



ORIGINAL RESEARCH PAPER

Medicine

A DIAGNOSTIC APPROACH TO CERVICAL LYMPHADENOPATHY - CASE SERIES OF 50 CASES.

KEY WORDS: Cervical lymphadenopathy, TB, Infections

Dr. Aashay Dharia	MBBS, Rajawadi Municipal Hospital, Mumbai.
Dr. Amrita Gujar	MBBS, Rajawadi Municipal Hospital, Mumbai.
Dr. Ajay Gujar*	MS (General Surgery), HOD General surgery, Rajawadi Municipal Hospital, Mumbai. *Corresponding Author

ABSTRACT
 Cervical lymphadenitis is common in childhood. The incidence is difficult to ascertain because it is usually caused by a viral upper respiratory infection and is self-limited. The pathophysiology of cervical lymphadenitis has not been fully elucidated, but it is suspected that infection of cervical lymph nodes results from contact with potential pathogens by airborne droplet transmission or when microorganisms penetrate the mucosa or skin of the head and neck, infiltrate the surrounding tissue, and are transported by afferent lymph vessels to lymph nodes. Although obvious infection of the anatomically drained area may be present, the infiltration of organisms is often asymptomatic, with no clinical evidence of an inoculation site. If the lymph nodes filter infectious and antigenic materials from the lymphatic fluid, lymphocytes proliferate, causing subsequent nodal enlargement.

INTRODUCTION

Lymphadenopathy is defined as the presence of one or more lymph nodes of more than 1 cm in diameter, with or without an abnormality in character. (1) In children, it represents the majority of causes of neck masses, which are abnormal palpable lumps or swellings.

Cervical lymphadenopathy is a very common disorder among children in India with low socio-economic status.

Park reported that 90% of all children aged 4-8 years have palpable lymphadenopathy. (2) In a systematic review of pediatric cervical lymphadenopathy involving 2,687 patients, two-thirds of the cases were due to non-specific benign etiologies with no definitive diagnosis, and 4.7% were secondary to malignancy. (3)

AIM:

- To assess the common causes of cervical lymphadenopathy among children.
- Cervical lymphadenopathy in the pediatric population is common in general medical as well as general surgical practice and presents either as a primary complaint of neck mass or as an incidental finding during clinical examination.

MATERIAL AND METHOD:

We selected 50 children from the age group of four years to twelve years from a secondary peripheral municipal hospital in a Mumbai suburb. All children were from low socio-economic classes.

A thorough history, examination, and hematological and radiological investigations are done in all patients. Cytology and histopathology in selective cases are done to reach a confirmed diagnosis.

RESULTS:

30 out of 50 children had nonspecific reactive lymphadenopathy. 12 had TB lymphadenopathy, and the remaining 8 had an infectious etiology other than TB.

TB lymphadenopathy remains the second-commonest cause of cervical lymphadenopathy in the Indian child population after reactive lymphadenopathy.

History:

The following questions were asked in evaluating the various possible causes of neck masses in children:

- Patient's age
- Duration of neck mass: (a) present since birth or recently discovered, and for how long; and (b) recurrence of neck mass
- Associated symptoms: (a) focal symptoms (e.g., pain, erythema); (b) infective symptoms (e.g., fever, sore throat, other localizing symptoms of infection); (c) weight loss, loss of appetite, night sweats, fatigue, easy bruising, and pallor
- Recent illnesses (e.g., pharyngitis, tonsillitis, dental infections)
- History of recurrent infections, recurrent skin abscesses, or recurrent lymphadenopathy
- Drug history, including any treatment with antibiotics
- Direct exposure: persons with tuberculosis or chronic cough
- Recent travel history
- Immunisation status

Physical Examination:

- A complete physical examination was done. General examination of the child's growth parameters and general health status. The presence of pallor or jaundice was determined. In addition, a detailed examination of neck swelling was done in the following manner:
- Size, number, location, skin over swelling, scars, and sinuses
- Quality of lesion: (a) tenderness, warmth, mobility, fluctuance, consistency, and erythema; and (b) other overlying skin changes such as cutaneous sinus tract
- A sequential examination of the lymph node chains of the head and neck (Fig. 1) was performed. In suspected cervical lymphadenopathy, other areas of peripheral lymphadenopathy were palpated (i.e., axillary, inguinal) to determine if the lymphadenopathy is localized or generalized.

