Nerve abscess in primary neuritic leprosy

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Summary Nerve abscess is an infrequently reported complication of leprosy. We describe a patient with a pure neuritic type of leprosy with multiple nerve abscesses, who presented with tingling and numbness in the medial aspect of his right forearm and hand. Subsequently he developed pain, redness and swelling over the medial side of his right elbow and the flexor aspect of his right wrist. High-resolution ultrasound showed diffuse thickening of the right ulnar nerve with hypoechoic texture housing a cystic lesion with internal debris suggesting an abscess, at the cubital tunnel. Histopathological examination of the pus and tissue obtained from the abscess revealed presence of granulomas with lepra bacilli. The patient responded to surgery and multidrug therapy. In conclusion, the nerve abscess as the first manifestation of leprosy is uncommon and a high index of suspicion is required to make a correct diagnosis.
Introduction

Leprosy is characterised by three cardinal features, hypoesthetic skin lesions, thickened peripheral nerves, and a positive skin-smear examination for lepra bacilli. Primary neuritic leprosy presents as peripheral neuropathy, but characteristic skin lesions are absent and skin smears are negative for acid-fast bacilli. Needle aspiration cytology or a nerve biopsy is often required for the diagnosis. Host immune responses to the bacilli or its antigenic fragments are the major cause of disability or morbidity in patients of Hansen’s disease. Nerve abscesses are infrequently reported and occur mainly in tuberculoid or borderline tuberculoid leprosy. The ulnar nerve is the most frequent site for abscess formation; superficial branches of the upper limb nerves are also a common site of involvement. We hereby, report an unusual case of recurrent nerve abscesses in a patient with primary neuritic leprosy.

Case report

An 18-year-old man presented with progressively increasing tingling and numbness involving his right ring and little finger along with the inner border of the right hand and forearm of 1 year’s duration. There were no complaints of weakness. The patient noticed swellings, initially at the medial side of his right elbow, and later on at the lower part of his forearm and wrist, 24 and 8 weeks prior to admission, respectively. These swellings were small and painless initially but gradually grew in size, and became red and tender. Tingling sensation also progressed to involve the thumb along with the index and the middle finger. As the swelling on the medial side of the right elbow grew in size, it became fluctuant with persistent signs of inflammation. Nerves were decompressed 2 weeks prior to this admission. The operative notes stated that there was an abscess, 5 cm by 3 cm, soft to firm in consistency, extending for up to 5 cm along the ulnar nerve proximally from the cubital tunnel.

On examination, a diffuse fluctuant swelling at the wrist extending from the centre of the distal wrist crease to the medial side, 4 cm by 2·5 cm, was observed. Another rounded swelling, soft to firm in consistency, 1 cm by 1 cm, was observed approximately 5 cm proximal to the distal wrist crease. Both the swellings were tender and were not attached to the overlying erythematous skin (Figure 1A).

A linear, 6 cm, operative scar was seen along the right cubital tunnel (Figure 1B). There was mild weakness in the flexion and abduction of the right 5th digit; rest of the intrinsic and the extrinsic muscles of the hand revealed normal strength. A sensory loss of approximately 50% was observed along the distribution of the right ulnar nerve. The right ulnar nerve was thick and tender at the cubital tunnel and the operated site appeared healthy. Tinel’s sign was noted on examining the proximal wrist swelling. There were no hypopigmented or hypoanaesthetic patches over any part of the body and no other nerve was thickened.

Slit-skin smear examination was negative for *Mycobacterium leprae*. Electrophysiological studies were suggestive of predominantly axonal type of sensory-motor ulnar neuropathy. High-resolution ultrasound showed diffuse thickening of the right ulnar nerve with hypoechoic texture housing a cystic lesion with internal debris suggesting an abscess, at the cubital tunnel. Similar findings were observed on subsequent examination of the lesions at the Guyon’s canal and proximal to the carpal tunnel (Figure 2A, 2B and 2C).

Histopathological examination of the material obtained from decompression of the nerve abscess at the elbow revealed well-formed granulomas along with dense mixed inflammatory
infiltrates of neutrophils, few eosinophils, lymphocytes and macrophages; areas of necrosis were also observed. Modified Ziehl-Neelsen staining was positive for acid-fast bacilli (Figure 3A and 3B).

