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PRACTICE

EASILY MISSED?

Avascular necrosis of the hip

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What you need to know

- Common risk factors for AVNFH are alcoholism, use of steroids, chemotherapy and immunosuppressant medication, and sickle cell anaemia
- Consider MRI scan of the hip and referral to an orthopaedic team if a patient has a painful hip for longer than six weeks with normal radiographs
- Early treatment improves the chances of hip survival by up to 88% at seven years

A 36 year old woman presents to her GP with a history of left groin pain radiating to the knee. The pain is severe, worse on walking, and associated with a limp. The patient revisits the GP a year later with persistent pain despite analgesia. Plain radiographs of the hip and knee show slight narrowing of the hip joint space with no other features and she is referred to a secondary care orthopaedic clinic. A magnetic resonance imaging (MRI) scan of the hip shows classic features of avascular necrosis of the femoral head (AVNFH) with collapse.

What is avascular necrosis of the femoral head?

Osteonecrosis of the femoral head (AVNFH) causes loss of integrity of subchondral bone structure due to abnormal microcirculation. The underlying pathogenesis is unclear[1]; risk factors are likely to affect microcirculation in some way but this has not been confirmed by research. The common end point is abnormal microcirculation and necrosis. Subchondral bone subsequently collapses, which leads to progressive secondary arthritis.

Mean age of presentation in the UK is 58.3 years, with a prevalence of two per 100 000 patients.[2] On average, AVNFH occurs earlier in life than typical osteoarthritis. It is more common in men and the highest prevalence is in men aged 25 to 44 and women aged 55 to 75.[3] In the UK it is the third most common indication for total hip replacement in people under 50.[4]

The following factors are associated with an increased risk of AVNFH[3 5]:

- High levels of blood triglycerides, total cholesterol, low density lipoprotein cholesterol, and non-high density lipoprotein cholesterol
- Male sex
- Urban residence
- Family history of AVNFH
- Heavy smoking
- Alcohol abuse
- Overweight
- Coagulopathies
- Vasculopathies
- HIV
- High exposure to steroids, chemotherapy, and immunosuppressant medication.

Steroids have been shown to increase odds of osteonecrosis (non-site specific) by a factor of three and immunosuppressants by a factor of six. Zhao reported that the odds of AVNFH were 35 times greater in patients taking corticosteroids and six times greater in patients with "alcoholism" status.[3]

Why is it missed?

AVNFH is rare. Patients with the condition can have coexisting chronic rheumatic and haematological problems. This may lead to diagnostic uncertainty, particularly given the use of

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chemotherapy, immunomodulatory agents, and steroids in these conditions, which are all risk factors for AVNFH.

A physical examination can help identify the anatomical structures that might be causing the pain, since hip pain can originate from multiple hip and non-hip areas. Presentations may be missed because 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.

Normal plain radiographs in the early stages of AVNFH can be falsely reassuring and delay appropriate referral. If the plain radiograph is negative and the patient continues to complain of hip pain, the doctor may give a diagnosis of non-specific hip pain (given that musculoskeletal presentations are common in primary care) and send the patient for physiotherapy.

Of new presentations, 18.75% are diagnosable only with MRI and are easily missed on normal plain radiographs.[3] Only the MRI scan is diagnostic.

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.[6] 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 stages of disease.[5] 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.

How is AVNFH diagnosed?

AVNFH diagnosis starts with a careful history and examination to determine that the hip is the source of pain. Ultimately an MRI is required to diagnose AVNFH and may also diagnose other causes of hip pain.

A careful history

A history showing pain lasting longer than six weeks, typically located in the groin and thigh and which is worse on weight bearing and movement is key.[6] Usually there is no history of trauma. Ask about risk factors and refer for MRI of the hip if the patient has any "red flags" (box 1). AVNFH is often bilateral and the risk of bilateral AVNFH is highest within two years of unilateral diagnosis.[6]

Box 1: Red flags requiring referral or further assessment

- Hip pain for more than six weeks with normal hip radiograph
- Patients presenting with hip pain and risk factors including
  - o previous unilateral AVNFH
  - o alcohol excess
  - o high exposure to steroid therapy
  - o immunologic therapy
  - o chemotherapy
  - o sickle cell disease and other coagulopathies
  - o HIV
  - o recent pregnancy

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 (fig 1).

Radiological tests

Early AVNFH is not apparent on plain radiographs. If the patient continues to be in pain, further investigation and referral is warranted. AVNFH is diagnosed on MRI of the hips,[7] which may also diagnose a breadth of treatable hip pain (such as rheumatological disease, musculotendinous disease, and bony disease) when carefully correlated with clinical symptoms[8] (fig 2).

Other investigations, such as blood tests, should only be considered if indicated for other reasons or if there is a high suspicion of rheumatological disease or infection.

Referral

If the patient has signs of AVNFH on MRI of the hip, refer to an orthopaedic surgeon for consultation (fig 3).

In secondary care, AVNFH diagnosis should be shared with any care teams involved in the administration of steroids, chemotherapy, and immunologic therapy.