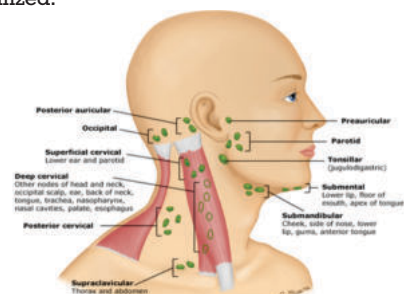


Figure 1: Illustration showing lymph nodes region of neck



Pic 1. Posterior triangle multiple lymphadenopathy

A quick examination of the eyes, ears, nose, mouth, and throat was performed to look for common sources of infection that could cause cervical lymphadenopathy (Table I).

Table 1. Drainage areas of lymph nodes

Region	Drainage areas
Submental	Bottom lip, floor of mouth, skin of cheeks
Submandibular	Mouth, lips, tongue, submandibular gland, cheek
Preauricular	Anterior and temporal scalp, anterior ear canal and pinna, conjunctiva, parotids
Postauricular	Temporal and parietal scalp
Occipital	Posterior scalp
Upper, middle and lower cervical	Tongue, tonsils, larynx, oropharynx, anterior neck, scalp, lower ear canal, parotid
Posterior cervical	Scalp and neck
Supraclavicular	Mediastinum, lungs, abdomen

To complete the examination, we assessed for the presence of rashes, KD features, petechiae or purpura, and joint swelling, and palpated the abdomen to assess for hepatosplenomegaly or abdominal masses.

Investigations:

1. Blood investigations

A complete blood count (CBC) and peripheral blood film (PBF) are done for all patients. Raised total white cell count and neutrophilia are suggestive of a bacterial etiology, whereas cytopenia can be seen in viral etiologies, hematological malignancies, or autoimmune conditions. Thrombocytosis might be present in cases of reactive cervical lymphadenitis or other inflammatory conditions. It is important to note the differential white cell counts, as lymphopenia can be seen in systemic lupus erythematosus, and a high percentage of atypical lymphocytes or monocytes can be seen in infectious mononucleosis syndrome. The PBF might reveal the presence of blast cells in cases of hematological malignancies.

The choice of blood tests is guided largely by clinical suspicion after the child's assessment. Other blood investigations, like liver function tests and viral markers, are done for anesthesia fitness.

2. Imaging

- Chest radiography is done for all children to rule out primary pulmonary tuberculosis or hilar lymph nodes.
- Ultrasonography is advocated in all cases as the initial imaging modality for cervical lymphadenopathy. It was

useful in determining whether complications such as abscess formation have occurred. It was also useful to differentiate lymphadenopathy from other causes of congenital or acquired neck masses.

- Computed tomography (CT) or magnetic resonance (MR) imaging investigations were done on only two children. particularly useful in evaluating neck masses located within the deep neck.

3. Diagnostic FNAC

Performing FNAC on children was a bit of a difficult job. 23 out of 50 children underwent FNAC. 11 patients had a cytology report of reactive lymphadenopathy; 4 had TB lymphadenitis; and 8 were inconclusive.

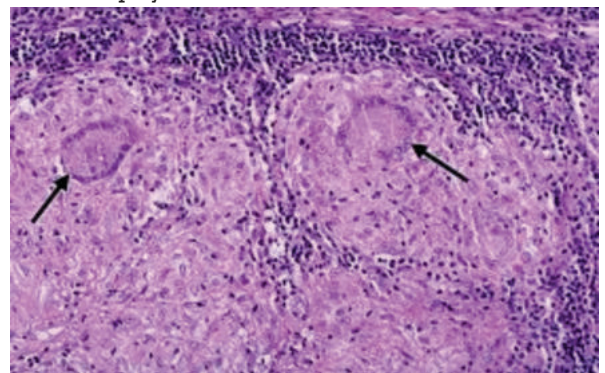
12 patients underwent lymph node biopsies. Lymph node biopsies were done under general anesthesia after proper consent. 1.5cm incision was taken along Langer's neck line. Incisions are opened in layers, and complete excision of lymph nodes is done. Specimens are grossly examined for particular features like consistency and caseation.

