

## Original Research Article

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# Clinical and laboratory evaluation of lymphadenopathy in particular with fine needle aspiration cytology

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## ABSTRACT

**Background:** To know the various causes of lymphadenopathy in children and to know the usefulness of FNAC in diagnosis of various causes of lymphadenopathy.

**Methods:** Children less than 12 years with significant lymphadenopathy (lymphadenopathy of >1 cm in cervical, axillary and >1.5 cm in inguinal region) were included.

**Results:** A total of 50 children were enrolled in the study. The incidence of lymphadenopathy was more common in the age group of 4-8 year during the lymphoid phase with male preponderance of all the causes infections especially tuberculosis was the major cause of lymphadenopathy which is totally preventable by giving BCG vaccination. The sensitivity of FNAC in the present study was 71.3%. In 3 cases FNAC was not done because peripheral smear examination revealed that the patients are suffering from acute lymphoblastic leukemia.

**Conclusions:** FNAC is a simple bedside investigation though traumatic is of immense value for diagnosing various cases. Even though it may not be a replacement for lymph node biopsy, it is preferred as a first line investigation because of its simple procedure.

**Keywords:** Children, Fine needle aspiration cytology, Infections, Lymphadenopathy, Lymph node, Tuberculosis

## INTRODUCTION

Examining the lymph nodes is an important aspect of the general physical examination of both well and ill children and adolescents. Lymph nodes are normal structures, and certain lymph nodes may be palpable in a healthy patient, particularly in a young child. Palpability of lymph nodes is called lymphadenopathy. Lymph node enlargement is a common clinical finding in pediatric practice. It may represent a normal age-related physiological change or a transient response to various benign local or generalized infections originating from the upper respiratory tract infection or skin.<sup>1</sup> However, it may also herald chronic infections like tuberculosis, brucellosis, and serious

conditions like malignancy and autoimmune disorders or other rare causes like atypical mycobacterial lymphadenitis, SLE, brucellosis, or histiocytosis.<sup>2,3</sup> The etiological profile varies from country to country and region to region. In developing countries like India, acute upper respiratory infections, suppurative skin infections and tuberculosis are the major causes for regional lymphadenopathy.<sup>4</sup> Examining the lymph nodes is an important aspect of the general physical examination of both well and ill children and adolescents.<sup>5</sup> Thus, the challenge for the general pediatrician is to learn how to distinguish pathologic from nonpathologic lymph nodes and to develop a rational approach to the evaluation of lymphadenopathy.<sup>6</sup> The aim and objective of this study

was to know the various causes of lymphadenopathy in children, its associated clinical findings and know the usefulness of FNAC in diagnosis of various causes of lymphadenopathy.

## METHODS

### *Source of data*

The study was conducted in Department of Paediatrics, Katuri Medical College and Hospital, Guntur Andhra Pradesh, India. Children with lymphadenopathy attending Pediatric OPD and admitted in Pediatric Department during the time period October 2015 to October 2017 were included in the study.

### *Method of collection of data*

#### *Inclusion criteria*

- Age <12 years
- Lymphadenopathy of >1 cm in cervical, axillary and >1.5 cm in inguinal region.

#### *Exclusion criteria*

Insignificant palpable lymphnodes are excluded i.e; lymphadenopathy of < 1cms in cervical axillary and <1.5 cm in inguinal region.

After taking informed consent, detailed history was taken, and Thorough general physical examination was carried out. Palpable peripheral lymphnodes were examined noting their size, location, consistency, number, mobility, presence of matting and presence of any local changes like redness, discharge or sinus formation. Systemic examination with relevant investigations were done. Fine Needle aspiration cytology (FNAC) was done in study group after selecting the most prominent node. In patients with source of infection, swab was taken for culture and sensitivity. In patients with suspected systemic infection or malignancy following tests were done - Chest X-ray, Serological tests for HIV, Acid fast bacilli staining and lymph node biopsy.

### *Statistical analysis*

A prospective study consisting 50 patients with lymphadenopathy (<12 year) is undertaken to find the incidence of various causes of lymphadenopathy in the affected patients for 2 year.

## RESULTS

A total of 50 patients with lymphadenopathy including both local and generalized were studied between October 2015 to October 2017 for a period of 2 years by taking proper history, through physical examination both generalized and systemic and all the patients were

subjected for relevant investigations for establishment of diagnosis which is essential for institution of proper treatment.

