Enigma unraveled: Role of Ultrasonography in Tuberculous Lymphadenopathy

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ABSTRACT
Lymphadenopathy is the most common form of extrapulmonary tuberculosis; cervical region being the frequent affected site. Ultrasound is a useful noninvasive imaging modality in the assessment of cervical lymph nodes. The morphology of lymph nodes is evaluated by grey-scale sonography and the power Doppler sonography helps in the assessment the vasculature of lymph nodes. Tuberculous lymphadenitis exhibits distinctive features like presence of adjacent soft tissue edema and matting of nodes. This article highlights the use of ultrasonographic as a diagnostic approach, by comparing and differentiating the features of tubercular lymph nodes in a 10-year-old female patient.

Keywords: Tuberculous lymphadenitis, Ultrasonography, Power Doppler.

INTRODUCTION
Tuberculosis continues to be a major problem and a significant health issue, challenging the medical community; in spite of available novel and effective therapies. The possibility of tuberculosis infections often is ignored in the differential diagnosis of lymphadenopathy, resulting in a delay of the appropriate treatment.

Detection of cervical lymphadenopathy with ultrasound is superior to clinical examination with the sensitivity of 96.8 and 73.3% respectively. Lymph nodes less than 5 mm in diameter are difficult to detect with computed tomography (CT), whereas high resolution ultrasound can detect small lymph nodes of even 2 mm in diameter. This article describes the role of ultrasonography in early diagnosis of tubercular lymphadenitis in a 10-year-old female patient with a bilateral swelling in submandibular region.

CASE REPORT
A 10-year-old female patient visited the Department of Oral Medicine and Radiology with a chief complaint of swelling in the right and left side of the lower face since 1 month (Fig. 1). Patient initially noticed a small swelling of $0.5 \times 0.5 \text{ cm}^2$; in the right submandibular region, which gradually increased to the present size of $5 \times 4 \text{ cm}^2$. In due period of 10 days, another similar swelling on the contralateral side was noticed. Patient also gave history of evening rise of temperature, 15 days before the occurrence of swelling.

On examination, gross facial asymmetry was noticed due to a diffuse swelling in the lower one-third region of the face. Bilaterally the swelling extended anterio-posteriorly, from the corner of mouth to the angle of mandible and superioinferiorly from the ala tragus line to about 3 and 1 cm from the inferior border of mandible on right and left side respectively. The skin over the swelling was stretched and glossy.

On palpation all the inspectory findings were confirmed. The swelling was firm in consistency and nontender. Multiple matted submandibular lymph nodes measuring about 1.5 to 2 cm in diameter were appreciated. On intraoral examination no abnormalities were seen. Correlating the history and clinical findings, a provisional diagnosis of tuberculous lymphadenitis was given, however, submandibular space infection and lymphoma were also considered in the differential diagnosis. Patient was subjected for the following investigations: Complete hemogram, panoramic radiography, posterioanterior view of chest, ultrasonography, fine needle aspiration cytology (FNAC) of submandibular lymph nodes and tuberculin skin test.

Blood examination revealed hemoglobin of 10.3 gm%, total leukocyte count of 9,900/cu.mm (59% polymorphonuclear leukocytes, 39% lymphocytes and 2% eosinophils).

Fig. 1: Bilateral swelling in the submandibular region
Erythrocyte sedimentation rate was 65 mm in the first hour. The chest X-ray film, and OPG (Fig. 2) and chest radiograph (Fig. 3) were normal. Ultrasound examination showed bilaterally multiple enlarged lymph nodes in the submandibular, supraclavicular, cervical region and in the right parotid region (Figs 4A to C). Largest lymph node measured 4.2 × 1.2 cm in the right submandibular region (see Fig. 4A). Power Doppler study showed moderate displaced vascularity in the lymph nodes. Ultrasound-guided fine needle aspiration of the right submandibular swelling was done cautiously and aspirate revealed gray-white material with hemorrhage. Cytological examination showed moderately good number of epithelioid cells, granulomas admixed with plenty of lymphoid cells with few scattered stromal fragments (Fig. 5). Tuberculin skin test was positive (7 mm). A final diagnosis of tuberculous lymphadenopathy was given with the above investigational findings. Patient was further directed to a medical institute for antitubercular therapy.

