

A STUDY ON ETIOLOGY AND CYTOMORPHOLOGICAL PROFILE OF SIGNIFICANT LYMPHADENOPATHY IN CHILDREN AGED 1- 12 YEARS ATTENDING GOVERNMENT GENERAL HOSPITAL, KAKINADA

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Abstract

Background: The aim is to study the etiology and cytomorphology of significant lymphadenopathy in children aged 1 to 12 years attending GGH Kakinada. **Materials and Methods:** It was a Hospital-based prospective observational study of inpatient and outpatients carried out at Tertiary care Hospital in Kakinada. Significant lymphadenopathy cases both localized and generalized were attended to OPD, GGH, Kakinada and thus admitted in wards and PICU. **Result:** In the present study, all patients presented with palpable swelling [100%]. Majority of patients [81.6%] had swelling of size 1-2 cms. In the present study, the majority of study patients had regional lymphadenopathy [95%] and generalized lymphadenopathy was seen in 5% patients. Among cases with regional lymphadenopathy, the majority of patients [87.5%] had cervical lymphadenopathy suggesting that oropharyngeal and nasopharyngeal areas and respiratory tract infections were most common cause for regional lymphadenopathy. 82.5% of patients had mobile swelling, out of which reactive lymphadenitis and non-specific lymphadenitis were the major findings in FNAC. 17.5% of patients had matted swelling, of which chronic granulomatous lymphadenitis the major finding in FNAC. Fine needle aspiration cytology was done to all individuals and results showed that maximum individuals had reactive lymphadenitis on FNAC with 47.5% followed by 20% patients who had chronic nonspecific lymphadenitis, 15.8% patients had acute suppurative lymphadenitis, 15% patients had chronic granulomatous lymphadenitis and 1.6% patients had HODGKIN'S lymphoma. 11.7% patients had Mantoux test positive but 15% patients had chronic granulomatous lymphadenitis which suggests that patients with negative Mantoux test can also manifest with TB lymphadenitis. 14.2% of patients had abnormal chest x-ray with changes of lobar pneumonia, bronchopneumonia or cavitory lesions. 83.3% patients were started on antibiotics and 14.2% patients were started on antitubercular therapy and 1.7% patients were referred to a higher centre for anticancer therapy. 89.2% patients recovered and 10.8% lost to follow-up. **Conclusion:** FNAC is preferred as first-line investigation. Along with cell block analysis and ancillary techniques, it provides an excellent diagnostic accuracy. FNAC being simple with minimum complications with good diagnostic accuracy can be used as a primary diagnostic test in children with significant lymphadenopathy. It is a reliable test in diagnosis of tubercular lymphadenitis especially when used in combination with other tests with high positive predictive values. Further studies and a longer follow up involving detection of antigen, antibodies against lesser known viruses, parasites and investigations for rarer causes of lymphadenopathy may decrease the fraction of many of these undiagnosed reactive hyperplastic conditions.



INTRODUCTION

Lymph node (LN) enlargement is a common clinical symptom in paediatrics, with palpable nodes detected in approximately 80-90 percent of children.^[1] LN enlargement can occur as a result of normal aging physiological changes or as a transitory reaction to a variety of benign local or systemic infections originating in the upper respiratory tract or skin. However, persistent infections such as tuberculosis and brucellosis, as well as significant illnesses such as malignancies and autoimmune disorders, as well as other unusual causes such as atypical mycobacterial lymphadenitis, SLE, brucellosis, or histiocytosis, might cause it. The aetiological profile differs from region to region since lymphadenopathy is a common manifestation of numerous illnesses. Acute upper respiratory tract infections TB, and suppurative skin infections are the most common causes of regional lymphadenopathy in developing nations like India.

