CASE REPORT

Transient osteoporosis: an unusual presentation of hip pain in a trail runner

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SUMMARY

We present a case of transient osteoporosis of the hip in a 38-year-old recreational trail runner. Shortly after a trail running competition, he developed acute hip pain, functional disability and an antalgic gait. Diagnosis was made with MRI showing bone marrow oedema, plain radiographs demonstrating osseous demineralisation and bone scintigraphy showing uniform radioactive uptake. Treatment included off-loading of the anatomical site for 6 months until symptom resolution, analgaesia, Vitamin D, bisphosphonates and pulsed electromagnetic field therapy. He recovered fully and returned to running activities 8 months after initial presentation. Transient osteoporosis of the hip is rare but benign, self-limiting condition; however, awareness and exact diagnosis are important as runners often present with hip pain and other more serious pathologies such as avascular necrosis or stress fractures need to be excluded.

BACKGROUND

Transient osteoporosis (TO) is a rare condition,[1] affecting the weight bearing joints of the lower extremity, predominantly the hip, in middle-aged men.[2 3] The cause of TO is unknown but the disease has a self-limiting character. Symptoms resolve spontaneously generally within between 4 and 9 months, but it can take up to 24 months for complete resolution after onset of first symptoms.[2 3] Symptoms include sudden onset of pain of the affected joint with weight bearing, reduced range of motion with functional disability and antalgic gait. Diagnosing TO can be challenging often taking several months but a correct and speedy diagnosis is paramount as other conditions such as avascular necrosis (AVN) or stress fractures may present similarly and necessitate aggressive surgical interventions.[1–3]

We present an unusual case of transient osteoporosis of the hip (TOH) in a recreational trail runner that presented with acute and disabling onset of hip pain after a trail running competition highlighting the importance of recognising this rare condition.

CASE PRESENTATION

A 38-year-old man, lifelong recreational trail runner (weight 72 kg, height 174 cm, body mass index 23.8 kg/m^2, running 3–5 times/week, running distance 30–40 km/week mostly in natural environments and on trails) presented to the accident and emergency (A&E) department shortly following a 10 km trail running race with right-sided hip pain. In the weeks leading up to his presentation he increased his activity levels with additional hiking of 2–3 hours on most days. He was otherwise fit and healthy, non-smoker, with no other medical history of note.

The right-sided hip pain started the day following the running competition and was poorly localised in the right hip and gluteal area which increased with impact activities and hip abduction. He self-managed with non-steroidal analgesic drugs (NSAID, ibuprofen) but symptoms persisted and 1 week post-race he presented to the A&E department. He was diagnosed with greater trochanteric pain syndrome (GTPS) and gluteal tendinopathy and was advised to rest from aggravating activities and continue current analgesic treatment. Over the next week symptoms gradually progressed despite regular analgaesia with increasing activity-related pain over the right hip area, moderate to severe pain on walking and weight bearing, global reduction in all hip movements with functional disability and the development of an antalgic gait (Trendelenburg gait). There was no pain at rest or at night. He re-presented to the A&E department and plain radiographs of the hip were obtained to exclude a fracture.

The patient was off loaded with crutches and referred for an MRI scan (3 weeks after initial presentation), which showed diffuse bone marrow oedema (see figure 1). The patient's symptoms remained unchanged, with moderate to severe pain on weight bearing. Diagnostic uncertainty remained (TO vs AVN) and a ^{99m}Tc-MDP (technetium methylene diphosphonate) bone scintigraphy and repeat plain radiograph of the hips were obtained 4 weeks after initial symptoms.

INVESTIGATIONS

The patient underwent plain radiographs of the hip 2 weeks after initial symptoms developed. The radiographs did not demonstrate any relevant pathological findings. One week later an MRI scan showed diffuse bone marrow oedema in the right femoral head and intertrochanteric area, with joint effusion but without discernible fracture lines or subchondral changes (see figure 1). Further investigations 1 week later included a ^{99m}Tc-MDP bone scintigraphy showing a uniform radioactive uptake in the right femoral head, without cold spots and a repeat plain radiograph demonstrated a discreet bone density loss in the right femoral head and neck area (see figure 2).

