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Easily missed? Avascular necrosis of the femoral head.

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Competing interests

We have read and understood the BMJ policy on declaration of interests and declare the following interests: None.

Contributorship

All authors have made substantial contributions to the conception or design of the work, revision and final approval prior to publication. An expert patient contributed their experiences to the paper to give a patient's perspective on the referral and treatment of AVNFH. The expert patient read and approved the final draft prior to submission. We would like the thank Dr SLM Lamb, General Practitioner from Cross Hills Practice in West Yorkshire for reviewing the manuscript prior to submission. Prof P Giannoudis will act as guarantor for the overall quality of this submission.

What you need to know

- Salvageable avascular necrosis of the femoral head (AVNFH) presents with hip pain and a normal plain radiograph.
- AVNFH is more common in men and patients between the ages of 30 and 50 but risk increases with age in females.
- Common risk factors for AVNFH are alcoholism, use of steroids, chemotherapy and immunosuppressant medication and sickle cell anaemia.
- Consider Referral to hip specialist and MRI scan of the hip on a routine basis (2 months) in patients presenting with painful hip and normal radiographs.
- Share the diagnosis of AVNFH with other treating teams to prevent further harm.
- Early treatment improves the chances of hip survival to between 70 to 80% over five to seven years.

Case:

A 36 year old post-partum lady presents to her GP with a history of gradual onset left groin pain radiating to the knee. The pain was severe and progressed rapidly. Pain was worse on walking and associated with a limp. The patient was examined by the GP and referred for a plain radiograph of the hip and knee. Radiographs demonstrated slight narrowing of the hip joint space with no other features. Pain continued despite analgesia and the patient was told nothing further could be done. Almost a year passed, and the patient revisited the GP for a review and was referred to secondary care orthopaedic clinic. MRI scan of the hip demonstrated classic features of avascular necrosis of the femoral head (AVNFH) with collapse. The patient was reluctant to undergo total hip replacement and underwent novel treatment with core decompression with local stem cell therapy and distraction with an external fixator, which has improved symptoms and delayed the need for a total hip replacement.

What is avascular necrosis of the femoral head?

AVNFH causes loss of integrity of subchondral bone structure due to abnormal microcirculation, but the underlying pathogenesis remains unclear[1]. Subchondral bone subsequently collapses leading to progressive secondary arthritis. Mean age of presentation in the UK is estimated to be 58.3 years with an estimated prevalence of 2 per 100 000 patients[2]. AVNFH typically occurs in younger patients with highest prevalence in Males aged 25 to 44 and women aged 55 to 75[3]. In the UK it is the third most common indication for THR in patients under 50 years old [4].

Why is it missed?

AVNFH is a rare and patients with AVNFH can have co-existing chronic rheumatic and haematological problems which may lead to diagnostic uncertainty. Accurate reproduction of groin pain on isolated hip movements can be challenging to elicit in a primary care setting due to time and space constraints. 18.75% of new presentations are diagnosable only with MRI and may be easily missed[3]. Normal plain radiographs in the early stages of AVNFN can be falsely reassuring and delay appropriate referral.

Why does it matter?

Early diagnosis and referral are essential since bone destruction normally occurs within two years of disease onset, making joint preserving intervention impossible [5]. Early identification of AVNFH gives the multidisciplinary team time to change medical treatments which might be provoking onset of AVNFH. Surgical decompression of the femoral head reduces the need for further surgery in the short to medium term but is only suitable for the earliest disease stages[6]. Once patients have progressed to secondary hip arthritis, joint replacement is usually inevitable. However, given the younger age of patients with AVNFH the lifetime risk of revision surgery and associated morbidity is great.

"Red flags" requiring referral or further assessment

- Painful hip >6weeks with normal hip radiograph
- Patients presenting with hip pain and risk factors including:
  - Previous unilateral AVNFH
  - Alcohol excess
  - High exposure to steroid therapy
  - Immunologic therapy
  - Chemotherapy
  - Sickle cell disease and other coagulopathies
  - HIV
  - Recent pregnancy

How is AVNFH diagnosed?

A careful history

A history demonstrating pain lasting longer than six weeks, typically located in the groin and thigh which is worse on weight bearing and movement is key [5]. Usually there is no previous history of trauma. High blood levels of triglycerides, total cholesterol, LDL‑cholesterol, and non‑HDL‑cholesterol, male gender, urban residence, family history of osteonecrosis of the femoral head, heavy smoking, alcohol abuse, overweight, coagulopathies, vasculopathies, HIV and high exposure to steroids, chemotherapy and immunosuppressant medication are associated with an increased risk of AVNFH[3,6]. AVNFH is often bilateral and the risk of bilateral AVNFH is highest within two years of unilateral diagnosis [5].

Examination

Reproduction of pain in the groin, thigh and anterior aspect of knee with isolated thigh rotation will not diagnose AVNFH, but will help to differentiate hip pain from pain originating from the spine and knee. This can be performed with the patient sitting or supine (Figure 2).

Radiological tests

Early AVNFN is not apparent on plain radiographs and if the patient continues to be in pain, further investigation and referral is warranted. AVNFH is diagnosed on MRI of the hips[7] and may also diagnose a breadth of treatable hip pain when carefully correlated with clinical symptoms[8] (figure 1).

A patient's perspective

Our expert patient felt her symptoms developed suddenly and she was severely debilitated by the pain in her hip. She had recently given birth to her second child and was struggling to cope at home. She felt like her concerns were not taken seriously, because she was young and only had minor changes on her plain radiograph. She hopes that this article will educate primary care teams about the potential problems associated with AVNFH and also how they might be averted for future patients.

How patients were involved in this article

The case was an abbreviated version of a patient's journey with AVNFH. The paper was shared with an expert patient and adjustments were made accordingly.

Referring on

If the patient has a normal plain radiograph and continuing pain the next best step is MRI of the hip and referral to a hip specialist for consultation.

In secondary care, the results should be shared with the care teams involved in the administration of steroids, chemotherapy and immunologic therapy. Medical and surgical treatment depends on the patient characteristics and stage of AVNFH. Medical treatment of pre-collapse disease with prostacyclin analogues and bisphosphonates may reduce symptoms and prevent loss of joint congruity [5]. Surgically, treatment remains controversial, but most patients will be offered core-decompression surgery with or without adjunctive pharmacological therapy to reduce pain and potentially reverse pre-collapse AVNFH [9]. Specialist tertiary centres may offer bone grafting and osteotomies to encourage vascular regrowth and unload damaged hip articular surface respectively. Once collapse has occurred, total hip replacement can give patients reliable pain relief and improved function

Education into practice:

How often do patients with normal plain radiographs get reassessed and referred in your practice?

How will this article help you identify those patients most at risk of AVNFH?

Have you or your colleagues seen a patient with AVNFH? How did they present?

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