The majority of cases may be diagnosed based on careful observation. Because lymphadenopathy is not a symptom of a single disease, diagnosing it can be difficult and, it necessitates a thorough understanding of differential diagnosis of the cervical lymphadenopathy. For patients with lymphadenopathy, this study provides a systematic clinical approach as well as treatment.^[2]

Any major lymph node enlargement that does not subside or remains static in size for more than two weeks following standard antibiotics should be extensively explored, according to the experts.^[3]

Systemic infections, cancers, and other factors can all play a role. Whereas regional lymphadenopathy is defined as enlargement of lymph nodes within contiguous anatomic regions.^[4] it is most commonly caused by the presence of an infectious or inflammatory condition in the lymph node's drainage area (s). Infectious aetiologies are the most common cause of regional lymphadenopathy in children, which is typically observed in the cervical area.

Until recently, lymph node biopsy was the preferred method of diagnosis in cases with lymphadenopathy, particularly when malignancy was suspected. In recent years, however, fine needle aspiration cytology has been used as an alternative. Fine-needle aspiration cytology (FNAC) is a less invasive way of diagnosing lymphadenitis that is easy, rapid, and cost-effective. It is a useful diagnostic tool, especially in children.^[4]

TB is still prevalent in this region, with lymph node tuberculosis being the most common form of extra pulmonary tuberculosis (responsible for 30-40 percent of cases). We choose this study to learn about the disease burden of tuberculosis in our area, to examine various aetiologies, and to provide early intervention in cases of tuberculosis by employing FNAC for early lymphadenitis detection.

Aims and Objectives

To study the etiology and cytomorphology of significant lymphadenopathy in children aged 1 to 12 years attending GGH, Kakinada

To evaluate the various etiologies of lymphadenopathy in children using fine needle aspiration cytology (FNAC) as diagnostic tool.

MATERIALS AND METHODS

Study Design: Hospital-based prospective observational study of inpatient and outpatients.

Study Setting: Tertiary care Hospital in Kakinada.

Sampling: significant lymphadenopathy cases that were attended OPD aged from 1 to 12 yrs to GGH, Kakinada and thus admitted in wards and PICU.

Sample Size: 120 Patients.

Study Patients: significant lymphadenopathy cases both localized and generalized were attended to OPD, GGH, Kakinada and thus admitted in wards and PICU.

Inclusion Criteria

Patients between the age group of 1yr to 12 yrs patients with lymphadenopathy with lymph node size of

1. 1cm in the cervical and axillary region
2. 1.5cm in inguinal region
3. 0.5cm in other peripheral regions
4. Lymph nodes with discharging sinus and which were hard, rubbery, and matted.

Exclusion criteria:

Children age <1yr and >12 yrs

Children having lymphadenopathy of size < significant lymphadenopathy

Study Period: The study period was one and half years that is from 1st January 2020 to 1st July 2021.

Study Tools: fine-needle aspiration cytology (FNAC), clinical examination and other tools as required, and biopsy as necessary All systems were thoroughly examined and findings were noted. Blood tests for haemoglobin level, total and differential counts, and Erythrocyte sedimentation rate were performed on all patients in the study group using standard haematological techniques. Due to the high frequency of tuberculosis, the Mantoux test was performed on patients as part of their standard workup. After identifying the most prominent node, all of the patients in the study group underwent fine-needle aspiration cytology (FNAC). If any suspected systemic infection or malignancy: chest X-ray, HIV serological tests, bone marrow examination, Acid-fast bacilli were done.

Statistical analysis: Data analysed by using excel 2013 and represented in the form of tables and diagrams. Significance tested by applying appropriate tests wherever necessary.

Ethical issues: Prior approval from the independent ethics committee was obtained. All the pre-requisite permissions and informed consent were obtained from study patients. The interviewers ensured confidentiality and comfort. Confidentiality was

guaranteed by not writing their names on the study tools and completed sheets kept secure.