It was observed that 10,17 and 23 children were having lymphadenopathy in the age groups of 0-3 year, 4-8 year and 9-12 year respectively comprising of 20%,46% and 34%. Majority of patients were having lymphadenopathy only after 4 year of age. There is an increased incidence of lymphadenopathy in male children.

The male to female ratio was 1.27:1. Analysis of the symptoms of the patients with lymphadenopathy, the major symptoms in order of incidence were palpable swelling (45;90%), fever (45;90%), cough (27;54%), weight loss (16;32%), loss of appetite (16;32%) and sore throat (10;20%). Duration of lymphadenopathy of less than one month was seen in 25 cases, 1-6 months 24 cases and more than 6 months in 1 case. 98% of the cases with lymphadenopathy were seen below 6 months of duration on palpation of the lymphnodes 80% of the patients were having firm lymphnodes, remaining 20% of the patients were having soft lymphadenopathy n. Enlargement of lymphnodes in cervical region, was the major finding in these patients. On palpation of lymphnodes, tenderness was observed in 21 cases against absence of tenderness in 29 cases. Analysis of the investigations revealed 24 (48%) patients had leukocytosis and 25 patients had anemia, ESR was raised in 23 patients comprising of 46% of patients. Among the 50 cases 3 patients had acute lymphoblastic anemia.

### *Cultures*

Out of 50 cases 20 had features of infection in the local area of drainage of enlarged lymph nodes and 16 swabs were taken for culture and sensitivity from the following areas. Throat (9), ear discharge (5), scalp lesions (2). Streptococci was the predominant organism isolated from throat culture. Swabs were taken from patients who had ear discharge (5 cases). Pseudomonas was isolated in 40% of cases, citrobacter in 40% cases and staphylococci in 20% of cases. Two cases presented with impetigous lesion over the scalp. Staphylococcus aureus was isolated in all the cases.

### *Culture of pus aspirate from lymph nodes*

Out of 5 cases, 3 (60%) cases were culture positive for staphylococcal aureus. These patients had single group of lymph nodes enlargement. The lymphnodes were painful, tender, soft, fluctuant. Remaining 2 (40%) cases had sterile culture. Fine needle aspiration was done in 47 cases out of 50 and submitted for histopathological examination for confirmation of the diagnosis. FNAC was not done in 3 cases because the peripheral smear examination revealed that the children are suffering from acute lymphoblastic leukemia. Analysis of the FNAC results revealed positive for tuberculosis in 11 cases reactive hyperplasia in 26 cases, granulomatous changes

seen in 4 cases and suppurative lymphadenitis in 6 cases. So, it revealed tuberculous changes were seen in 11 children and non-tuberculous in 33 children. Tuberculosis was positive in 23.4%, which was the single most specific lesion causing lymphadenopathy.

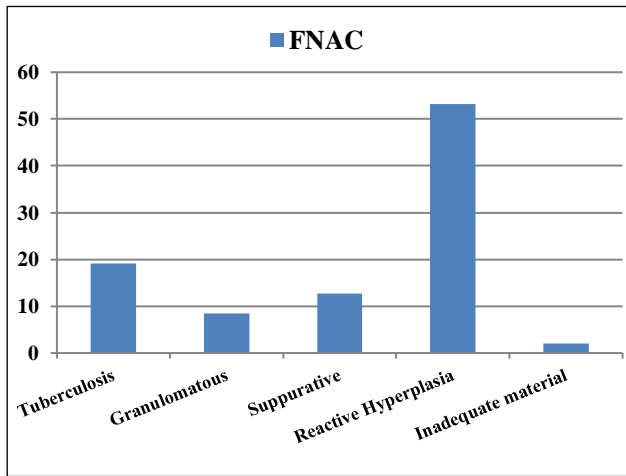


Figure 1: Fine needle Aspiration Cytology (FNAC).

Table 1: Causes of lymphadenopathy.

