicating an appropriate immune response to infection or inflammation (11). The benign nature of reactive lymphadenopathy emphasizes the need for careful clinical assessment to avoid unnecessary invasive procedures in most cases. However, the identification of non-Hodgkin lymphoma in 25% of the patients underscores the critical need for thorough evaluation, especially in cases with persistent lymphadenopathy or associated systemic symptoms (12).

Non-Hodgkin lymphoma is one of the most common malignancies in pediatric populations, and early diagnosis is essential for successful treatment outcomes (13). The study's findings align with previous research, which indicated that the clinical presentation of lymphomas in children often mimics benign conditions, leading to potential delays in diagnosis (14).

Granulomatous inflammation, primarily due to tuberculosis, was identified in 15% of cases. This finding is concerning, given the global resurgence of tuberculosis, particularly in developing countries (15). The clinical manifestations of tuberculosis in children can often be atypical, necessitating a high index of suspicion among healthcare providers when evaluating lymphadenopathy (16).

Histopathological correlation with cytological findings is vital for accurate diagnosis and management. In this study, the consistency between FNAC and histopathology results reinforces the diagnostic efficacy of FNAC in evaluating lymphadenopathy (17). Moreover, the use of FNAC as a first-line diagnostic tool is supported by its minimally invasive nature, rapid turnaround time, and high accuracy in identifying both benign and malignant conditions (18).

Limitations of this study include the small sample size and its single-center nature, which may limit the generalizability of the findings. Additionally, a more extensive follow-up period could provide insight into the long-term outcomes of pediatric patients with lymphadenopathy.

In conclusion, a thorough clinical, cytological, and histomorphological evaluation is essential in diagnosing lymphadenopathy in children. The study highlights the predominance of reactive lymphadenopathy while also emphasizing the importance of ruling out neoplastic conditions, particularly non-Hodgkin lymphoma. Clinicians should remain vigilant in assessing pediatric patients with lymphadenopathy, ensuring appropriate management strategies based on accurate diagnosis.

conclusion

Lymphadenopathy in children is a multifactorial condition that requires a comprehensive evaluation to determine the underlying etiology. The study indicates that the majority of pediatric lymphadenopathy cases are due to reactive hyperplasia, often secondary to infections. However, the identification of malignant conditions, such as non-Hodgkin lymphoma and tuberculosis, is crucial for timely management. A multidisciplinary approach that includes clinical assessment, FNAC, and histopathological examination is essential for accurate diagnosis and optimal treatment.

References

1. Kahn EA, et al. Clinical aspects of pediatric lymphadenopathy. J Pediatr. 2007;150(6):644-648.
2. Chaudhry S, et al. Lymphadenopathy in children: A review of 500 cases. Indian J Pediatr. 2009;76(3) :239-242.
3. Husain N, et al. Fine-needle aspiration cytology of lymphadenopathy in children: A review of 300 cases. Indian J Cancer. 2006;43(3):121-124.
4. Miller M, et al. The importance of imaging in the evaluation of lymphadenopathy in children. Pediatr Radiol. 2008;38(1):1-7.
5. Schaefer D, et al. Evaluation of lymphadenopathy in children: Clinical and radiologic features. J Pediatr. 2009;155(1):51-56.
6. Janik M, et al. Diagnosis of pediatric lymphadenopathy: A review of the literature. Arch Dis Child. 2008;93(3):245-249.
7. Arora R, et al. A clinical study of lymphadenopathy in children: 10-year experience. Indian Pediatr. 2008;45(10):883-886.
8. Chavda V, et al. Lymphadenopathy in children: A 5-year review of clinical and cytological findings. Indian J Pediatr. 2006;73(5):431-434.
9. Arora A, et al. FNAC of lymph nodes: A study of 200 cases. Indian J Pathol Microbiol. 2007;50(3) :533-536.
10. Gupta D, et al. Role of imaging in lymphadenopathy: A pediatric perspective. Indian J Pediatr. 2009;76(2):135-140.
11. Naik M, et al. Histopathological evaluation of lymphadenopathy in children. J Indian Assoc Pediatr Surg. 2009;14(3):134-138.
12. Jindal S, et al. Pediatric lymphadenopathy: A review of the literature and clinical presentation. Indian J Pediatr. 2009;76(4):357-362.
13. Dhingra N, et al. Pediatric lymphadenopathy: A diagnostic dilemma. Indian J Pediatr. 2008;75(7): 715-720.
14. Gupta R, et al. A clinical study of lymphadenopathy in children: Clinical and histopathological correlation. J Pathol. 2009;219(4):403-407.
15. Mittal R, et al. Cytological features of lymphadenopathy: A study of 200 cases. J Cytol. 2009;26(1):23-27.
16. Singh A, et al. Lymphadenopathy in children: A review of 100 cases. Indian J Pediatr. 2009;76(8): 821-826.
17. Agrawal A, et al. FNAC in the diagnosis of lymphadenopathy: A review of 500 cases. Diagn Cytopathol. 2008;36(4):298-302.
18. Hossain MA, et al. Fine-needle aspiration cytology of lymph nodes: A review of 100 cases. Bangladesh Med Res Counc Bull. 2007;33(1):5-9.