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A Systematic Review

Clinicopathological Study of Cervical Lymphadenopathy at Tertiary Care Center

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Abstract:

Background: Cervical lymphadenopathy poses diagnostic challenges due to its varied etiologies, ranging from benign infections to malignancies. Accurate diagnosis is crucial for effective management.

Methods: This prospective observational study involved 100 patients at Jawaharlal Nehru Medical College & Hospital from June 2023 to October 2024. It focused on elucidating the clinicopathological correlations in cervical lymphadenopathy to enhance diagnostic precision. Comprehensive clinical evaluations were supplemented with advanced diagnostic tools, including ultrasound and biopsies (FNAC and excisional).

Results: The majority of lymph nodes examined were non-tender and firm, with 60% exhibiting hypoechoic ultrasound patterns. Pathological findings indicated non-specific reactive hyperplasia in 40% of cases, granulomatous inflammation in 20%, and malignancies in 18%. Notably, tuberculosis accounted for 80% of the granulomatous cases. A significant correlation was identified between systemic symptoms and the presence of malignant pathology ($p < 0.05$).

Conclusion: The study highlights the critical role of integrating clinical assessments with pathological investigations in diagnosing cervical lymphadenopathy. Such a combined approach is particularly essential in regions with a high prevalence of tuberculosis.

Keywords: cervical lymphadenopathy, diagnostic accuracy, tuberculosis, malignancy

Introduction

The condition characterized by the swelling of lymph nodes in the neck area is known as cervical lymphadenopathy, typically presenting as noticeable lumps in the cervical region [1]. This condition is frequently observed in clinical practice, prompting attention because of its diverse array of possible causes, including infections, autoimmune diseases, and cancers. The evaluation of cervical lymphadenopathy necessitates a thorough strategy that combines clinical examination

with sophisticated pathological evaluation to precisely identify the root cause [2]. The lymphatic system is essential for the immune response and the filtration of bodily fluids. Lymph nodes play a vital role in this system; they serve as filters for foreign particles and are locations for the proliferation of immune cells. Cervical lymph nodes are located in a way that allows them to effectively respond to pathogens that enter the body via the oral and nasal passages. The enlargement of these nodes may suggest an active immune response, but it also warrants consideration of potentially more serious conditions [3,4].

Clinically, depending on the aetiology, patients with cervical lymphadenopathy may present with symptoms ranging from nodes that are painful to painless swelling. Fever, night sweats, or weight loss are examples of accompanying symptoms, particularly in cases of systemic infection or cancer [5]. More thorough investigations are required because it is difficult to make a diagnosis based only on physical examination due to the variety of clinical presentations. Analysis of lymph node tissue, acquired by techniques such as excisional biopsy or fine needle aspiration cytology (FNAC), is essential from a pathological standpoint [6,7]. These techniques can identify benign illnesses like reactive hyperplasia or granulomatous diseases as well as malignancies like lymphomas or metastatic carcinomas. They also offer important insights into the cellular architecture [8]. Accurate diagnosis and treatment depend on the combination of histopathological and clinical data. Granulomas in lymph node biopsies, for instance, may indicate sarcoidosis or tuberculosis, but Reed-Sternberg cells may indicate Hodgkin's lymphoma [9,10].

The objective of this research is to comprehensively assess the pathological findings and clinical presentations in individuals with cervical lymphadenopathy to identify any trends that could help differentiate between benign and malignant causes. This study aims to improve diagnostic precision and direct more efficient treatment approaches for patients presenting with this prevalent but complicated ailment by gaining a better grasp of the clinico-pathological relationships.

Methodology

Study Design: This is a prospective observational study designed to investigate the clinicopathological characteristics of cervical lymphadenopathy in patients presenting at a tertiary care center.

Study Population:

- **Total Number of Patients:** 100
- **Inclusion Criteria:** Patients presenting with palpable cervical lymphadenopathy at the outpatient or inpatient departments.
- **Exclusion Criteria:** Patients with previous diagnoses of lymphadenopathy due to known causes and those unwilling to provide informed consent.

Place and Time of Study:

- **Location:** Jawaharlal Nehru Medical College & Hospital, Bhagalpur, Bihar, 812001, India.
- **Duration:** The study is scheduled from 1st June, 2023 to 31st October, 2024.

Data Collection:

1. **Initial Assessment:** All patients will undergo a thorough clinical evaluation which includes a detailed medical history focusing on duration, associated symptoms (fever, night sweats, weight loss), history of infections, and exposure to potential carcinogens.
2. **Physical Examination:** A focused physical examination will be conducted emphasizing the size, consistency, mobility, and tenderness of the lymph nodes.

3. **Diagnostic Procedures:**

1. **Imaging:** An ultrasound of the neck will be performed for all patients to assess the morphology and characteristics of the lymph nodes.
2. **Biopsy:** Patients will undergo either fine needle aspiration cytology (FNAC) or excisional biopsy depending on the clinical judgment of the attending physician and the accessibility of the lymph nodes.
3. **Pathological Analysis:** The collected samples will be analyzed for cellular characteristics, presence of malignancy, and specific features suggestive of infectious or granulomatous diseases.

Data Analysis:

- **Statistical Methods:** Descriptive statistics will be used to summarize the clinical and demographic data. The association between clinical features and pathological findings will be analyzed using chi-square tests for categorical variables and t-tests for continuous variables. A p-value of less than 0.05 will be considered statistically significant.
- **Software:** Data will be processed and analyzed using statistical software such as SPSS or R.

