CASE REPORT

Myositis ossificans circumscripta, secondary to high-velocity gunshot and fragment wound that causes sciatica

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SUMMARY

This report concerns an unusual cause of sciatica. The case presented is of a young man with myositis ossificans that resulted in sciatica and was treated with en bloc excision and low-dose radiotherapy and indomethacin. The aim of this study was to explain the different diagnostic properties of myositis ossificans around the hip and non-classic causes of sciatica.

BACKGROUND

Myositis ossificans circumscripta is a solitary, non-progressive, benign ossifying lesion of soft tissues.¹ A synonym for myositis ossificans is heterotopic ossification. There are several clinical subtypes of myositis ossificans.² Myositis ossificans circumscripta refers to the new extraosseous bone that appears after trauma.² Myositis ossificans is also a recognised complication of paralysis that occurs below the level of a spinal cord injury.²

The patient is usually an athletic adolescent or young adult who presents with a lump in a muscle that has been evident for some weeks and may have been somewhat painful.¹ A history of trauma can usually be elicited, but these traumatic incidents are, more often than not, trivial in nature.¹

This report concerns a young man with chronic sciatic pain and a limp. The patient was a young, athletic man. He was a veteran of the Libyan Civil War and his discomfort originated from a high-velocity gunshot and fragment wound. Presentation at our clinic was 8 months after the injury.

The aim of this study was to remind orthopaedic surgeons about rare and unusual properties of extra-spinal entrapment of the sciatic nerve as well as the diagnostic and aetiological properties of non-neurological causative myositis ossificans around the hip.

CASE PRESENTATION

A 27-year-old-man sustained a high-velocity gunshot and fragment wound to his right hip 8 months before presentation at our clinic. Symptoms of radiating pain from his right lower extremity, limping and sciatica had been ongoing for several months with pain worsening in a sitting position. Non-steroidal anti-inflammatory drugs provided minimal relief. Physical examination determined a limp on the right side. Neurological examination revealed no impairment. Sensation was intact.

INVESTIGATIONS

Hip range of motion was limited and painful, and the Lasègue test was positive at 30–50°. Plain radiographs revealed an exostotic bony mass composed of dense calcification arising from the ischion rami bridges onto the trochanter minus posteriorly (figure 1A). CT scans showed an exophytic outgrowing calcified mass with irregular borders and an exostotic mass bridging the ischial ramus and trochanter minus (figure 1B–D). Faint soft tissue calcification with well-defined bony margins, separated from the periosteum by a lucent zone could be easily seen, originating from the ischion rami and bridging onto the trochanter minus posteriorly (figure 1B,C). Characteristic features of peripheral ossification were observed on the CT scan (figure 1B,C). The tumour could be seen pressing on the nerve posteromedially (figure 2).

DIFFERENTIAL DIAGNOSIS

Extraspinal entrapment of the sciatic nerve or primary bone tumours simulating lumbar disc syndrome (ie, along its course within the pelvis or the lower extremity) is infrequent and difficult to diagnose because symptoms are similar to those of the more frequent causes of sciatica.^{3–7}

Especially at this anatomic location, it is very important to rule out tumours or tumour-like conditions that can mimic myositis ossificans, such as osteochondroma and chondrosarcoma.

In the case presented here, the radiological features of myositis ossificans were ‘faint soft tissue calcification within 2–6 weeks, (may have well-defined bony margins by 8 weeks)⁸ separated from periosteum by lucent zone and on CT, the characteristic feature is peripheral ossification’,⁹ which were very typical and in contrast with chondrosarcoma. The anamnesis was also more associated with myositis ossificans than chondrosarcoma. Finally, the histopathological examination was consistent with myositis ossificans. In contrast with osteochondroma, there was no stalk-like (exostotic) protuberance on the bone in this case.

TREATMENT

En bloc excision was performed through the modified Gibson incision in which the curved part of the incision was lowered to approach the sciatic nerve and ischial tuberosity. The tumour mass was completely excised in portions. The exophytic mass had compressed the sciatic nerve but they had not adhered to each other. Postoperatively, indomethacin

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Figure 1 Plain radiographs revealing an exostotic bony mass (the arrow) faint soft tissue calcification (A–C). CT scan showing an exophytic outgrowing calcified mass with irregular borders (the arrow) and an exostotic mass bridging the ischion ramus and the trochanter minus (B–D).

was administered for 21 days with physical therapy and rehabilitation to improve range of motion and muscle strength for 15 days. Within 24 h postoperatively a single low dose of radiation was applied. The radiating pain and paresthesia were completely resolved and the neurological symptoms improved. Subsequent pathology reports showed no evidence of malignancy and were consistent with myositis ossificans.

Figure 2 The expected trajectory of the sciatic nerve is shown in the figure by arrow 1. The tumour was pressing on the nerve posteromedially as shown in the figure by arrow 2.

