Pedal mycetoma mimicking plantar fibroma: A case report

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Abstract

Introduction
Pedal mycetoma is an uncommon condition caused by actinomyces (bacterial) or eumycetoma (fungal). It is mostly seen in tropical countries, but more cases are now increasingly reported in the UK and other developed countries, because of frequent travel and increasing immigration rate. There is also a problem of delayed presentation, which makes detection difficult and also delays intervention. Most of the literature regarding this condition is outdated, thus new information is required. The aim of this case report is to highlight the peculiarities of this uncommon condition, with a view to helping clinicians to make an early diagnosis and institute the appropriate treatment without much delay.

Case report
A 47-year-old female of African origin presented with a history of a growing lump on the sole of her right foot. She normally lives in the United Kingdom, but has been visiting an African country in the last few years. Physical examination showed an isolated nodular lesion on the sole of her right foot, at the instep with intact skin, and no sinus formation. The working diagnosis was a plantar fibroma. The patient was otherwise fit and well, with no history suggestive of immunosuppression. She was not diabetic and was not on steroids or other medications. Physical examination revealed an isolated lump on the sole of her foot, with no other findings. Differential diagnoses considered include plantar fibroma, inter-metatarsal neuroma, subcutaneous lipoma, plantar fasciitis, aspergillosis, ganglion and warts among others. She had ultrasound and later excision biopsy followed by histology that confirmed fungal mycetoma. She made a recovery without any additional treatment and had no recurrence after 2 years of follow-up.

Conclusion
This case report highlights the peculiarities of pedal mycetoma in terms of clinical presentation, diagnosis and treatment. We have also discussed the roles of laboratory and radiological imaging modalities in arriving at a timely and accurate diagnosis, which helped in preventing confusion with other similar lesions in the foot.

Introduction
Mycetoma is an uncommon condition that can affect any part of the body including the foot (pedal mycetoma). It is more common in warm tropical and subtropical countries where people walk barefooted, but a few cases have been described in the United Kingdom, with the incidence increasing due to worldwide travel and delayed diagnosis in some cases¹. Majority of the literature regarding this condition is old and mostly comes from these developing countries, but Messoudi and colleagues recently published a series of 15 cases of Madura foot in Morocco². The organisms are normally present in the environment (soil and dust), and infection occurs in barefooted persons after minor penetrating skin injury, which allows soil organisms to gain an entry into the tissues, occurring preferentially in rural areas, usually among labourers who work barefooted³. The aim of this case report was to present pedal mycetoma mimicking plantar fibroma.

Case report
A 47-year-old female of African origin presented with a 2-year history of a growing lump on the sole of her right foot. She normally lives in the United Kingdom, but has been visiting an African country in the last few years. Physical examination showed an isolated nodular lesion on the sole of the right foot, at the instep with intact skin, and no sinus formation. The working diagnosis was a plantar fibroma. The patient was otherwise fit and well, with no history suggestive of immunosuppression. She was not diabetic and was not on steroids or other medications. Physical examination revealed an isolated lump on the sole of her foot, at the instep with intact skin, and no sinus formation. The working diagnosis was a plantar fibroma. The patient was otherwise fit and well, with no history suggestive of immunosuppression. She was not diabetic and was not on steroids or other medications. Physical examination revealed an isolated lump on the sole of her foot, at the instep with intact skin, and no sinus formation.

An ultrasound of the foot showed multiple small hypoechoic locules present in the subcutaneous fat overlying the plantar pleural cysts (Figure 1). The cysts measured between 3 and 5 mm in diameter and contained internal echoes and some linear hypoechoic areas. The ultrasound finding suggested a parasitic infection (Figure 1). Excision biopsy was performed and a fibro-fatty lump was analysed for histology (Figure 2). The lesion was located in the subcutaneous plane, with no local spread. This was excised completely, without breaching the plantar fascia. Histopathological analysis showed cellular nodule embedded in fibrous tissue composed of lymphocytes,
macrophages and plasma cells (Figures 3 and 4, haematoxylin and eosin staining). Centrally in the two nodules, there were aggregates of fungal hyphae associated with a neutrophilic inflammatory reaction (Figures 5 and 6, PAS staining). Haematoxylin and eosin staining of the biopsy specimen revealed the presence of fungal grains, and the appearances of the lesion were those of mycetoma (Figures 3–6). The specimen is normally processed by haematoxylin–eosin and May–Grünwald–Giemsa staining of a cytologic smear of a sample obtained via fine-needle aspiration or excision biopsy. Mycetoma grains can be distinguished from artefacts and other organisms by the intimate relationship between the grain and neutrophils. The appearance of the grains is as follows: Actinomyctoma—Homogenously eosinophilic with haematoxylin–eosin stain (blue in the centre with pink filaments in the periphery with May–Grünwald–Giemsa stain); Eumyctoma—brownish colour with haematoxylin–eosin stain (black with a green tinge with May–Grünwald–Giemsa stain). Our patient made a good recovery after surgery, with no signs of recurrence after 1 year of follow-up.