RESULTS

In the present study, the majority of patients belonged to 5-8 years with 41.7% followed by 9-12 years with 36.7% and 1-4 years constituted 21.6%. [Table 1]

Majority were males with 55% and females constituted 45%. [Table 2]

In the present study, all patients had palpable swellings [100%] and 48.3% patients had fever as presenting complaint, 42.5% patients had cough as presenting complaint, 15% patients had pain and swelling, 21.7% patients had sore throat, 9.2% had ear discharge, 30.8% patients had loss of weight or failure to gain weight and loss of appetite as presenting complaints along with palpable swellings. [Table 3]

In the present study, maximum patients had swelling of lymph nodes with duration < 1 month with 68.3%, with the duration of 1-6 months 17.5% and with the duration of > 6 months 14.2%. [Table 4]

In this study, the majority of patients had left side swelling with 37.5% and right swelling constituted 35.8% and 26.7% patients had bilateral swelling. [Table 5]

In the present study, the majority of patients had single lymph nodal swelling 55.8%, and 44.2% patients had multiple lymph nodal swellings. [Table 6]

In this study, the majority of patients had 1-2 cms of swelling size accounted 81.6% ,and patients with 2-4cms swelling size constituted 15.8% and > 4cms constituted 2.5%. [Table 7]

In this study, the maximum number of patients presented with cervical lymphadenopathy 87.5% and patients with axillary lymphadenopathy were 4.2% and with inguinal lymphadenopathy were 3.3% and with generalized lymphadenopathy were 5%. [Table 8]

In the present study, the maximum number of patients presented with cervical lymph nodal swelling with 87.5%, and in cervical region maximum presented with anterior cervical lymph nodal swelling with 35.8%, posterior cervical swelling were 28.3%, submandibular swelling were 9.2%, occipital lymph nodal swelling were 4.1%, posterior auricular swellings were 9.1% and with supraclavicular swellings were 0.9%. [Table 9]

In the present study, 30% patients had pharyngitis, 20% patients had tonsillitis, 11.7% patients had scalp infection with pediculosis, 10.8% patients had dental caries, 1.67% patients had hepatosplenomegaly and 9.2% patients had otitis media. [Table 10]

In the present study, fine-needle aspiration cytology did in all children and reports were the maximum patients had reactive lymphadenitis 47.5%, 20% patients had chronic nonspecific lymphadenitis, 15.8% patients had acute suppurative lymphadenitis, 15% patients had chronic granulomatous lymphadenitis in FNAC and 1.6% had findings suggestive of Hodgkin's lymphoma in fine-needle aspiration cytology. [Table 11]

In the present study, 11.7% patients had Mantoux test positive and 88.3% were negative. [Table 12]

In this study, chest X-ray had shown abnormality with changes of pneumonia, effusions and cavitory lesions in 14.2% patients and 85.8% patients had normal chest X-ray. [Table 13]

In the present study, antibiotics were given to 83.3% patients and antitubercular therapy to 14.2% cases and 0.8% had necrotizing granulomatous lymphadenitis and given with both antitubercular therapy and antibiotics, and 1.7% patients were referred to higher center for anticancer therapy. [Table 14]

In the present study, patients were followed up for 6 months in cases of chronic granulomatous lymphadenitis on antitubercular therapy and 1 month in cases of other causes, and 89.2% patients recovered and 10.8% were lost follow-up. [Table 15]

Table 1: Sex distribution

Age	Number	Percentage
1-4yrs	26	21.6 %
5-8 yrs	50	41.7 %
9-12 yrs	44	36.7 %

Table 2: Symptoms

Sex	Number	Percentage
Male	66	55%
Female	54	45%

Table 3: Symptoms

Symptoms	Total	Percentage
Palpable swelling	120	100%
Fever	58	48.3%
Cough	51	42.5%
Pain	18	15%
Low & failure to gain Weight	37	30.8%
Ear discharge	11	9.2%
Sore throat	26	21.7%

Table 4: Duration of symptoms

Duration	Total	Percentage
< 1month	82	68.3%
1-6 months	21	17.5%
>6months	17	14.2%