Medical and surgical treatment depend 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 but their efficacy is not currently well defined.[6] Surgically, treatment remains controversial, but most patients with pre-collapse AVNFH are offered core decompression surgery with or without adjunctive pharmacological therapy to reduce pain and potentially prevent the need for total hip replacement in 88% of patients for up to seven years.[9 10]

Postoperative recovery involves a period of non-weight bearing for 12 months and gradual return to work and driving at 8 weeks. Full benefit is usually felt at 12 months after surgery. Specialist tertiary centres may offer novel treatments such as 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 rapid, reliable pain relief and improved function but is associated with the risk of future revision, particularly in younger patients. A full description of all the options is beyond the scope of this article and patients should discuss all available options with their surgeon to enable informed shared decision making.

A patient's perspective

Our patient 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 her concerns were not taken seriously because she was young. She hopes that this article will educate primary care teams about the potential problems associated with AVNFH and how they might be averted for future patients.

Our 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.

How patients were involved in this article

The case was an abbreviated version of a patient's experience with AVNFH recorded following patient interview. The paper was shared with an patient who emphasised her frustration when initially dismissed from primary care with symptoms of hip pain.

Education into practice

How often do patients with normal plain radiographs get reassessed and referred in your practice if there is ongoing hip pain?

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?

Provenance and peer review: Commissioned, based on an idea from the author.

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Figures

Fig 1 Demonstration of hip rotation to elicit hip pain with the patient sitting (A) and supine (B, C, D)

Fig 2 Typical changes seen on plain radiograph (top) and MRI (bottom) of the hip in early and late AVNFH. The appearance of early AVNFH is not apparent on plain radiograph but is visible on MRI

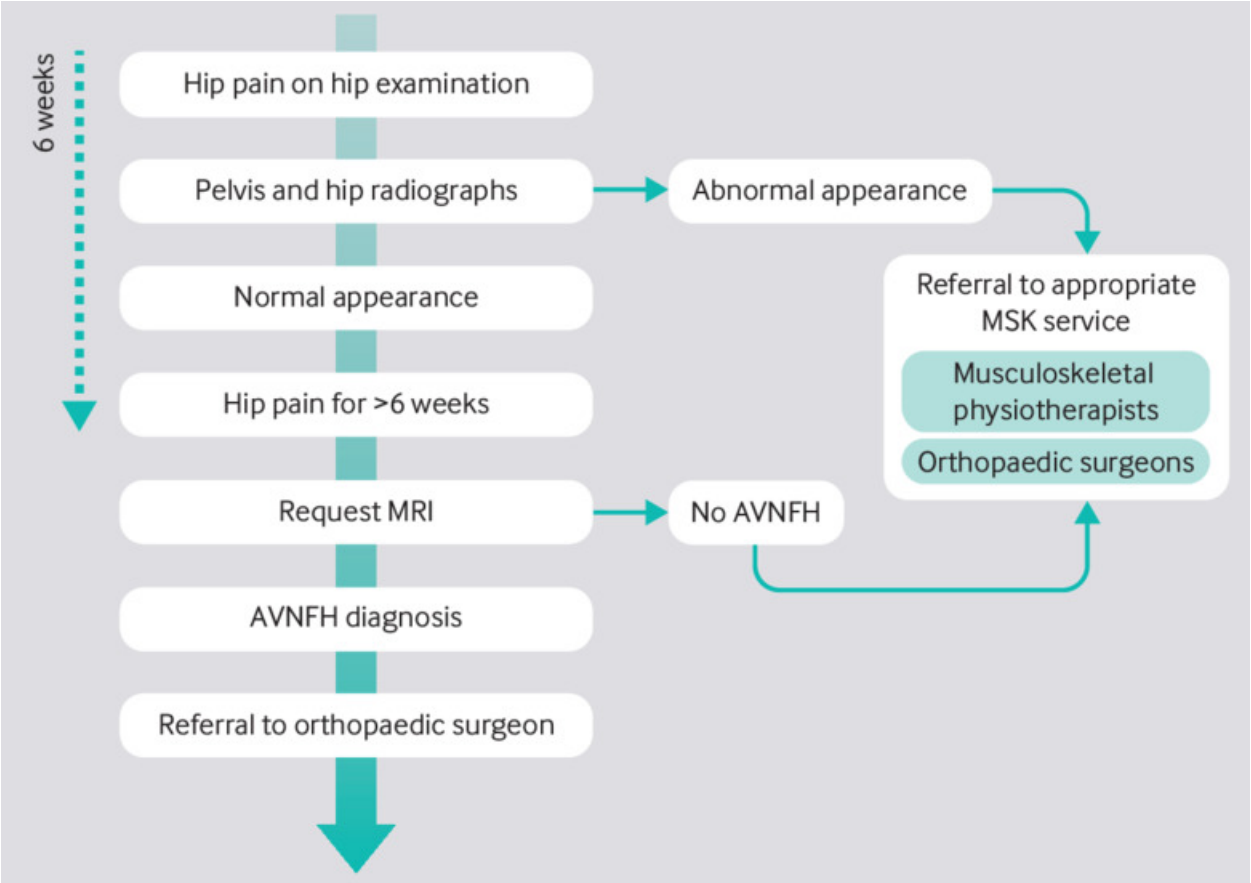

Fig 3 Proposed pathway for managing AVNFH in a primary care setting