Lymphoma Involving the Ulnar Nerve
Sonographic Findings

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We report a case of a 70-year-old man with lymphoma of the ulnar nerve that presented as a palpable mass on his left forearm and wrist. He had a history of oral lymphoma with complete remission after chemotherapy and radiotherapy. The lesion appeared sonographically as a hypoechoic mass mimicking a cyst encasing the ulnar nerve. However, the mass showed vascularity on color Doppler sonography. Lymphoma involving the peripheral nervous system is very rare.1 To the best of our knowledge, there has been no report of sonographic findings that describe lymphoma involving the peripheral nerves. In this report, we describe the sonographic features of a case involving lymphoma of the ulnar nerve and correlate sonography with magnetic resonance image, positron emission tomography/computed tomography, and histopathologic examination.

Case Report

A 70-year-old man came to our radiology department with swelling on his left forearm and wrist for more than 1 month. The patient had a history of diffuse large B-cell lymphoma of the oral cavity with complete remission after chemotherapy and radiotherapy. Sonography with a L12–5 MHZ linear array transducer (HDI 5000; Philips Medical Systems, Bothell, WA) showed diffuse thickening of the ulnar nerve (Figure 1) and a surrounding hypoechoic mass measuring 1.5 × 1.5 × 6.5 cm (Figure 1). The mass encased the whole neurovascular bundle with thickening of the enveloping fascia (Figure 1). Color Doppler sonography revealed vascularity within the lesion (Figure 1B). The lumen of the ulnar artery was intact (Figure 1). Magnetic resonance imaging was performed and showed a well-defined mass between the flexor digitorum profundus, flexor digitorum superficialis, and flexor carpi ulnaris muscles (Figure 2). It separated those muscles with a smooth and sharp margin (Figure 2D). It contained thickened ulnar nerve and vessels. The mass and nerve showed homogeneous enhancement after contrast agent infusion (Figure 2).
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Positron emission tomography/computed tomography was performed with fluorodeoxyglucose F 18 (FDG) and showed an elongated mass with intense FDG hypermetabolism in his left forearm and wrist (Figure 3). He also had a recurring mass in his tongue, which showed intense FDG hypermetabolism (Figure 3A). Sonographically guided biopsy was performed to confirm the mass. Histopathologic examination revealed a mass composed of large atypical lymphoid cells with lobated nuclear membranes, vesicular chromatin, and prominent nucleoli (Figure 4A). The cells aggregated around individual nerve fibers, separating each fiber (Figure 4B). These cells were positive for CD20 (B-cell marker) and negative for CD3 (T-cell marker), consistent with diffuse large B-cell lymphoma.

Discussion

Lymphoma occasionally recurs in the peripheral nervous system after treatment with either single or multiple nerve involvement. Recurrence in multiple peripheral nerves may be accompanied by central nervous system involvement, and this phenomenon suggests that the blood-nerve barrier may protect tumor cells from chemotherapeutic agents.1 Recurrence in a single peripheral nerve is very rare.2–6 In our case, 2 lymphoma masses recurred in an ulnar nerve and the tongue, and they were shown on positron emission tomography (Figure 3). The mass in the

Figure 1. Sonography of the left forearm. A, Transverse scan showing a hypoechoic mass (arrows) surrounding the ulnar neurovascular bundle (arrowheads). The ulnar nerve shows diffuse thickening (curved arrows), and the ulnar artery shows an anechoic lumen (open arrow). B, Color Doppler scan showing color flow in the hypoechoic mass. The lumen of ulnar artery is intact (arrow). C, Longitudinal scan showing a hypoechoic mass (arrows) surrounding the ulnar nerve and ulnar artery (open arrow). The ulnar nerve shows diffuse thickening (curved arrows) along with a prominent perineurium (arrowhead) and epineurium (feathered arrow). D, Panorama scan showing diffuse thickening of the ulnar nerve (curved arrows) with a surrounding hypoechoic mass (arrow) in the volar aspect of the forearm extending to the wrist.
The ulnar nerve was in the forearm and wrist. Surrounding muscles were displaced with a smooth and sharp interface on magnetic resonance imaging (Figure 2).

On sonography, intranodal and extranodal lymphoma most typically appears as a discrete or conglomerate hypoechoic or anechoic mass compared with adjacent muscle. This is likely related to the internal homogeneous cell population within tumors. A mass may be hypoechoic and confused with a cyst. When we examined this mass with gray scale sonography, we initially thought it was a chronic abscess (Figure 1). Color flow Doppler imaging was helpful in show-

**Figure 2.** Magnetic resonance imaging of the left forearm. A–C, The mass (arrows) shows intermediate signal intensity on T1-weighted (A) and T2-weighted (B) axial images and homogeneous enhancement on a fat-suppressed gadolinium-enhanced T1-weighted axial image (C). Arrowheads indicate the ulnar nerve located between the flexor digitorum profundus, flexor digitorum superficialis, and flexor carpi ulnaris muscles. The ulnar nerve shows diffuse thickening and signal intensity equal to that of the mass on the T1-weighted (A) and T2-weighted (B) images and homogeneous enhancement on the fat suppressed gadolinium-enhanced T1-weighted axial image (C). D, T2-weighted coronal image showing the mass (arrows) separating adjacent muscles with a smooth and sharp interface.
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Figure 3. A. Coronal FDG whole-body maximal intensity projection positron emission tomographic scan showing 2 areas with intense FDG hypermetabolism in the left forearm (arrow) and right oral cavity (arrowhead). B. In the left forearm, the lesion is shown as a fusiform mass (arrow) extending to the wrist.

Figure 4. A. Photomicrograph showing that the mass is composed of large atypical lymphoid cells with lobated nuclear membranes, vesicular chromatin, and prominent nucleoli (hematoxylin-eosin, original magnification ×400). B. Photomicrograph showing aggregates of hypercellular lymphoid cells around the nerve fibers (arrows) (hematoxylin-eosin, original magnification ×100).
ing it as a solid mass (Figure 1B). The ulnar nerve running through the mass showed even, diffuse thickening on sonography, and each nerve fascicle also showed uniform thickening with a prominent perineurium and epineurium (Figure 1C). On histopathologic examination, the atypical lymphoid cells surrounded individual nerve fibers, increasing the interfiber distances (Figure 4B). The sonographic findings of lymphoma of the peripheral nerves include diffuse thickening of the nerve with a surrounding hypoechoic mass that mimics a cystic mass. Color Doppler sonography may also be helpful in differentiating between lymphoma and a cystic mass.

References