Table 5: Side of swelling

Side	Number	Percentage
Right	43	35.8%
Left	45	37.5%
Bilateral	32	26.7%

Table 6: Number of swellings

Sl.no.	Swellings	Total	Percentage
1.	Single	67	55.8%
2.	Multiple	53	44.2%

Table 7: Swelling Size

Size	Total	Percentage
1-2cms	98	81.6%
2-4cms	19	15.8%
>4cms	3	2.5%

Table 8: groups of lymph nodes involved

Group	Total	percentage
Cervical	105	87.5%
Axillary	5	4.2%
Inguinal	4	3.3%
generalized	6	5%

Table 9: Distribution of Cervical Lymphadenopathy

Group	Total	Percentage
AC	43	35.8%
PC	34	28.3%
SM	11	9.2%
SC	1	0.9%
OC	5	4.1%
PA	11	9.1%

Table 10: associated findings

Associated finding	Number	Percentage
HSM	2	1.67%
pharyngitis	36	30%
tonsillitis	24	20%
scalp infection	14	11.7%
dental caries	13	10.8%
otitis media	11	9.2%

Table 11: FNAC

Finding	Total	Percentage
ASL	19	15.8%
RL	57	47.5%
CGL	18	15%
CNSL	24	20%
HL	02	1.6%

Table 12: Mantoux test

Sl.no.	Test	Total	Percentile
1.	positive	14	11.7%
2.	negative	106	88.3%

Table 13: CXR

CXR	Total	Percentage
Abnormal	17	14.2%
Normal	103	85.8%

Table 14: Treatment Given

Treatment	Total	Percentage
ABS	100	83.3%
ATT	17	14.2%
ACT	2	1.7%
ATT+ABS	1	0.8%

Table 15: outcome

Outcome	Total	Percentage
Recovered	107	89.2%
NFUP	13	10.8%

DISCUSSION

This study is a prospective, cross-sectional observational study done at government general hospital, Rangaraya medical college, Kakinada in the department of paediatrics with a sample size of 120. All patients from 1 to 12 years of age attending out-patient department at GGH, Kakinada, and inpatients in wards and PICU with significant lymphadenopathy were included in the study.

Enlargement of the lymph nodes (LN) is a common clinical finding in paediatric practice. Approximately 80-90% of children have palpable nodes. Lymph node enlargement can occur as a result of normal aging physiological change or as a transitory reaction to a variety of benign local or systemic infections originating in the upper respiratory tract or the skin. Chronic infections such as tuberculosis and brucellosis, as well as dangerous illnesses such as malignancies and autoimmune disorders, and other rare causes such as atypical mycobacterial lymphadenitis, SLE, brucellosis, or histiocytosis, can cause it.

The aetiological profile differs from region to region since lymphadenopathy is a common presentation of numerous diseases. Acute upper respiratory infections, suppurative skin infections, and tuberculosis are the leading causes of regional lymphadenopathy in developing countries like India. Because lymphadenopathy is not a symptom of a single disease, diagnosis can be difficult and it needs a thorough understanding of the differential diagnosis of lymphadenopathy.

Age: In the present study, maximum number of patients belonged to 5-8 years which was 41.7% and those from 9- 12 years constituted 36.7% followed by 1-4 years with 21.6%. Majority of individuals between 1-4 years had acute suppurative lymphadenitis in FNAC with 42.3% and among 5-8 years maximum patients had reactive lymphadenitis with 52% and those between 9-12 years had reactive lymphadenitis as major finding in FNAC, constituting 52.3% which is statistically significant.

In a study conducted by BHARGAV ET AL⁵, significant lymphadenopathy is common in age group 5-8 years with 45% followed by 9-12 years 43.3% and 1-4 years constituted 11.7%. In a study by Deva Kumar B ET al,⁶ significant cervical lymphadenopathy was common among 4-8 years 43%, followed by 8-12 years with 36%.