It is sent for histopathology and MRT-PCR.

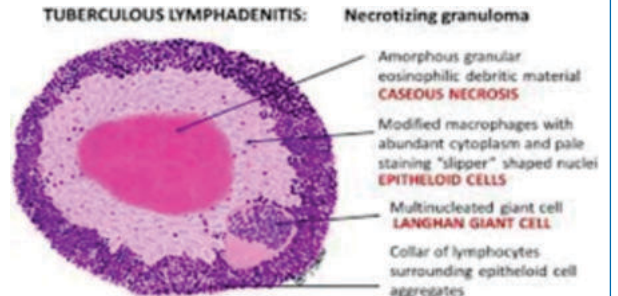
4. Excisional biopsy

The gold standard for tissue diagnosis is an excisional biopsy. There are several indications for which an excisional biopsy may be considered: (4,5,6) (a) persistent or progressive lymphadenopathy after 4–6 weeks; (b) lymph nodes greater than 1.5 cm; (c) symptoms and signs suggestive of malignancy; (d) supraclavicular lymph node; (e) unexplained, prolonged fever; (f) abnormal FBC (in particular cell line defects) or chest radiography; and (g) concerning features on ultrasonography or CT.

The largest and most abnormal lymph node was excised. (6) The biopsy specimen was sent for histology, gram stain and bacterial culture, acid-fast bacilli (AFB) smear and culture, and an AFB polymerase chain reaction test.



Pic 2a . TB Granuloma



Pic 2b. TB Granuloma

All children were treated after a definitive diagnosis was established. Reactive lymphadenopathy patients followed up for 3 months. Infectious etiology patients were treated with a 10-day course of oral broad-spectrum antibiotics. Patient with TB lymphadenitis treated with a primary line of 4 drugs in the

standard anti-koch's regime for 9 to 12 months of treatment as all were non-resistant to rifampicin.

RESULTS:

Age (in years)	No. of patients
4-6	12
6-8	24
8-10	9
10-12	6

Age group of patients was 4 years to 12 years. Mean age was 8yrs.

Male	Female
22	28

22 were males and 28 were females.

Duration of symptoms (in days)	No. of patients
1 to 7	20
8 to 14	12
15 to 30	03
More than 30	15

In our study, the average duration of neck swellings ranged from 7 days to 45 days. The mean days were 21. All 12 TB lymphadenopathies had a duration greater than 30 days.

Painful	Painless
05	45

45 complained of painless single or multiple swellings (lymph nodes). Only 5 had a pain score of 3 to 5, which is suggestive of a bacterial infection.

Site	numbers
Anterior triangle	16
Posterior triangle	34

16 patients had lymphadenopathy in the anterior triangle whereas 34 patients had it in the posterior triangle.

Single lymph node	Multiple Lymph nodes
16	32

On local examination, 32 had multiple lymph nodes and 16 had single lymph nodes. All 12 Tb lymphadenopathies had more than one lymph node.

Soft to firm	Matted and variegated	Soft and fluctuation
44	3	3

44 lymph nodes had a soft to firm consistency. Six out of 12 TB lymphadenopathies had classical features. Three of them were matted with variegated consistency, and three had soft consistency with abscess formation.

Causes of infective lymphadenitis	No. of patients
Scalp infection	4
Dental caries	3
Ear discharge	1

8 lymphadenopathies had an infectious etiology. The commonest were scalp infections (4), dental caries (3), and ear discharge (1).

WBC count	No. Of patients
< 11000/cmm.	46
>11000/cmm.	04
Predominant Lymphocytes	04
Predominant Neutrophils	04

In our study, 46 patients had a normal WBC count, though four had a high percentage of lymphocytes. The remaining 4 had counts ranging from 11300 to 14500, with predominant neutrophils.

Normal ESR	Raised ESR
42	08

Erythrocyte sedimentation rate (ESR) levels did in all 50. ESR is an inflammatory marker that may be raised in infective (more likely from a bacterial cause) or inflammatory causes of cervical lymphadenopathy. Out of 50, only 4 had raised ESRs with TB lymphadenopathy and 4 with bacterial infection.