DISCUSSION

The possibility of tuberculosis infection is often overlooked in the differential diagnosis of cervical lymphadenopathy, resulting in a significant delay of the appropriate treatment. Patients with tuberculous lymphadenitis or benign reactive cervical lymphadenitis frequently present with discrete, nontender nodes in the cervical region. Though tuberculin skin test is a basic tool in the diagnosis of tuberculosis infection, ultrasonography of neck lymph nodes is an initial noninvasive investigation of choice.

In case of tuberculosis the lymph nodes involved are the groups in the supraclavicular fossa and the posterior triangle. The non-Hodgkin’s lymphoma commonly involves submandibular, upper cervical and lymph nodes in the posterior triangles. Ultrasound was performed in the present case which showed bilaterally multiple enlarged lymph nodes in the submandibular, supraclavicular and in the right parotid region. Largest lymph node in our case measured about 4.2 × 1.2 cm in the right submandibular region. It has also been reported that lymph nodes in the upper neck, including those in the submandibular and subdigastric region, tend to be larger than those in the lower neck. Inflammatory nodes may have similar size of the malignant nodes, whereas malignancy may be detected in small nodes. Thus, distribution and size of the involved lymph nodes cannot be the only criterion for diagnosis.

Normal and reactive nodes are usually elliptical in shape with a short axis to long axis ratio less than 0.5. Although pathologic nodes are usually round, normal submandibular and parotid nodes can also be round in shape (95 and 59% respectively). It is been seen that tuberculous nodes are often round in shape with unsharp border and is related to the associated edema and inflammation of surrounding soft tissue (periadenitis), as seen in our case. Multiple medullary sinuses constituting the echogenic hilus, acts as an acoustic interface which partially reflects the ultrasonic waves to produce an echogenic structure; while fatty infiltration makes the hilus more obvious. Normal nodes usually have echogenic hilus. Hilus is absent in lymphomatous (72-73%) and tuberculous (76-86%) nodes.

An ancillary feature common in tuberculous lymphadenitis is matting, which is considered as clumps of multiple abnormal nodes with no normal intervening soft tissues. The high incidence of matting in tuberculous nodes is considered to be the result of periadenitis and adjacent soft tissues edema and is a useful feature to differentiate tuberculosis from other diseases. Soft tissue edema due to tumor infiltration or as an inflammatory response to adjacent disease may be observed in granulomatous lymph nodes.

Ultrasonography evaluates the nodal distribution, shape, size and internal architecture. The ultrasonographic features that help in differentiating tuberculous nodes are the presence of nodal matting and adjacent soft tissue edema. The advent of power Doppler sonography provides more...
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A useful Doppler feature in classifying tuberculous nodes is displaced vascularity which is not found in normal nodes and relatively uncommon in other pathological nodes. This is related to the high incidence of intranodal cystic necrosis of tuberculosis which displaces the vessels. In our case, moderate displaced vascularity was seen. Avascularity in tuberculous nodes (19%) may be related to the extensive intranodal cystic necrosis of tuberculous nodes, which destroys the blood vessels of the lymph nodes. Fibrosis and hyalinization cause compression and obliteration of intranodal vessels leading to apparent avascularity of tuberculous nodes which may reflect advanced stages of the disease where healing is initiated.

Fig. 4A: Ultrasound image showing bilateral enlarged submandibular lymph nodes more on the right side

Fig. 4B: Ultrasound image showing enlarged lymph nodes

Fig. 4C: Enlarged lymph nodes in the right parotid region
CONCLUSION

In countries with a high prevalence of tuberculosis, people are exposed more intensively on average, and show tuberculosis in an early age. Our case report underlines the fact that tuberculosis lymphadenitis is an important health issue and has to be considered seriously in the differential diagnosis of lymphadenopathy. To maximize the success rate of diagnosis, a combination of culture, cytologic examination of FNA sample and PCR tests along with power Doppler and 3D sonography seemed to be the most effective strategy.

REFERENCES


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Fig. 5: Fine needle aspiration biopsy showing multiple well defined epithelial cells