CASE REPORT

A foreign body masquerading as a tumour

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SUMMARY

A 29-year-old man presented to his local orthopaedic service with a mass in the medial aspect of his left thigh, present for 1 year. It had not changed in size, although he complained of increasing tightness in the region. He denied any systemic symptoms or history of local trauma. Extensive imaging performed at his local hospital was thought suggestive of a musculoskeletal tumour. The patient was referred to our tertiary centre musculoskeletal tumour clinic. Review of external imaging and further investigations revealed a fluid-filled intramuscular mass containing an echogenic focus consistent with foreign body. Ultrasound-guided aspiration yielded fluid which grew *Staphylococcus aureus*. Only when presented with this information did the patient vaguely recall sitting on a wooden kebab stick 30 months previously. At surgery, a thick-walled abscess with a central foreign body was identified and drained. At follow-up 1 month later, he was well with no recurrent problems.

BACKGROUND

Lumps and bumps represent a significant portion of the workload for general practitioners and surgeons. Not infrequently, these occur in limbs. When diagnosis is uncertain, patients are often referred to an orthopaedic surgeon, or, if facilities are available, a musculoskeletal tumour clinic for further evaluation and diagnosis. We present the case of a young adult man with a foreign body abscess mimicking a musculoskeletal neoplasm and emphasise the importance of relatively simple investigation techniques such as ultrasound (US), which are often overlooked with increasing availability of more sophisticated diagnostic modalities. The role of specialist musculoskeletal radiologists and surgeons is also highlighted.

CASE PRESENTATION

A 29-year-old man presented to his local orthopaedic service with a mass in the distal, medial aspect of his left thigh. He had noticed this 1 year previously. It had not changed appreciably in size, although he complained of an increasing sensation of tightness in the region. He denied systemic symptoms, weight loss, fever or any history of trauma to the region.

INVESTIGATIONS

Blood tests revealed a white cell count of $7.9 \times 10^9/l$ ($3.2 \times 10^9/l$ neutrophils) and C reactive protein of 6.

Extensive imaging had been performed at the referring hospital: an initial US showed a mass within vastus intermedius, with reported increased central blood flow on Doppler scanning, suggestive

of tumour. Subsequently, x-ray showed an incidental femoral enchondroma and MRI was reported to show an encapsulated mass with a necrotic or haemorrhagic core that enhanced slightly in comparison with the surrounding muscle on T1 weighting and was bright on T2 and short TI inversion recovery series. The reporting radiologist suggested a differential diagnosis of myositis ossificans or soft tissue tumour which could be differentiated on CT. CT was thought suggestive of a soft tissue tumour of uncertain nature.

At this point, the patient was referred to our tertiary centre and reviewed in the musculoskeletal tumour clinic. On examination in clinic, the patient was afebrile and found to have a prominent, firm fullness in the anteromedial aspect of his distal left thigh. There were no scars, erythema or warmth and a full range of painless motion at the knee joint.

Review of external imaging and further investigations by a musculoskeletal radiologist is revealed below.

CT demonstrated an ill-defined hypodense mass lying within the vastus intermedius muscle, in proximity to the distal femur. Within it, a 2.3 cm longitudinal hyperdense structure was identified. Review of the MRI scans confirmed a $6 \times 1.5 \times 1.5$ cm mass in the vastus intermedius with ill-defined surrounding oedema and a central fluid core with a non-enhancing structure (figures 1 and 2). In view of the above, US-guided aspiration was performed. This demonstrated a thick walled, fluid-filled intramuscular mass containing a 2.8 cm long echogenic focus consistent with a foreign body (figure 3). Two drops of viscous fluid were aspirated and sent for microbiological culture, which yielded *Staphylococcus aureus* sensitive to flucloxacillin and clarithromycin.

TREATMENT

Only when presented with this information and asked specifically if he had a penetrating injury did the patient vaguely recall inadvertently sitting on a wooden kebab stick some 30 months previously. He thought this had been completely removed when he pulled it out at the time. At surgery, a well-circumscribed, thick-walled lesion containing purulent material was approached through the plane between vastus medialis and vastus intermedius and a transverse incision into the medial aspect of the vastus intermedius. It was excised completely and histological analysis revealed a central abscess surrounded by a collagenous wall with florid chronic and acute inflammation, granulation tissue reaction and foreign body giant cells. At its centre was the tip of a wooden stick. The patient was discharged with a 7-day course of oral flucloxacillin.

