CASE REPORT

Surgical treatment of three cases of plantar foot ulceration in leprosy

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Summary Neurophatic foot ulceration (NFU) is a common problem in leprosy patients. Three cases of NFU, who did not respond to conservative measures, were treated with orthopaedic surgery. The purpose of the treatment was, by using different approaches, the reduction of bone hyper pressure areas, allowing the ulcer to heal.

Introduction

Neuropathic foot ulceration is a common complication of leprosy. Impairment of motor, sensory and autonomic nerve function produces lower thresholds for tissue damage. Plantar ulcers often become infected with the development of osteomyelitis and bone absorption producing a deformed foot, which is even more prone to ulceration. Abnormal morphology due to paralysis of intrinsic and/or extrinsic muscles of the foot is an important risk factor for plantar ulceration. When deformations and ulcerations are chronic and debilitating, not responding to medical treatment, preventive and rehabilitative surgery may be useful.

Case Reports

Two hundred thirty eight leprosy patients are followed in the Dermatology Department of Curry Cabral Hospital. We report on three patients with plantar foot ulceration that did not respond to conservative measures. They were referred to the Orthopaedic Department for surgical therapy, to avoid the amputation suggested for our first case.

Case 1. A 77 year-old Negro female, born in Mozambique and living in Portugal since 1976, was diagnosed with borderline-tuberculoid leprosy at the age of 15 and treated with sulphone monotherapy. In 1980, she had left below-knee amputation because of ulceration and chronic deformation. The right foot (Figure 1) was deformed, with chronic ulceration.

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present for 12 years complicated by two episodes of cellulite and osteomyelitis in the year before surgical intervention.

The X-ray shows serious osseous absorption and deformities (Figure 2).

**Case 2.** A 56 year-old Negro female, born in Mozambique, living in Portugal since 1979, was diagnosed with borderline lepromatous leprosy at the age of 20 and treated with sulphone monotherapy. Both feet were deformed and there was bilateral neurological involvement of her posterior tibial and common peroneal nerves. She had right foot plantar ulceration of 32 years standing which had not responded to medical treatment (Figure 3).

X-ray showed hallux-valgus and osseous absorption (Figure 4.)

**Case 3.** A 61 year-old caucasian female, born and resident in Portugal, diagnosed with leprosy in adolescence and treated with WHO multidrug therapy for multibacillary disease in 1994. She presented with serious sequelae of nerve damage, with thermal and sensory loss in a glove and stocking distribution. In 1999, she developed plantar left foot ulceration that did not respond to conservative measures (Figure 5).

**Surgical Treatment**

In the first patient, the cutaneous plantar lesions in the mid-foot were related with bone exostoses in the tarsal-cuboid and transition cuboido-cuneiform articulation. These areas were surgically removed and this reduced the high-pressure areas resulting in cure of cutaneous ulceration. In the
second patient the high-pressure areas corresponded to the area beneath the metatarsal heads. The heads of the metatarsals were surgically removed. The first metatarsal was transitorily stabilised with two Kirschner wires from hallux to the first metatarsal (Figure 6).

This method was applied in both feet. The ulcers under the metatarsal heads, corresponding to the high-pressure areas resolved.

The third patient had acquired flat foot (talipes valgus) associated with a skin ulceration corresponding to the first cuneo-metatarsal articulation, where there was a prominent bone exostoses. There was also luxation of all the metatarsal-phalangeal articulations, with subsequent projection of the heads of the metatarsals.

Using an inferior approach the heads of metatarsals were excised, along with the bone exostosis area. With this surgery, we could obtain the cure of the plantar ulceration.

There was no ulcer recurrence in any of the three patients, during follow-up of 4, 2 and 1 years respectively.

**Discussion**

Surgery is indicated whenever the foot is non functional, structurally badly deformed, very unstable, or there is lack of viable tissue for weight bearing and prone to ulceration, and is aimed to be preventive of relapse and rehabilitative.\(^3\)
In our patients, the advanced stage of bone destruction and failure of the conservative treatment – non-weight bearing, immobilisation, and medical treatment of infections – prompted the need for surgical correction.

Several surgical procedures can be used in the treatment of bone sequelae of the feet in patients with leprosy. Structural corrections are indicated for deformities that increase or are responsible for foot ulceration; some can be performed by general surgeons. Advanced bone corrections, must be performed by an orthopaedic surgeon. The presence of bone lesions in our patients excluded the isolated use of superficial flaps, which have been described as adequate in treatment of plantar ulcers in leprosy. In our three patients with badly structurally deformed feet, we attributed the ulceration to related bone high-pressure areas. Bone corrections were necessary for the patients to remain free of plantar feet ulcerations.

Surgical intervention was planned according to the hyperkeratosis or ulceration areas that are the mirror of hyper pressure bone areas. Additionally, surgical technique should take into account the risk of creating new pressure areas and eventual occurrence of new ulcers.

Radiological examination (conventional X-ray including a weight bearing lateral X-ray, C-T scan) confirms that the cutaneous lesions correspond to the bone exostosis areas. In every case the definition of surgical strategy must be oriented to reduce these hyper pressure zones, allowing the cure of ulcerations and reducing the probability of relapse.
In conclusion, there are not standardised orthopaedic surgical procedures that must be studied and applied case to case. In our three patients, different methods achieved the same purpose, the reduction of bone hyper pressure areas.

Figure 4. Case 2: X-ray of the right foot.

Figure 5. Case 3: Plantar left foot (talipes valgus) ulceration.
In spite of the success of the treatment with 4, 2 and 1 year of follow-up, without significant relapse, the aim in these cases has been to continue with preventive measures and prompt diagnosis of eventual complications.

Care of some leprosy patients extends for a long period beyond the giving of antibacterial treatment. Preventive measures, after identification of patients at risk\textsuperscript{6–8} are very important in avoiding foot ulceration in leprosy.

\textbf{References}