Symptoms: In the present study, all patients presented with palpable swelling 100% and fever was a major symptom in 48.3% followed by cough in 42.5% patients and 30.8% patients had a loss of weight or failure to gain weight or loss of appetite as complaint and 21.7% patients had a sore throat as presenting complaint and pain of swelling in 15% and 9.2% patients presented with ear discharge and 42% patients had more than one symptom. In a study conducted by Nageswarao ET al,⁷ 50 patients were taken and the maximum subject presented with palpable swelling in 88% followed by fever in 44% patients and cough in 21% cases.^[8-10]

Associated findings: In the present study, 30% patients had pharyngitis on examination and 20% patients had tonsillitis and 11.7% patients had scalp infection in the form of pediculosis, a 10.8% patients had dental caries on examination and 1.67% had hepato splenomegaly on examination. In a study conducted by Bhargav ET al,¹¹ 25% patients had tonsillitis and 13.3% had otitis media and 3.3% patients had oro dental infections, and 1.7% patients had a rash.

Site: In the present study, maximum patients had regional lymphadenopathy with 95% among which, maximum patients had cervical lymphadenopathy 87.5% and axillary lymphadenopathy constituted 4.2% followed by inguinal lymphadenopathy 3.3% and generalized lymphadenopathy was seen in 5% patients. In a study conducted by Pradeep Reddy et al,⁸ 100 patients were taken and reports obtained were regional lymphadenopathy was 70% and 30% had generalized lymphadenopathy, and among regional lymphadenopathy, cervical lymphadenopathy constituted 85%. In a study conducted by Singh ET al,⁹ majority patients had cervical lymphadenopathy 96.79% and axillary lymphadenopathy constituted 1.61% and inguinal lymphadenopathy 0.08% and supraclavicular lymph nodal enlargement in 0.06%

Group of lymph nodes in cervical lymphadenopathy: In the present study, cervical lymphadenopathy constituted 87.5% and in cervical lymphadenopathy, maximum patients had anterior cervical lymph nodes involved in 35.8% followed by posterior cervical lymph nodes in 28.3% and submandibular constituted 9.2% and posterior auricular in 9.1% and occipital 4.1% and supraclavicular 0.9%. In a study conducted by Bhargav ET al,⁵ 43.3% patients had upper anterior cervical lymph nodes involved and 36.7% had

posterior cervical lymph nodes involved followed by submandibular in 8.31% and posterior auricular 5%. 3.3% were in the supraclavicular region and 3.3% in the occipital region.

Size: In the present study, majority of patients had swelling size of 1-2cms in 81.6% followed by 2-4cms in 15.8% and >4 cms in 2.5%. Among patients with 1-2cms swelling size, maximum individuals had reactive lymphadenitis in FNAC and among 2-4cms maximum cases had acute suppurative lymphadenitis in FNAC and among individuals with swelling size >4cms maximum had acute suppurative lymphadenitis in FNAC which is statistically significant.

In a study conducted by Bhargav ET al 5 ,Out Of 60 patients, maximum patients had size 1-2 cms with 61.1% and 30% had swelling size of 2-4cms and 8.3% had swelling of size of >4cms. In a study conducted by Rizwan ET al,^[10] 89 patients were taken and results tuberculous cervical lymphadenopathy and among those with tubercular lymphadenopathy,81.6% had swelling >1.5cm and 18.4% had swelling of 1-1.5cm and in non tuberculous swelling out of 51, 80.4% patients had swelling size 1-1.5cm and 19.6% patients had swelling size >1.5cm.

Consistency: In the present study, maximum patients had firm consistency 83.4% followed by the soft inconsistency of swelling in 16.6%. Among those, maximum cases had reactive lymphadenitis in FNAC and among soft consistency cases, maximum individuals had acute suppurative lymphadenitis in FNAC.

In a study conducted by Bhargav ET al⁵,86.7% patients had swelling with firm consistency whereas 13.3% had soft consistency swelling.

Tenderness: In the present study, maximum patients had non-tender swelling with 80%, and 20% patients had swelling with tenderness .Among patients with tender swelling maximum cases had acute suppurative lymphadenitis in FNAC with 62.5% and among patients with non- tender swelling maximum patients had reactive lymphadenitis with 56.3%.

