Epitrochlear lymph nodes: Anatomy, clinical aspects, and sonography features. Pictorial essay[☆]

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Abstract The normal and abnormal aspects of the epitrochlear lymphatic station are not well known, mainly because the axillary basin is commonly regarded as the primary lymphatic target of all upper limb disorders. The purpose of this paper is to illustrate, through a review of specific cases, the normal and abnormal findings that can emerge during ultrasonographic (US) and color-Doppler US exploration of the epitrochlear region. We illustrate the normal anatomy and variations of the epitrochlear lymph nodes and highlight the functional role of this lymphatic station. Subsequently we describe the US and color-Doppler US findings. A number of different abnormalities are reviewed, including metastases (mainly from upper limb cutaneous melanomas), Hodgkin disease, and non-Hodgkin lymphoma, lymphadenitis (cat-scratch disease, foreign bodies, and IV drug abuse). Measures are suggested to avoid interpretative pitfalls and to carry out an effective differential diagnosis of elbow masses. This article represents a pictorial essay of the US and color-Doppler US features of various epitrochlear lymph node abnormalities that clinicians may not be familiar with.

Sommario Gli aspetti normali e anormali delle stazioni linfatiche epitrochleari non sono ben conosciuti, dal momento che il cavo ascellare viene comunemente considerato come il bersaglio linfatico primario delle affezioni dell'arto superiore. Scopo di questo contributo è di illustrare, attraverso un ampio numero di schemi e immagini, gli aspetti normali e anormali all'ecografia (US) e al color-Doppler che si incontrano nell'esame dei linfonodi della regione epitrochleare. Viene mostrata l'anatomia dei linfonodi epitrochleari. Viene sottolineato il ruolo funzionale di questa stazione linfatica. Successivamente viene descritto l'aspetto ecografico e color-Doppler. Viene mostrata una serie di aspetti patologici: metastasi (soprattutto dei melanomi cutanei dell'arto superiore), malattia di Hodgkin, linfomi non Hodgkin, linfadeniti (malattia del graffio del gatto, da corpi estranei e da tossicodipendenza). Vengono forniti suggerimenti su come evitare i trabocchetti ed effettuare una

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corretta diagnosi differenziale con le altre masse del gomito. Questo lavoro consta di una carrellata iconografica sugli aspetti US e color-Doppler delle diverse alterazioni dei linfonodi epitrocleari, evenienza poco nota.

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Introduction

Clinicians and ultrasound operators are probably not adequately familiar with the anatomic and pathologic aspects of the epitrochlear lymph nodal station. This is mainly because in clinical practice the axilla is commonly considered the primary lymphatic target of all disorders (inflammatory, cancerous, etc.) involving the upper extremity. The focus of this pictorial review is to illustrate, through a number of paradigmatic cases, the normal and abnormal findings that can be demonstrated with US and color-Doppler US in studies of the epitrochlear lymph nodes and in the general work-up of elbow masses. Informed consent to this report was obtained from all patients.

Anatomic aspects

The epitrochlear lymph nodes, also known as the cubital or supraepitrochlear lymph nodes, are part of the superficial lymphatic system of the upper limb. There are usually one or two of these lymph nodes, sometimes three, and rarely four. The epitrochlear nodes are located in the subcutaneous connective tissue on the medial aspect of the elbow, about 4–5 cm above the humeral epitrochlea.

As a general rule, the epitrochlear station drains the lymph from the last two or three fingers and from the medial aspect of the hand itself. Nevertheless, drainage areas of the upper limb are characterized by wide interindividual variability. Some lymphatic vessels arise from the epitrochlear nodes and extend to the axillary station [1] (Fig. 1).

Clinical and sonography assessment

Adequate evaluation of the patient history and clinical findings is mandatory before a sonographic examination of the epitrochlear region. The US morphostructural findings should be considered in light of the clinical data, which include location, extension, size, color of the overlying skin, surface appearance, consistency, pain, interval between development of epitrochlear swelling and current evaluation, mobility with respect to the skin and deep planes, isolated involvement, and adhesion between the enlarged lymph nodes [2,3].