USG < 1.5 cm lymph node size NO FNAC/ Biopsy	USG > 1.5 cm lymph node size FNAC/ Biopsy
27	23 FNAC/ 14 out of 23 biopsy

23 patients who had lymph node sizes greater than 1.5 cm on USG were selected for FNAC. 14 out of 23 underwent an excision biopsy. 23 out of 50 children underwent FNAC.

FNAC report	No. Of patients
Inconclusive	8
Reactive/Infective	11
TB	04

11 patients had a cytology report of reactive lymphadenopathy; 4 had TB lymphadenitis; and 8 were inconclusive.

Histopathology	Numbers
TB Granuloma	12
Bacterial and inflammatory	02

14 patients underwent lymph node biopsies. Out of which 12 showed histopathological report of TB lymphadenopathy with classical granuloma.

Multiplex MRT-PCR	Number Out of 12
Detected resistance to Rifampicin	10
Not detected	02

Multiplex real-time PCR was positive in 10 and not detected in 2.

DISCUSSION:

Cervical lymphadenopathy is a common problem in children, with reactive lymphadenopathy from a variety of viral infections being the most common cause. In these instances, systemic antibiotics are not warranted.

In a child with cervical lymphadenopathy, the duration of lymphadenopathy is a key consideration in determining its possible etiology, which can be categorized into four main groups: infectious, immunologic, malignancy, and miscellaneous causes. The causes can then be classified according to the origin and time course of symptoms, as presented in Table II. (4,5)

Table 2: Causes of cervical lymphadenopathy

Infective	Bacterial, viral, fungal, parasitic, spirochaetal, mycobacterial
Neoplastic	Usually leukaemia or lymphoma but can be secondary (metastasis) from any solid tumour elsewhere in the body. The commonest solid tumours in children are neuroblastoma, rhabdomyosarcomas, osteosarcomas, nasopharyngeal carcinoma and thyroid cancers. Note that brain tumours very rarely metastasize to lymph nodes.
Immunological	JIA, SLE, Vasculitic disease Special mention to Kawasaki Disease
Metabolic	Lipid storage disorders – such as Gaucher disease and Niemann-Pick disease
Drugs	Phenytoin, allopurinol, atenolol, carbamazepine, penicillin
Miscellaneous	Post live vaccines, e.g BCG

Features suggestive of cervical lymphadenitis secondary to bacterial infection include an acute presentation, fever, and prominent tenderness in the lymph nodes with or without overlying erythema. The primary source of infection may or may not be found. In these cases, empiric antibiotic therapy should be directed towards treating the most likely causative organisms, *Staphylococcus aureus* or *Streptococcus pyogenes*. The choice of investigations is largely guided by clinical suspicion after an assessment of the child. Investigations should be performed in cases of subacute or chronic lymphadenopathy when there are associated red flags or if the child does not respond to first-line treatment. First-line investigations are CBC and ESR tests, with other tests as clinically indicated, to evaluate for more worrisome pathology.

An excisional biopsy of the cervical lymph node is the gold standard for tissue diagnosis.

The Xpert MTB/RIF assay is an easier method to conduct, and while its ability to detect rifampin resistance simultaneously is a benefit, its sensitivity from smear-negative-culture-positive specimens was lower than Advansure TB/NTM real-time PCR. Further investigation to increase the sensitivity and detect other drug resistances by kit-based assays is required for the rapid and accurate diagnosis of tuberculosis. (7)

In children with acute cervical lymphadenitis, a timely re-evaluation should always be done to examine their clinical response to appropriate first-line oral antibiotics.

CONCLUSIONS

Cervical lymph node swelling of uncertain origin in childhood can pose a special challenge to the attending general surgeon, ENT, and pediatric physicians. Cervical lymphadenopathy in the pediatric age group is largely inflammatory and infectious in etiology, although in some patients it may be related to neoplastic disease. It is important for the surgeon to be aware of the clinical manifestations and specific etiologies of this condition, as well as the diagnostic approaches and therapeutic options currently available. Close follow-up is required to monitor the need for either additional diagnostic tests or a biopsy should a patient fail to respond to appropriate initial therapy. In the Indian pediatric population, cervical TB lymphadenopathy remains one of the commonest causes. Diagnosis is easy, and if treated on time, it is curable without spreading to other sites. Histopathology and the detection of acid-fast bacilli remain the main diagnostic tools.

No conflicts of interest

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