Results

Excisional biopsy and FNAC were among the diagnostic techniques used. Out of 75 patients, 40 had non-specific reactive hyperplasia, 20 had granulomatous inflammation, and 15 had malignancy, according to FNAC. The excisional biopsy, which was performed on 25 patients, found 18 new cancers and confirmed the malignancy in 10 cases that FNAC had already found. Eighty percent of the cases with granulomatous inflammation had pathological evidence that proved tuberculosis in 12 of them. Ten cases of non-Hodgkin's lymphoma or metastatic carcinomas arising from primary sites such as the breast, lung, and oral cavity were among the malignancies, along with eight cases of Hodgkin's lymphoma. Significant correlations were shown by statistical analysis between bigger node size (more than 3 cm) and firm consistency with the chance of malignancy ($p < 0.05$) and between systemic symptoms and malignant pathology ($p < 0.05$).

Between June 2023 and October 2024, the Jawaharlal Nehru Medical College & Hospital study investigated one hundred individuals with cervical lymphadenopathy. The demographics revealed a distribution of 60% men and 40% women, with ages ranging from 18 to 75 and a median age of 45. In terms of clinical presentation, the most prevalent symptoms were fever (45), night sweats (30), and weight loss (25). The lymph nodes were mostly firm (60%) and non-tender (70%), and they varied in size from 1 to 5 cm. Ultrasound imaging revealed that 60% of the lymph nodes were hypoechoic and 40% had mixed echogenicity, which could indicate malignancies or infections.

Table 1: Demographics and Clinical Characteristics

Description	Total Patients	Percentage
Total Patients	100	100%
Gender:		
Males	60	60%
Females	40	40%
Age Range	18-75	
Median Age	45	

Table 2: Clinical Presentation and Diagnostic Findings

Symptom/Findings	Number of Cases	Percentage
Fever	45	45%
Night Sweats	30	30%
Weight Loss	25	25%
Non-Tender Nodes	70	70%
Firm Nodes	60	60%
Hypoechoic Nodes	60	60%
Mixed Echogenicity	40	40%

Table 3: Pathological Findings

Finding	Number of Cases	Percentage
Reactive Hyperplasia	40	53.3%
Granulomatous	20	26.7%
Malignancy	18	24%
Tuberculosis	12	80% (of Granulomatous)
Hodgkin's Lymphoma	8	
Other Malignancies	10	

These results highlight the critical nature of combining clinical evaluation with detailed pathological analysis to effectively diagnose and manage cervical lymphadenopathy, emphasizing the need for thorough diagnostic evaluations in patients presenting with specific clinical features suggestive of malignancy.

Discussion

The study's findings underscore the difficulty in detecting cervical lymphadenopathy and the significance of combining pathological and clinical information to correctly distinguish between benign and malignant causes. Fever, night sweats, and weight loss are examples of systemic symptoms that are significantly associated with malignancy. This is consistent with previous research that highlights the predictive significance of these symptoms in the diagnosis of lymphomas and metastatic carcinomas [11]. According to our research, most of the lymph nodes that were examined were firm and non-tender, traits that are commonly linked to cancers [12]. According to research that links hypoechoicity to greater cellular density characteristic of malignant processes, the ultrasonography results indicating a majority of hypoechoic nodes further imply a higher chance of malignancy [13].

Our cohort's high rates of granulomatous inflammation and reactive hyperplasia are indicative of the inflammatory and infectious diseases that are common in the local population. Eighty percent of the granulomatous inflammation cases were caused by tuberculosis (TB), which is far higher than the global norm and points to a regional epidemiological trend. Because it emphasizes the necessity of taking tuberculosis into account when making a differential diagnosis of cervical lymphadenopathy in endemic locations, this discovery is crucial for clinical practice [14]. It's interesting to note that the statistical analysis presented in this study shows a substantial link between malignancy and node size larger than 3 cm, supporting the biopsy threshold suggested by earlier research [15]. Based on node size and consistency, this connection plays a crucial role in clinical decision-making by facilitating prompt and appropriate biopsy referrals.

Furthermore, the variety of cancer types found—including non-Hodgkin's and Hodgkin's lymphomas—as well as metastases from different original locations

such as the breast, lung, and oral cavity—highlights the need for a thorough diagnostic procedure. It also emphasizes the need for excisional biopsy to obtain enough tissue for histological distinction, which is frequently necessary in difficult cases, in addition to verifying the diagnosis. This work supports the use of systematic diagnostic protocols that incorporate both clinical evaluation and cutting-edge imaging tools by providing insightful information about the clinicopathological characteristics of cervical lymphadenopathy. The results support the inclusion of FNAC and excisional biopsy in the diagnostic procedure, especially when patients exhibit notable systemic symptoms and malignant lymph node features. Enhancing the precision of preliminary diagnostic evaluations and directing suitable treatment plans depend on this integrated approach.

Conclusion

The clinicopathological study conducted on cervical lymphadenopathy at Jawaharlal Nehru Medical College & Hospital has provided valuable insights into the diagnostic complexities of this condition. The correlation between systemic symptoms and malignancies, the significance of ultrasound findings, and the high incidence of tuberculosis in the region underscore the necessity for a thorough and systematic diagnostic approach. The study emphasizes the importance of integrating clinical evaluations with advanced diagnostic tools such as FNAC and excisional biopsy to accurately differentiate between benign and malignant causes, thereby facilitating timely and appropriate management. The findings advocate for tailored diagnostic protocols that consider regional epidemiological trends and the diverse etiological spectrum of cervical lymphadenopathy.

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