The US findings are those commonly considered in the assessment of all superficial lymphadenopathies. The main morphostructural features include number, size (longitudinal and transverse diameters), shape (including analysis of the longitudinal-to-transverse diameter ratio), borders (sharp or ill-defined with respect to the surrounding fat tissue, overt signs of infiltration), appearance of the central, hilar hyperechoic structure (absent, displaced, etc.), thickness and structure of the cortex, and characteristics of lymph node vascularity as displayed by color-Doppler and power-Doppler, including intensity, origin (hilar or capsular), and distribution (homogeneous or inhomogeneous) [4,5].

Swelling, particularly when it involves the medial aspect of the elbow, may have a variety of nodal and extranodal causes. The former group includes acute lymphadenitis (cutaneous infections, cat-scratch disease, etc.), tubercular lymphadenitis, sarcoidosis-related lymphadenitis, lymphomas, and metastatic lymphadenopathies (chiefly from melanomas, but also from other cutaneous and noncutaneous tumors) (Figs. 2 and 3). Among the extranodal causes of elbow swelling

Fig. 1 Normal epitrochlear lymph node. Dual-mode image displaying an epitrochlear node (arrows) with a large central hyperechoic hilum and a thin hypoechoic cortex. Directional power-Doppler shows a hilar-type vascularization.

Fig. 2 Acute epitrochlear lymphadenitis (serologically confirmed cat-scratch disease). A veterinarian developed painful swelling involving the medial aspect of the elbow a few days after being scratched by a cat. Dual-mode US image (A) shows an oval-to-round, hypoechoic lymph node. Dual-mode directional power-Doppler image (B) demonstrates the intense but normally distributed nodal vascularization.

are tumors (median nerve tumors, fibromas, hemangiomas, lipomas, and Merkel cells tumor), sebaceous cysts, abscesses (septic arthritis of the elbow joint), Kimura disease, cutaneous and subcutaneous hematogenous metastases [6,7].

In patients with cutaneous melanoma, involvement of the epitrochlear lymph nodes (like that of the popliteal fossa and retroareolar nodes) is included in a particular category of nodal metastasis termed as "interval" lymphadenopathies [8–14]. While the upper extremity regional

lymph nodes are those located in the axilla, the epitrochlear nodes are considered an "in transit" target encountered by tumor cells as they spread from primary melanoma lesions located on the forearm, wrist, or hand. Failure to detect these lymph nodes along the melanoma spread pathways may be a cause of tumor relapse. From this point of view, the following case is particularly interesting. Three years before our observation, this female patient had undergone excision of a cutaneous melanoma from the

Fig. 3 Acute epitrochlear lymphadenitis in an IV drug abuser. Dual-mode directional power-Doppler image demonstrates an enlarged lymph node with intense, hilar vasculature.

Fig. 4 Epitrochlear lymphadenopathy representing recurrence of a cutaneous melanoma on the shoulder. A follow-up PET-CT scan (A) demonstrated tracer uptake (arrow) in the left epitrochlear region. Subsequent color-Doppler scan (B, depicted as a gray-scale illustration) confirmed the presence of lymph node metastasis reflected by an oval, hypoechoic, inhomogeneous lymph node with peripheral (capsular) flow signals.

Fig. 5 Hodgkin disease presenting with epitrochlear lymphadenopathy. US (A) shows a large, hypoechoic lymph node. Gadolinium-enhanced T1-weighted magnetic resonance imaging (B) revealed multiple enlarged lymph nodes (arrows) within the distal third of the arm and the epitrochlear region.

scapular region and radical axillary lymphadenectomy (after a positive sentinel lymph node biopsy). Follow-up included a PET-CT examination performed with the upper limb within the study volume, and fluorodeoxyglucose uptake was observed in the elbow. Melanoma metastasis to the epitrochlear lymph node was confirmed by US and surgical excision (Fig. 4). In this case, the radical axillary lymphadenectomy had caused an abnormal, descending pathway of melanoma spread to the elbow region.

The detection of epitrochlear lymphadenopathies is also interesting in patients with lymphomas (Fig. 5). As a matter of fact, this site is sometimes the first or only site of involvement in hematological disease [15–18]. Consequently, in rare cases an epitrochlear lymph node lesion may be the first sign of lymphomatous disease.

Conclusion

Epitrochlear lymphadenopathies are not a common finding in clinical practice but (also for this reason) they should not be underestimated. Appropriate assessment must be based on clinical and US findings to distinguish between the various nodal and non-nodal causes of swelling involving the medial aspect of the elbow.

Conflict of interest statement

The authors have no conflict of interest.

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