Cause	No of cases	Percentage
Tonsillitis	10	20
Otitis media	6	12
Scalp infection	2	4
Orodental infection	3	6
Tuberculosis	15	30
Lymphadenitis	5	10
Leukemia	3	6
Cause not known	6	12
Total	50	100

Finally, disease wise analysis of the cases of lymphadenopathy, specific diseases like tuberculosis and acute lymphoblastic leukemia were identified in 15 and 3 cases respectively. Rest of the 32 cases were having nonspecific lymphadenopathy. After identifying the specific diseases, the other diseases like tonsillitis, otitis media, and scalp infection might have caused non-specific lymphadenitis. Finally, disease wise analysis of the cases of lymphadenopathy, specific diseases like tuberculosis and acute lymphoblastic leukemia were identified in 15 and 3 cases respectively. Rest of the 32 cases were having nonspecific lymphadenopathy. After identifying the specific diseases, the other diseases like tonsillitis, otitis media, and scalp infection might have caused non-specific lymphadenitis.

**DISCUSSION**

In the present study, 50 cases of lymphadenopathy were studied in detail by taking history, detailed clinical examination and relevant investigation was done for institution of appropriate treatment over a period of 2

year from October 2015 to October 2017 in the department of Pediatrics Katuri Medical College. Lymphadenopathy is a common clinical entity for which the child is brought to the hospital for evaluation.

**Age**

In the present study maximum number of patients were having lymphadenopathy between 4-8 years age comprising of 46%. The present study was in correlation with study of other authors like Pradeep Reddy M et al, and Siva Prasath et al, where the reported incidence was 55% and 47% respectively.<sup>7,8</sup> In the study of Singh et al, the reported incidence between 5- 10 year was 48.59%.<sup>9</sup> It shows that the incidence of lymphadenopathy was more common in the age group of 4-8 year during the lymphoid phase.

**Sex**

In the study the incidence of lymphadenopathy was more in male children than in females were the sex ratio was 1.27:1. Similar sex incidence was reported where there is male preponderance in the studies of other authors like C. Karadeinz et al, Singh et al, Bezabin M et al, Mitra S et al, where the incidence was 2.5:129;2.34:139;1.3:140;1.27:141.<sup>10-13</sup> The reason for the increased incidence in male children has to be studied in detail to know the exact reason. The present study was a hospital based study, the increased incidence in male children may not reflect true incidence.

**Site**

In the present study, cervical group of lymphnodes was most commonly involved (50 cases, 100%), followed by axillary (5 cases, 10%). Of the analysis of the distribution of lymphnodes in various areas of the body, it was observed all the cases were having cervical lymphadenopathy, followed by axillary, supratrochlear and inguinal lymphadenopathy. Three patients were having generalized lymphadenopathy in which the lymphnodes were palpable in cervical, supratrochlear, axillary and inguinal lymphadenopathy. The present study was in correlation with the studies done by Singh et al, where the incidence in order of frequency was cervical 96.79% (498), axillary 1.61% (9), inguinal 0.08% (4) and supraclavicular 0.06% (3) cases respectively.<sup>9</sup> In study done by Pradeep Reddy M et al, in 100 cases, cervical lymphadenopathy was present in 85% of cases. In study done by Yaris et al, reported after palpation of 153 lymphnodes in 98 patients, cervical lymphadenopathy was present in all the cases.<sup>7,14</sup>

**Symptoms**

The most common symptom in my study is palpable swelling in the neck seen in 88% (44 cases), followed by fever 44% (22 cases) and cough in 42% (21 cases). In study done by Pradeep Reddy M et al, in which 52%

cases were presented with swelling in the neck followed by 48% of cases with fever and cough each.<sup>7</sup> In study done by Somaiah G et al, 90% of cases had patients with presenting symptom as swelling in the region of neck followed by fever in 90% and cough in 52.9%.<sup>15</sup>

### ***Consistency, tenderness and mobility***

On palpation of lymph nodes in present study, firm consistency was observed in 80% of the patients, which was in comparison with studies of others like Knight Phillip et al, Lake et al with incidence of 96% and 99% respectively.<sup>1,16</sup>

### ***Duration of lymphadenopathy***

In the present study, 50% (25) of cases were having the duration of < 1 month, 48% (24) were between 1 month and 6 months duration and 2% (1) was more than 6 months. Similar results were obtained in study done by Somaiah G et al<sup>15</sup> in which 50.8% cases had swelling < 1 month duration, 41.3% cases had duration of 1 to 6 months and 7.9% cases had duration of more than 6 months. In both the studies the maximum number of cases were reported before 1 month of duration and remaining after 1 month of duration, very few cases were reported after 6 months of duration.