Mobility: In the present study, the maximum number of patients had mobile swelling in 82.5% and non-mobile swelling with matted lymph nodes was seen in 17.5%. Among patients with mobile swelling maximum individuals 56.6% had reactive lymphadenitis in FNAC and among patients with matted swelling maximum patients 47.6% had chronic granulomatous lymphadenitis.

In a study conducted by Bilal ET al,^[11] the majority of patients had mobile nodes with 87.5% and matted lymph nodes in 12.5%. In a study conducted by Bhargav et al,^[5] maximum patients had mobile lymphnodes in 90% and 10% had matted lymph nodes.

Blood counts: In the present study, the maximum number of patients had normal total leukocyte count 93% and among differential counts, 74.2% patients had neutrophilia followed by 19.2% patients with lymphocytosis and 6.6% had eosinophilia. Among

patients with neutrophilia, maximum patients had reactive lymphadenitis in FNAC with 44.9% and among individuals with lymphocytosis maximum cases had reactive lymphadenitis in FNAC with 47.9% and among patients with eosinophilia maximum cases had reactive lymphadenitis in FNAC with 47.9%. In a study by Bhargava ET al 5, 58.3% patients had neutrophilia and 35% had lymphocytosis and 6.7% had eosinophilia.

ESR: In the present study, maximum patients had raised ESR with 52.5% and 47.5% patients had normal ESR. In a study conducted by Pradeep ET al,^[10] 100 sample size was taken and reports were obtained, among which maximum patients with 62% had raised ESR. In a study conducted by Bhargav ET al 5, 58.3% patients had raised ESR and 41.7% patients had normal ESR.

FNAC: In the present study, fine needle aspiration cytology was done to all 120 patients. Outof 120 patients, maximum number of patients had reactive lymphadenitis with 47.5% followed by chronic nonspecific lymphadenitis in 20% patients followed by acute suppurative lymphadenitis in 15.8% individuals followed by chronic granulomatous lymphadenitis in 15% cases and 1.6% patients had Hodgkin's lymphoma in FNAC. In a study conducted by Annam V et al,^[12] Of 324 cases, the cytomorphologic features observed were reactive lymphadenitis in 58.02% of cases, granulomatous lymphadenitis in 30.55%, suppurative lymphadenitis in 7.10% and malignancies in 5.62%.

Mantoux test: In the present study, Mantoux was positive in 11.7% patients, and 88.3% patients had Mantoux negative whereas TB lymphadenitis constituted 15% suggesting patients with negative Mantoux may also manifest with TB lymphadenitis. Bhargava ET al,^[5] 60 patients were taken and 15% patients had Mantoux positive and total TB lymphadenitis on FNAC was seen in 16.7% patients.

CONCLUSION

Significant pediatric lymphadenopathy is frequently encountered problem in children which requires detailed history and physical examination in arriving for the etiological diagnosis. Most of them are associated with the infections in the draining of that particular group of lymph of nodes and treatment by appropriate antibiotics is sufficient. Cervical lymphadenopathy is the most common and can be associated with serious systemic illnesses including Tuberculosis and neoplasms especially when they are of chronic duration (> 1 month) and when the obvious source of infection is not evident. Detailed investigation work up including CBP, ESR, Peripheral blood smear, Chest X ray, FNAC, Mantoux test along with various serological tests for infectious etiology. FNAC being simple with minimum complications with good diagnostic accuracy can be used as a primary diagnostic test in children with significant lymphadenopathy. It is a

reliable test in diagnosis of tubercular lymphadenitis especially when used in combination with other tests with high positive predictive values. Further studies and a longer follow up involving detection of antigen, antibodies against lesser-known viruses, parasites and investigations for rarer causes of lymphadenopathy may decrease the fraction of many of these undiagnosed reactive hyperplastic conditions

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