

PICTORIAL REVIEW

# Tumours and tumour-like lesions in the foot and ankle

L.F. Foo, N. Raby\*

Department of Diagnostic Radiology, Western Infirmary, Glasgow, UK

Received 27 February 2004; received in revised form 14 May 2004; accepted 18 May 2004

## KEYWORDS

Ankle; Foot; Bone neoplasms; Soft tissues; neoplasms; Diagnosis

We present a spectrum of tumour and tumour-like lesions in the foot and ankle in which a specific diagnosis can be made or strongly suggested on the basis of location, imaging features and the relevant clinical findings. Characteristic imaging appearances are emphasized.

© 2005 The Royal College of Radiologists. Published by Elsevier Ltd. All rights reserved.

## Introduction

Tumours and tumour-like lesions of the foot and ankle are not common. They do, however, occur with sufficient frequency to present a regular diagnostic challenge. Symptoms are often non-specific, most commonly that of pain and soft-tissue swelling. As a result of the intrinsic compact anatomy, mechanical function of the foot and ankle, and regular constraint from footwear, these lesions tend to present earlier than at other locations.

Rather than providing an extensive review of all possible lesions, this review focuses on a spectrum of tumours and tumour-like lesions of the foot and ankle in which a specific diagnosis can be made or strongly suggested on the basis of location, imaging features and the relevant clinical findings. Characteristic radiological appearances are emphasized.

## Soft-tissue lesions

A wide spectrum of soft-tissue masses occur in the foot and ankle, some unique to this area. The vast majority of these are benign, with tumour-like

lesions such as Morton's neuroma, ganglion cysts and plantar fibromatosis far outnumbering true soft-tissue neoplasms.<sup>1,2</sup> Malignant soft-tissue tumours are rare. Soft-tissue lesions are most commonly assessed by means of ultrasound, computed tomography (CT) or magnetic resonance imaging (MRI), or a combination of imaging methods; which of these employed will depend on local expertise and tailored to the clinical scenario. MRI, with its superior contrast resolution and multiplanar capability, is considered the gold standard imaging technique in detection and evaluation of soft-tissue masses; key imaging characteristics are highlighted here.

## Benign lesions

In general, the differentiation of benign from malignant soft-tissue masses, short of biopsy, can be problematic. In the foot and ankle, however, the most common benign lesions demonstrate characteristic anatomical locations and imaging features, making it possible to arrive at a specific diagnosis.<sup>3</sup>

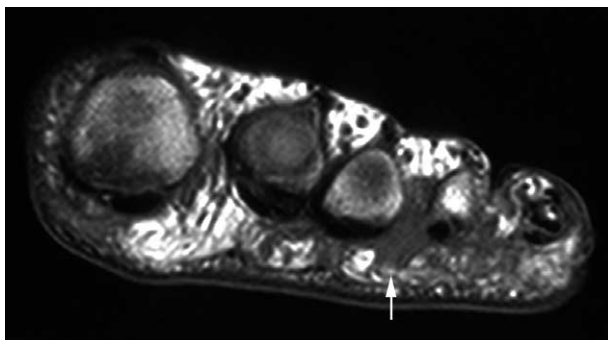
## Lesions of neural origin

### Interdigital/Morton's neuroma

Morton's neuroma is not a true neuroma; nerve enlargement is a consequence of non-neoplastic reactive perineural fibrosis of the inter-digital

\*Guarantor and correspondent: N. Raby, Department of Diagnostic Radiology, Western Infirmary, Dumbarton Road, Glasgow G11 6NT, UK. Tel: +44-141-211-1954; fax: +44-141-337-3416.

