Magnetic resonance imaging of ulnar nerve abscess in leprosy: a case report

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Summary  A 14-year-old girl on multidrug treatment for borderline tuberculoid leprosy presented with a swelling in her left arm and soon thereafter developed an ulnar claw hand. MRI showed a well-defined ovoid lesion arising from the left ulnar nerve, isointense to muscle on T1W images and hyperintense on T2W and STIR images. On post-gadolinium T1W sequence, the lesion showed peripheral rim enhancement with central necrosis suggestive of abscess. The ulnar nerve proximal and distal to the lesion was thickened and showed mild contrast enhancement. On aspiration the swelling yielded frank pus which was positive for acid-fast bacilli.

Introduction

Leprosy is a chronic granulomatous infection caused by Mycobacterium leprae, which involves superficial structures, especially skin and peripheral nerves. The clinical manifestations of leprosy form a continuum extending from polar tuberculoid to polar lepromatous leprosy. In all forms of leprosy, peripheral nerve involvement is a common feature. Nerve abscess may occur in various forms of leprosy due to caseation of nerve fasciculi leading to cold abscess formation. Any peripheral or cutaneous nerve may be involved, but the ulnar nerve is the most commonly affected. In this report, we present the MRI appearance of ulnar nerve abscess in a patient with leprosy.

Case report

A 14-year-old girl presented with two hypopigmented macules on the face and dorsal aspect of the left hand with loss of sensation over these lesions. On clinical examination, the peripheral nerves were not thickened. A slit skin smear examination revealed presence of acid fast bacilli. She was diagnosed with borderline tuberculoid leprosy and she was put on multibacillary
multidrug therapy. During the 11th month of treatment, she noticed a small nodule on the medial aspect of her left arm. It was a well defined subcutaneous nodule, mildly tender on palpation. There was no fever, joint pain or visual symptoms. Over a period of 2 weeks, the patient also developed ulnar claw hand and complained of paraesthesia. On voluntary muscle testing, she could not flex her ring and little finger at the metacarpo-phalangeal joint or extend the interphalangeal joint. She could not abduct or adduct the digits. Loss of pain and touch sensation was noted in the distribution of the ulnar nerve. Clinically, ulnar nerve abscess and reversal reaction were considered. Ultrasound examination showed a well-defined, cystic lesion with internal debris (Figure 1). Necrotic supratrochlear lymph node and ulnar nerve abscess were suggested as the diagnostic possibilities. Aspirate from the swelling was positive for acid-fast bacilli. MRI was performed to establish the relationship of swelling to the ulnar nerve.

The following sequences were done: T1W TSE (TE = 18, TR = 520) in axial and sagittal planes, T2W TSE (TE = 104, TR = 4080) in axial plane, STIR (TI = 130, TR = 5000) in sagittal plane, T2W TSE (TE = 57, TR = 4470) in sagittal plane with fat saturation, and post-gadolinium T1W TSE (TE = 18, TR = 520) in axial and sagittal planes, using Siemens Sonata 1.5 T MRI scanner (Erlangen, Germany).

MRI showed a well-defined ovoid lesion in the course of the left ulnar nerve at midarm level (Figure 2). The sagittal sequences delineated the continuity of the lesion with the thickened nerve. The lesion was isointense to muscle on T1W images. The wall of the lesion was slightly hyperintense to muscle. On fat saturated T2W sequences, the lesion was hyperintense. The nerve above and below the level of lesion was thickened and showed hyperintensity on T2W and STIR images. On post-gadolinium T1W sequences, the lesion showed peripheral rim enhancement of the wall with central non-enhancing region suggestive of necrosis. The thickened nerve both proximal and distal to the lesion also showed mild enhancement.