OUTCOME AND FOLLOW-UP

At 1-year follow-up, the patient had good function of the painless hip with no recurrence.

DISCUSSION

Sciatica is defined as pain along the course of the sciatic nerve or its branches and is most commonly caused by a herniated disc or spinal stenosis. Characteristically, patients report gluteal pain radiating down the posterior thigh and leg, paresthesia in the calf or foot and varying degrees of motor weakness.

Sciatic nerve compression has been reported secondary to heterotopic ossification around the hip,¹⁰ misplaced intramuscular injections, myofascial bands in the distal thigh^{11 12} and myositis ossificans of the biceps femoris muscle.¹³ Additional causes include post-traumatic or anticoagulant-induced extraneural haematomas^{14 15} and compartment syndrome of the posterior thigh.¹⁶

Entrapment sciatic neuropathy complicating total hip arthroplasty has been described secondary to escaped cement, subfascial haematoma and nerve impingement during trochanteric wiring.^{17 18}

In literature, there are various cases of causes of sciatica, such as heterotopic ossification after posterior wall acetabulum fracture surgery,¹⁹ heterotopic ossification enveloping the sciatic nerve following posterior fracture dislocation of the hip,^{10 20 21} heterotopic ossification after simple trauma related with sports,²² heterotopic ossification secondary to high-velocity gunshot and fragment wounds around the hip^{23 24} and heterotopic ossification within the missile track.²⁵

In the case presented here, myositis ossificans was thought to be associated with a high-velocity gunshot wound and the fracture caused by the fragment. (A piece of the shrapnel was found to have penetrated the bone and caused ischial tuberosity

fracture.) The shrapnel fragment could be seen within the myositis ossificans mantle (figure 3).

In literature, several cases have been published about myositis ossificans secondary to high-velocity gunshot and fragment wounds around the hip. Federico *et al*²³ presented a case series where no fragments or bullets were found to have penetrated the bone or caused fracture around the hip. In another case reported by Morach *et al*,²⁵ a bullet was presumed to have passed through the bone or periosteum of the femur, seeding the ballistic cavity with osteoblastic cells and triggering dysplastic ossification within the surrounding muscle and tissue.²⁵ However, in that case it was emphasised that heterotopic ossification can occur within the missile track, but the fracture or periosteal injury could not be documented. In the current case however, the fractured base of the superior part of the tuber ischiadic bone was documented and could be seen clearly (figure 3). This case report may contribute towards proving the presumption of Morach *et al* as all the evidence of shrapnel, fracture and myositis ossificans is in the same location.

The radiological features of myositis ossificans are 'faint soft tissue calcification within 2–6 weeks, (may have well-defined bony margins by 8 weeks)⁸ separated from periosteum by lucent zone and on CT, the characteristic feature is peripheral ossification'.⁹ In the current case, the radiological findings were consistent with those properties. The myositis ossificans in this case developed around the fractured cortex of the superior tuber ischiadic bone (figure 3). The most plausible theory of this phenomenon involves injury to local skeletal structures, with seeding of perichondrial cells into ectopic tissue planes.²⁵

Federico *et al*²² presented two cases that had no associated fracture, fragment penetration to bone or obvious periosteal injury. In contrast to those cases there was an associated fracture in the current case (figure 3).

Surgery is warranted when the lesion mechanically interferes with joint movement or causes neurovascular compromise.^{26 27}

Figure 3 The shrapnel in the myositis ossificans mantle (arrow 1) that fractured the base of the superior part of tuber ischiadic bone. Arrows 2 and 3 showing the unfractured edges of the superior part of the tuber ischiadic bone.

Pakos *et al*²⁸ published an original research article which concludes that combined radiotherapy and indomethacin was effective in preventing heterotopic ossification. Also, Knelles *et al*²⁹ and Heyd *et al*³⁰ published original articles about the effectiveness of radiation.

In our case, sciatic nerve compression and hip joint limitation were evident. Therefore, we performed an en bloc excision, in accordance with literature postoperative single low-dose radiation with 3 weeks of oral indomethacin regimen were administered in order to avoid recurrence.

Learning points

- ▶ Extraspinal causes of sciatica are usually overlooked.
- ▶ Myositis ossificans of the hip is not a rare entity but this is the first reported case where shrapnel was found to have penetrated the bone causing a fracture of the ischial tuberosity, which then triggered myositis ossificans.
- ▶ This article may contribute to proving a previous assumption with the evidence of shrapnel, fracture and myositis ossificans in the same location.
- ▶ Once the myositis ossificans causing the major symptoms has been diagnosed, the choice of treatment should be en bloc excision and postoperative single low-dose radiation with 3 weeks of oral indomethacin treatment.

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