E-mail address: n.raby@clinmed.gla.ac.uk



**Figure 1** Morton's neuroma. A middle-aged woman with dorsal forefoot pain. Short axial T1-weighted MRI demonstrates specific site and classical appearance, with a low signal intensity 8 mm teardrop-shaped soft-tissue mass in the third inter-metatarsal space (arrow), at the level of the metatarsal heads, projecting inferiorly into the plantar subcutaneous fat.

plantar nerve, secondary to repetitive micro-trauma. The key diagnostic features lie in the typical symptomatology and specific anatomical site. It is most prevalent in middle-aged women, presenting with forefoot pain. It occurs in the inter-metatarsal space, typically the 3rd, between the metatarsal heads, on the plantar aspect of the foot. Lesions are multiple in 26% and bilateral in 13% of cases.<sup>4</sup>

A well-defined ovoid hypoechoic lesion is seen on ultrasound; lesions less than 5 mm may be missed.<sup>4,5</sup> On MRI, it is best seen on T1-weighted sequences, where it contrasts sharply with the adjacent high signal subcutaneous fat (Fig. 1),<sup>6</sup> it can also be made more conspicuous on fat-saturated images with gadolinium enhancement. Signal intensity on T2-weighted and short tau inversion recovery (STIR) images are variable, but usually low, depending on its fibrous content.

It should be noted that the presence and size of a Morton's neuroma does not necessarily relate to symptoms; up to one third are asymptomatic.<sup>5,7</sup>

**Nerve sheath tumours**

Nerve sheath tumours rarely occur in the foot and ankle; schwannomas and neurofibromas account for 5.4 and 3.9% of all benign soft-tissue masses in this location, respectively.<sup>8</sup> In general, they present in adults as slow growing lesions, which may cause pain or neurological symptoms.<sup>9</sup>

Schwannomas arise from Schwann cells of nerve sheaths. They are usually solitary, well-encapsulated lesions, eccentrically placed relative to a peripheral nerve. Neurofibromas arise from Schwann cells and fibroblasts. These non-encapsulated and more infiltrative tumours are most often solitary, arising from a superficial cutaneous nerve

within the dermis, although deep lesions related to a large nerve may also occur.

Schwannomas and neurofibromas share similar radiological features, and distinction between them may not be possible.<sup>10</sup> A characteristic feature is their ovoid or fusiform shape.<sup>10,11</sup> Lesions are hypoechoic and demonstrate posterior acoustic enhancement on ultrasound.<sup>12,13</sup> Signal intensities on MRI are relatively non-specific. However, the target sign on T2-weighted images, representing a ring of peripheral high-intensity myxoid tissue, and central relatively low-intensity fibrous tissue may suggest the diagnosis, if present; this is more common in neurofibromas.<sup>10,14</sup>

Although these solitary forms may occur in neurofibromatosis 1 (NF1), only plexiform neurofibromatosis, a diffuse form infiltrating a long nerve segment and its branches (Fig. 2), is pathognomonic of this autosomal dominant condition.<sup>10</sup>

**Lesions of fibrous origin**

**Plantar fibromatosis (Ledderhose's disease)**

Plantar fibromatosis is characterized by benign non-encapsulated nodular fibroblastic proliferation in the plantar aponeurosis or fascia. It is the most common benign soft-tissue mass in the foot and ankle, accounting for 15% of lesions in this region.<sup>2,8</sup> Most patients are adults between the ages 30-50 years, presenting with a small painless slowly growing nodule in the plantar aspect of the foot. Symptoms develop when the lesion attain a large size or as a result of local infiltration<sup>15</sup> into the adjacent subcutaneous tissue, overlying skin and underlying deep musculotendinous and neurovascular structures. Bilateral lesions occur in 20-50% of cases.<sup>15</sup>

The key features are that of its typical anatomical location and MRI characteristics. The nodule typically occurs in the superficial surface of the medial aspect of the mid-plantar fascia. On ultrasound, it has a fusiform shape extending along and adherent to the plantar fascia. It is hypoechoic relative to the subcutaneous tissue and fascia in which it is located.<sup>16</sup> Typical MRI appearance is that of an infiltrative mass, with a poorly defined upper margin. The lower margin is relatively well defined, outlined by subcutaneous fat. The dense fibrous nature of the lesion produces typical low signal intensity on T1 and T2-weighted sequences (Fig. 3).<sup>3,15</sup>

**Lesions of degenerative origin**

**Ganglion cyst**

This is a non-neoplastic cystic lesion containing gelatinous fluid thought to result from myxoid

Download English Version:

<https://daneshyari.com/en/article/9337129>

Download Persian Version:

<https://daneshyari.com/article/9337129>

[Daneshyari.com](https://daneshyari.com)