The patient was treated with Paucibacillary multi-drug therapy regimen (rifampicin 600 mg once a month, and dapsone 100 mg daily, for 6 months) along with corticosteroids. The new nerve abscesses at the wrist were not decompressed. At the first follow-up at 2 weeks, there was a decrease in tenderness as well as erythema surrounding the wrist swellings but the

**Figure 1.** (A) depicts a diffuse swelling at the right distal wrist crease (D) measuring 4 cm by 2.5 cm and a proximal rounded swelling (P) approximately 5 cm from the distal wrist crease, with associated inflammatory changes. (B) depicts post-operative status of the incised ulnar abscess over the cubital tunnel. (C) and (D) show the corresponding follow-up status at 6 weeks of the swellings at wrist (A) and at the cubital tunnel (B).

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**Figure 2.** High-resolution ultrasound reveals hypoechoic cystic lesions with internal debris, suggestive of an abscess (abs), at the Guyon’s canal (A), 5 cm proximal to the carpal tunnel (B) and at the cubital tunnel (C). Corresponding follow-up ultrasound sequence at 6 weeks of A, B and C is depicted in D, E and F respectively. Resolution is evident at the level of Guyon’s canal (D) and at the cubital tunnel (F).
size had not changed. At the second follow-up at 6 weeks, the swellings became smaller and more circumscribed with minimal tenderness. Sensations were restored (Figures 1C, 1D, 2D, 2E and 2F).

Discussion

Pure neuritic leprosy is characterised by only peripheral nerve involvement without any skin lesion. It is more commonly seen in the Indian subcontinent, and presents mainly as sensory and/or motor impairment of a single or multiple nerves. Caseous necrosis of the nerve lesions occasionally coalesces to form a nerve abscess. In a retrospective analysis of 686 patients of leprosy, nerve abscess was observed in four cases. Formation of nerve abscess mainly occurs in tuberculoid or borderline tuberculoid leprosy, although reports in other forms of leprosy also exist. These abscesses generally require surgical treatment, but the use of corticosteroids has also been advocated though with limited effect. Multiple nerve abscesses have either not been observed in primary neuritic leprosy or tend to involve only the cutaneous nerves. Our case is unique in this regard with sequential involvement of ulnar and median nerves as the first and the only manifestation of leprosy.

A 25-year PubMed based review of the relevant publications sheds light on the epidemiology, presentation and the use of treatment modalities in patients with leprotic nerve abscesses. Maximum data in this regard was published in 1996 and 1997, accounting for 86% of cases. A total of 294 patients of nerve abscess, with an age ranging from 7 to 70 years, and a male to female ratio of 4:1, have been recorded. Nerve abscesses have been reported most commonly in the ulnar nerve (57.9% and 74.3%) followed by cutaneous nerves of upper and lower limbs, peroneal nerve and median nerve. Nerve abscesses have either not been observed in primary neuritic leprosy or tend to involve only the cutaneous nerves. Our case is unique in this regard with sequential involvement of ulnar and median nerves as the first and the only manifestation of leprosy.
Amongst the diagnostic modalities used in making the diagnosis of nerve abscess, high-resolution ultrasound seems to be more useful than magnetic resonance imaging. The issues of patients’ cooperation and cost also go indisputably in favor of an ultrasound examination.

We offered a paucibacillary regimen to our patient and carefully observed his response. However, all the cases with a positive skin-smear test are classified as multibacillary leprosy, irrespective of the number of skin and nerve lesions and should be treated with multibacillary treatment regimens. In some cases of primary neuritic leprosy, lepra bacilli in nerve biopsies have been demonstrated; hence, such patients of primary neuritic leprosy also need multibacillary treatment regimen irrespective of the number of nerve involvements.11,12

In conclusion, the nerve abscess as the first manifestation of leprosy is uncommon, and a high index of suspicion is required to make a correct diagnosis. High-resolution ultrasound is a more useful diagnostic method as compared to magnetic resonance imaging for the correct diagnosis of nerve abscess in patients with leprosy.

References