Discussion
Mycetoma is a tropical infection that follows puncture wounds and is typically encountered in patients aged 20–50 years, especially those who walk barefooted. The causative organisms of mycetoma have geographical variations and can be bacterial (actinomyctoma) or fungal (eumyctoma) in origin. The fungal (eumyctoma) organisms include Madurella mycetoma, Madurella grisea and pseudallescheria, while the actinomyctoma caused by higher bacteria include Norcardia species and Streptomyces species. The lesion typically presents as a localized painless subcutaneous mass, draining sinuses and fungal grains consisting of mycetoma, and when extensive

Figure 1: Ultrasound appearance of the excised lump showing multiple small hypoechoic locules present in the subcutaneous fat overlying the plantar pleural cysts.

Figure 2: Macroscopic (gross) features of the excised fibro-fatty lump from the foot.
The clinical features of mycetoma begin initially with a subcutaneous swelling, which becomes a nodule, with gradually increasing induration, rupture, sinuses and discharge of fungal grains. There may be associated swelling and cellulitis of the affected limb, with or without systemic features, depending on the duration of the symptoms. The diagnosis of this condition is mostly clinical especially in endemic countries where advanced cases are often encountered. However, our patient presented early with a small subcutaneous lump on the sole of her foot, not associated with sinuses or discharge as in more advanced cases. The nodule was initially painless, but gradually became uncomfortable and interfered with walking as well as shoe wear.

Therefore, ultrasound scan was used to expedite the diagnostic workup and prepare the patient for surgery (Figure 1). Magnetic resonance imaging (MRI) can also be helpful in establishing the diagnosis with dot-in-circle appearance; high intensity lesion on T2 images with a tiny central low – signal focus representing fungal grains within inflammatory granulomata. This sign has also been described as a highly specific MRI and ultrasonographic sign of mycetoma. Fungal stains can also be done through microscopy of any visible discharge. Cytology, histology, enzyme-linked immunosorbent assay, immunohistochemistry and DNA sequencing have also been successfully used.

The treatment of choice is surgical excision with wide margins; antifungal or antibiotic treatment following surgical excision is debatable as the results are variable. Antifungal and antibiotic treatment can be used depending on the type of organism causing the lesion. For Actinomycetoma, combination therapy with trimethoprim-sulfamethoxazole, dapsone and streptomycin has been particularly effective.

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used. Rifampicin has been used in resistant cases. Azole treatment is the recommended regime for small Eumycetoma lesions in the extremities. Madurella mycetomatis may respond to ketoconazole and P. boydii (S. apiospermum) may respond to itraconazole. Other agents of Eumycetoma may respond intermittently to itraconazole or amphotericin B. However, Agarwal and colleagues have recently described their experience of two different regimens of medical treatment for patients with actinomycetoma of the foot and observed that the Ramam regimen was found to be very effective in treating such patients with only minimal bony involvement, while the Welsh regimen and its modification are suitable for more severe cases, because amikacin is more sensitive than gentamicin in the treatment of resistant organisms. The modified Welsh regimen can also be continued for five cycles when there is more extensive bony involvement.

In our patient, ultrasound was used as the modality of imaging and was successful in obtaining a valid diagnosis without much delay (Figure 1). Therefore, in our view, this is comparable with findings reported by MRI scan, which is more expensive and may take time to organize. The lesion was an isolated nodule and was excised with a wide margin and no sign of local infection spread (Figure 2).

We opted not to use antifungal or antibiotic treatment following surgical excision due to the complete resolution of symptoms and absence of recurrence after 2 years of follow-up. This case highlights the fact that mycetoma may occur anywhere due to frequent travel around the world and increasing migration from endemic areas.

Conclusion
This case report highlights the peculiarities of pedal mycetoma in terms of clinical presentation, diagnosis

Figure 5: PAS staining of the specimen was positive (indicating that this is of fungal and not bacterial origin).

Figure 6: High-power view of the PAS staining clearly showing fungal spores and hyphae.
and treatment. We have also discussed the roles of laboratory and radiological imaging modalities in arriving at a timely and accurate diagnosis, which helped in preventing confusion with other similar lesions in the foot.

References