The patient was continued on multidrug therapy, and steroids were added based on the clinical findings. Prednisolone 30 mg daily was initially given for 2 weeks and it was reduced to 20 mg daily for 1 month and gradually tapered. As the subcutaneous swelling had become fluctuant during follow-up, it was aspirated, leading to a significant decrease in its size. At the 2-month follow-up visit, there was significant improvement in the ulnar claw hand. On voluntary muscle testing, she could flex the metacarpo-phalangeal joint of the ring and little fingers, abduct and adduct the digits of left hand but not against resistance suggesting incomplete recovery. No recovery of sensory loss was noted.

Discussion

Leprosy is a unique infectious disease with a prolonged incubation period and a predilection for skin and nerves. The involvement of nerves can be caused by the primary infection and by immunologically mediated reactions. Reversal reaction is one of them.

Although the contribution of diagnostic imaging has been limited in leprosy, the improved soft-tissue definition afforded by MRI may be useful in evaluating neural involvement. Descriptions of MRI features of peripheral nerve involvement in leprosy are sparse in the literature. MRI may show diffuse oedema and swelling of the involved nerve, due to neuritis. However, these findings are quite non-specific and the differential diagnosis includes other hypertrophic neuropathies such as Refsum’s disease, amyloid infiltration, chronic relapsing polyneuritis and Guillain-Barré syndrome.² The presence of nodules or nerve sheath
granulomas is suggestive of leprosy. Martinoli et al. analysed peripheral nerves with ultrasonography and magnetic resonance imaging in leprosy and classified leprosy nerves into three groups based on imaging appearance: group I consisted of normal appearing nerves, group II included enlarged nerves with fascicular abnormalities, and group III included nerves with absent fascicular structures. They found Doppler US and MRI to have sensitivity of 74 and 92%, respectively, in identifying active reversal reactions, based on detection of endoneural colour flow signals, increased T2 signal and Gadolinium enhancement. Jebaraj et al. described the role of ultrasound and MRI in a case of tender neuropathy due to leprosy. Ultrasound showed well defined cord-like hypoechoic lesions along the left common peroneal

Figure 1. Ultrasound examination of the left arm showing a well-defined, cystic lesion with internal debris ( ). However, the relationship of this lesion with the ulnar nerve is not clear.
nerve. On MRI the peroneal nerve was enlarged and was isointense to muscle on T1W image and had high signal on STIR sequence. They concluded that MRI may exclude nerve abscess in cases of tender neuropathy. Recently Dawe et al.\textsuperscript{6} have described the MRI appearance of median nerve abscess in a patient of borderline tuberculoid leprosy. The patient while on treatment for leprosy developed a tender nodule over the right thenar eminence. MRI of wrist and hand showed abnormal thickening with heterogeneous increased signal intensity within the median nerve with an area of reduced T1W signal intensity at the centre of the nodule suggestive of fluid nidus consistent with nerve abscess.

The differential diagnoses in the present case included ulnar nerve abscess, peripheral nerve tumor and reversal reaction. MRI appearance of well defined ovoid lesion with peripheral rim enhancement and central necrosis favours nerve abscess. Differentiation of ulnar nerve abscess from reversal reaction is important, as reversal reaction can be managed conservatively with steroids, whereas ulnar nerve abscess may need surgical decompression.\textsuperscript{5}

In summary, MRI can accurately diagnose nerve abscess. MRI features of ulnar nerve abscess are similar to abscess elsewhere in the body. Post-gadolinium sequences are helpful in suggesting the diagnosis. In our case sagittal sequence was most useful in establishing the relationship of the lesion to the ulnar nerve.

\textbf{Figure 2.} Sagittal MRI STIR image (a) shows well-defined hyperintense ovoid lesion (†) in the distal half of left arm and thickened ulnar nerve proximal and distal to the lesion (arrowhead). On post-gadolinium T1W sequence (b), the lesion shows peripheral rim enhancement (†) with central necrosis suggestive of abscess. The thickened ulnar nerve (arrowhead) distal to the lesion shows mild enhancement.
References