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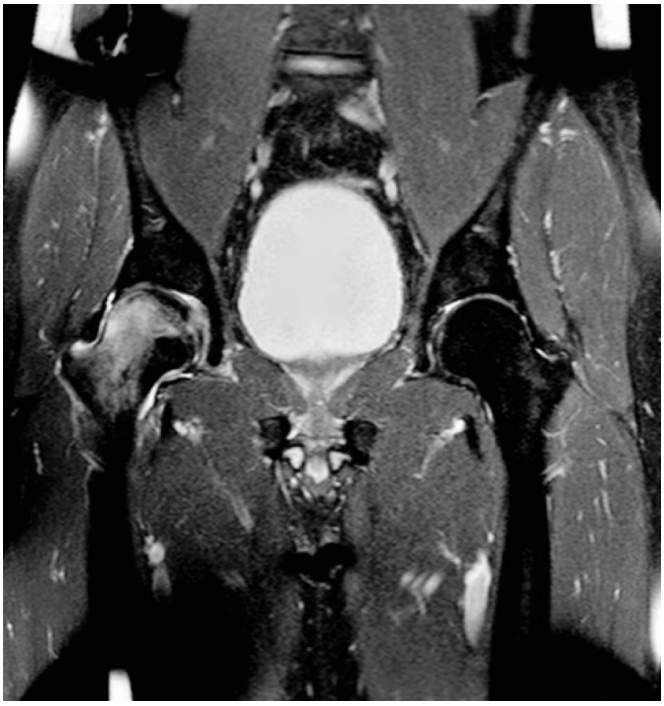

Figure 1 MRI scan of both hips taken at 3 weeks after initial presentation. T2 weighted images show bone marrow oedema of the right femoral head extending to the intertrochanteric area with joint effusion.

DIFFERENTIAL DIAGNOSIS

- TO.
- AVN.
- Stress fracture.
- GTPS.

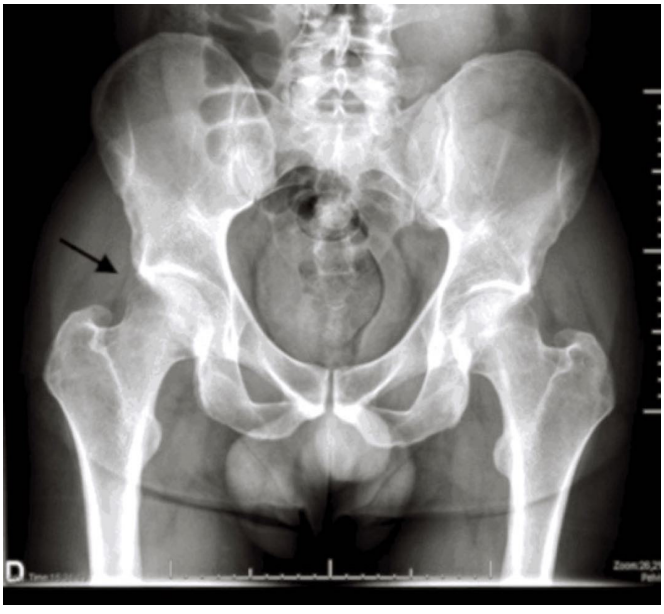

Figure 2 Plain radiograph of both hips taken 4 weeks after initial presentation. The arrow shows discreet bone demineralisation in the right femoral head.