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Figure 1 T1-weighted MRI showing both thighs. A 6×1.5×1.5 cm hyperintense lesion with a central area of low signal intensity and surrounding oedema was noted medial to the left femur (red arrow). This did not enhance with intravenous contrast and these findings are in keeping with a foreign body surrounded by a fluid-filled space.

OUTCOME AND FOLLOW-UP

At follow-up 1 month later, he was well with no recurrent problems.

DISCUSSION

Review of the literature revealed a report of two patients with sterile foreign body granuloma and an intramuscular foreign body abscess, respectively, that presented initially as suspected soft tissue tumours¹ and a report of two cases of tongue abscesses secondary to fish bone penetration that mimicked malignancy.² One author reported three cases of penetrating foot and hand injuries with cocktail sticks, which the patients wrongly thought they had removed completely at the time.³ These patients presented with recurrent infections over a number of weeks and months before deep exploration under general anaesthetic demonstrated a retained part of the cocktail stick; however, in these instances there was no suspicion of malignancy.

Figure 2 The mass was bright on water-sensitive sequences and the hypointense central core is also visible on these sequences.

Figure 3 Ultrasound of the left thigh showing a thick-walled, hypoechoic mass (yellow arrows) found to lie in the substance of vastus medialis, anteromedial to the femur. In the centre of the mass, a hyperechoic, linear focus consistent with a foreign body is demonstrated (red arrow).

Other foreign-body abscesses and granulomas have previously been mistaken for tumours in the abdomen, pancreas, liver, brain and breast with some of these being iatrogenic after retained swabs and drains.^{4–7} There has been a report in the literature of a sterile granuloma with a core rich in calcium phosphate, mistaken for a soft tissue neoplasm while it developed over an 8-year period at the site of intramuscular injection in the buttock.⁸ However, in all these cases, unlike the one described above, there was a clear history of previous surgery or trauma that may have given a clue to the underlying diagnosis.

This case report highlights the importance of simpler and cheaper investigation modalities such as US, which are increasingly overlooked with the widespread availability of more complex and expensive modalities such as MRI.

Ultrasonography has been described as an effective method for identification of and differentiation between various soft tissue masses,⁹ including abscesses and foreign body granulomas and has been described by some authors as the most cost-effective first line tool for investigation of most soft tissue masses, provided that it is carried out by suitably trained individuals with appropriate equipment. It has been suggested that MRI can, in many cases, be reserved for staging or problem cases not fully diagnosed on US.¹⁰

US is widely available and relatively inexpensive. It offers a number of advantages, including interaction between radiologist and patient at the time of examination and manoeuvrability. Modifications of the standard procedure include colour Doppler and three-dimensional power Doppler,¹¹ which can be combined with contrast injection. Doppler studies give

important information about lesion vascularity and can be useful aides when making a diagnosis. US is especially useful in distinguishing cystic from solid masses and retained foreign bodies are usually readily identified on US (clinicians should bear in mind that some foreign bodies, including those made of wood, are not visible on plain x-rays). It must be emphasised, however, that US is very operator and technology dependent. Apart from being a diagnostic imaging modality, US can be used to guide biopsy or aspiration, as in our case, to provide formal histological or microbiological diagnosis¹² or therapeutically (eg, to guide aspiration or drainage). It is important to recognise the limitations and indications for use of US so that it can be used safely in the diagnosis of soft tissue masses.

This report also reminds the reader that clinical history, although one of the cornerstones of effective diagnosis can occasionally be misleading. Musculoskeletal radiologists with a specialist interest in tumour radiology may be able to provide a more reliable diagnosis of unusual soft tissue masses identified on imaging studies.^{9 13}

Learning points

- ▶ Ultrasound (US) is a useful first-line tool in the investigation of soft tissue masses that is often overlooked.
- ▶ US is a versatile, cost-effective investigation modality but is operator dependent.
- ▶ Specialist musculoskeletal tumour services with dedicated radiologists can improve diagnostic accuracy prior to any therapeutic intervention.
- ▶ Foreign body masses are usually accompanied by a suggestive history; however, this possible differential diagnosis is not necessarily excluded in the absence of such history and physicians should keep an open mind when assessing patients. Direct questioning when taking a history may prevent the physician from being unintentionally misled.

Competing interests None.

Patient consent Obtained.

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