### ***Culture***

Culture of the organisms from the specimens of throat, ear, scalp and aspirate from the lymph nodes revealed the isolation of the predominant organisms like Streptococci, Pseudomonas and Citrobacter, Staphylococci (specimen from both scalp and lymph node aspiration) respectively. Culture of the ear swab specimen, it was observed that the following organisms were isolated such as Pseudomonas, Citrobacter, and Staphylococcus aureus, comprising of 40%, 40% and 20% respectively which is in correlation with the study of Ojala KS et al, where the reported incidence was Pseudomonas and Staphylococcus aureus was 19%, 22%. He did not isolate Citrobacter in his studies.<sup>17</sup> Culture from the lymph node aspirate specimen Staphylococcus aureus was the predominant organism isolated from the specimen comprising of 60 percent in the present study was in correlation with the study of Yaris et al with the incidence of 100%.<sup>14</sup>

### ***Fine needle aspiration***

FNAC was done in 47/50 cases in the evaluation of children with lymphadenopathy for proper establishment of diagnosis and institution of appropriate treatment. Histopathological examination revealed reactive hyperplasia in 55.4%, tuberculosis in 23.4% and suppurative lymphadenitis in 12.7%. In 3 cases FNAC was not done because peripheral smear examination revealed that the patients are suffering from acute lymphoblastic leukemia. The cytological evaluation in

the present study was comparable to the studies observed by Singh et al.<sup>11</sup>

### ***Sensitivity of FNAC***

The sensitivity of FNAC in the present study was 71.3%. When it is compared with the studies of other authors the sensitivity was low where the reported sensitivity observed by other authors was as follows such as Pradeep Reddy M et al, El Hag et al, Ramzy et al, Stanfield et al, Buchino et al, and Usha R Singh et al, where the reported sensitivity was 94%, 97%, 98%, 96% and 94% respectively.<sup>7,18-22</sup> Thus, FNAC as a primary diagnostic test is of value in diagnosing 71.3% of tuberculosis cases. It is helpful in those with benign conditions like reactive hyperplasia to rule out underlying serious systemic disease and reassuring patients. It is helpful in pyogenic cases to obtain material for culture and sensitivity there by instituting antibiotic treatment.

### ***Cause of lymphadenopathy***

Analysis of the causes of lymphadenopathy, it was reported that tonsillitis, otitis media, scalp infection, orodental infection, tuberculosis, leukemias and unknown causes were the major etiological factors for causing lymphadenopathy comprising of 20%, 12%, 4%, 6%, 30%, 6%, 6% and 12% respectively. Tuberculosis, tonsillitis, Otitis media and unknown cause were the major etiological factors causing lymphadenopathy comprising of 74%. Among, all the etiological factors tuberculosis was the major cause of concern for causing lymphadenopathy which is totally preventable by giving BCG vaccination and appropriate treatment to the patients who are having open tuberculosis. The present incidence of various etiological factors causing lymphadenopathy with other authors from various places like Somaiah G et al, and Annam et al, the incidence was comparable with their study with minor variation.<sup>15,23</sup> Only the present study reported that 6% of the patients who were having generalized lymphadenopathy found to have acute lymphoblastic leukemia.

### ***CONCLUSION***

Lymphadenopathy is one of the most common clinical entity in which the child is brought to the department of pediatrics for evaluation to establish the diagnosis and also for institution of appropriate treatment. So the incidence of lymphadenopathy is more in the age group of 4-8 years which are in the lymphoid phase of development. The incidence of cervical lymphadenopathy is more when compared with other sites because of location of more number of lymph nodes in the neck and also the incidence of diseases are more common in and around the oral cavity. The common presentation of any disease either local or systemic is lymphadenitis. So, detailed examination of the patient is very important to unearth the underlying disease process. In the present study the incidence of reactive hyperplasia was more

followed by tuberculosis. In developing countries like India whenever a patient attends the department of Paediatrics with lymphadenopathy it is always be prudent to exclude tuberculosis, which is quite prevalent.

#### **What this study aids**

FNAC is a simple bed side investigation though traumatic is of immense value for diagnosing various cases. Even though it may not be a replacement for lymphnode biopsy, it is preferred as a first line investigation because of its simple procedure FNAC is helpful in those with benign conditions like reactive hyperplasia to rule out underlying serious systemic diseases and reassuring the parents.

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