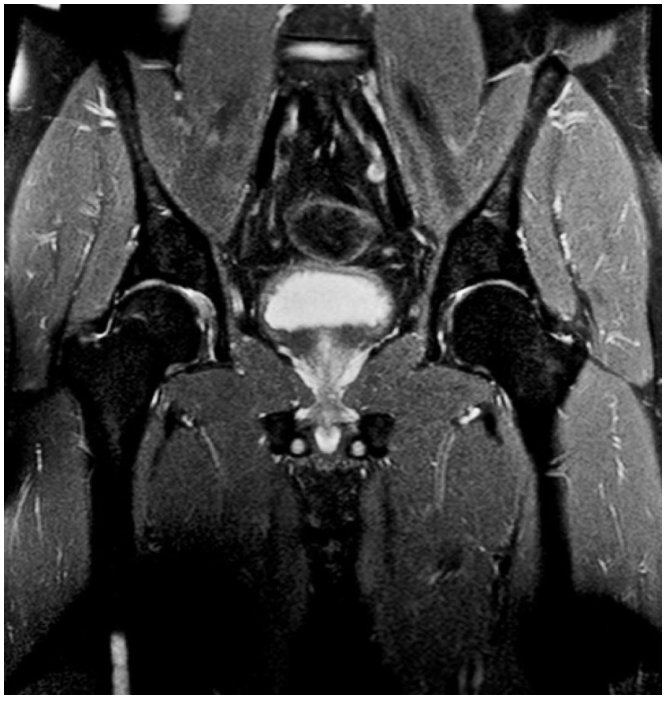

Figure 3 MRI scan of both hips taken at 8 months after initial presentation showing resolution of previous bone marrow oedema.

DIAGNOSIS

The diagnosis of TO was made 4 weeks after initial presentation based on clinical and radiological findings.

TREATMENT

Initial treatment consisted of pain relief with NSAID. Off-loading the affected area was achieved with crutches which considerably reduced pain and the further need for analgesia. After the diagnosis of TO was made adjunctive medical treatment included vitamin D and bisphosphonates (Risedronate) and pulsed electromagnetic field therapy (PEMFT) until resolution of symptoms.

OUTCOME AND FOLLOW-UP

The patient remained on crutches for a total of 6 months during which time pain, functional disability and antalgic gait reduced gradually. After a further 2 months of intense physiotherapy and rehabilitation he returned to sporting and running activities, approximately 8 months after initial symptoms developed. A repeat MRI scan at this time point showed no significant residual bone marrow oedema (figure 3). At an incidental encounter 2 years later, he was back to his normal training routine, had participated in several running events with no further episodes of hip pain or recurrence of TO on other anatomical sites.

DISCUSSION

Trail running is a popular sport[4] and common running-related injuries are well described.[5 6] Hip injuries can often present as a diagnostic and therapeutic challenge due to the vague and non-specific presentations and signs. Typical running-related hip injuries include iliotibial band syndrome (ITBS), bursitis, sports hernias, hip osteoarthritis and great trochanteric pain syndrome (GTPS); however, rarer and more serious causes such as stress fractures need to be considered.[6–8] This is in line with the initial diagnosis of GTPS received by our patient when first presenting to the A&E department. As symptoms progressed,

with the development of moderate to severe pain on weight bearing, functional disability and an antalgic gait the initial diagnosis had to be revisited and further investigations instigated. Initial plain radiographs of the hip were unremarkable, and a subsequent MRI scan revealed a bone marrow oedema in the femoral head and intertrochanteric area, with joint effusion but without any obvious fracture lines or subchondral changes, excluding the diagnosis of a stress fracture. Bone marrow oedema on MRI scans are, however, non-specific and can be seen in various pathologies, including TO and early stages of AVN.[2] For further differentiation between TO and AVN a bone scintigraphy with ^{99m}Tc-MDP was performed which revealed a homogenous, diffuse increased uptake in the right hip.[2 9] Bone scanning is considered to be sensitive but not specific for the detection of TO but in the early stages of AVN a cold spot resulting from decreased isotope uptake over the anterosuperior region of the femoral head can often be seen.[2 9] These results made the diagnosis of AVN less likely. A further plain radiograph depicted mild osseous demineralisation of the femoral head and neck which may be seen 3–6 weeks after initial presentation in TO.[1 2] Combining these radiological findings, with the clinical presentation we established the diagnosis of TO in our patient. Plain radiographs in the later stages of TO may reveal complete disappearance of the femoral head, known as 'phantom appearance'[2]; however, no further imaging was undertaken in our patient.

TO was first described in 1959 as transient demineralisation of the hip joint[10] and in 1977 as TOH.[11] Since then several reports have been published.[2] The cause of TO is unknown. Predominantly middle-aged men but also women during or after pregnancy are affected, and anatomical sites include weight bearing joints, especially the hip. Patients often present with acute joint pain, limited range of motion, functional disability and antalgic gait as was described in our patient.[2 12 13] The correct diagnosis is paramount as other serious pathologies such as AVN or stress fractures need to be excluded and appropriate treatment instigated in a timely manner to avoid long-term sequalae. Diagnosing TO can be challenging and often take several months.[3] Our patient was diagnosed within 1 months of presentation, due to speedy radiological investigations, clinical symptoms and a high index of suspicion. MRI is the investigation of choice, demonstrating a bone marrow oedema and plain radiographs showing osseous demineralisation.[1 12] Bone scintigraphy may aid in diagnostic uncertainty but is not recommended as a primary screening investigation.[2 14] Laboratory tests are generally unhelpful in diagnosing TO but can help in differentiating other pathologies. TO is a benign, self-limiting condition and patients generally recover fully within 4–9 months but in some cases can take up to 2 years.[2 3] Our patient recovered fully and returned to pre-disease activities and running approximately 8 months after initial presentation. TO can recur in the same patient, at the same joint or any other. Risk factors include male sex, smoking, low bone mineral density, previous trauma or sport-related injury.[3] A previous case of a TO of the navicular bone in a track and field athlete runner has been described.[15] To our knowledge this is the first case of a trail runner with TOH. A potential risk factor in our patient may have been an increase in impact activities in the preceding months. Treatment of TO is conservative with off-loading of the affected side, analgesia, vitamin D and bisphosphonates, all of which were received by our patient. In addition, we used PEMFT as an adjuvant treatment technique as benefits are described in post-menopausal osteoporosis, enhancing osteoblastogenesis and inhibiting osteoclastogenesis, thereby potentially contributing to an increase in bone mass and strength. However, its role in TO has not been fully investigated and thus cannot be generally recommended as a treatment strategy.[16]

In conclusion, this presents the first case of transient osteoporosis of the hip in a trail runner. TO is a rare disease and its clinical presentations, symptoms and treatment are not widely known. Hip pain in runners is a common presenting complaint and recognising TO and its differential diagnosis is important in assessing unusual presentations of hip pain in an active athlete population.

Patient's perspective

When I first injured my hip, I thought it was a muscle strain as I have always been very active. But the pain did not improve and then it progressed until I could not walk which made me worried. I had many tests and finally I was told it was not serious and I would recover. However, the road to recovery was very long and I was on crutches for 6 months and I was often worried I would not get back to my previous activity levels until I was finally allowed to run again 8 months after my initial injury. I am grateful for the excellent care I received but during the convalescence period I had many doubts and worries if I would ever be fully fit again. This is now over 2 years after my injury and thankfully I am back to where I was prior to this injury.

Learning points

- Hip injuries in runners are common and correct diagnosis often presents challenges.
- Transient osteoporosis of the hip (TOH) is a rare, self-limiting condition which is presented with acute onset pain, disability and antalgic gait with spontaneous recovery in 4–9 months.
- TOH predominately affects middle-aged men, and diagnosis is made with MRI and plain radiographs demonstrates bone marrow oedema and bone demineralisation, respectively.
- Awareness and early diagnosis are important, to exclude other more serious conditions like avascular necrosis that may be present in a similar way.

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