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Groin pain secondary to Femoral Acetabular Impingement Syndrome - A case of mistaken identity

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CASE STUDY

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ABSTRACT

Groin pain is a common presentation usually associated with inguinal hernias, thus a clinician will rarely consider hip pathology. We present the case of a 51-year-old man with right groin pain and imaging-confirmed right inguinal hernia. His atypical symptoms and signs however led to us pursuing other differentials; he was subsequently diagnosed with a Cam-type femoral acetabular impingement (FAI) syndrome. Through this case study and literature review, we aim to increase awareness amongst general surgeons regarding this uncommon differential of FAI syndrome- a painful condition associated with morphological characteristics of the proximal femur and/or acetabulum. A thorough history and examination in patients with groin pain is essential in the diagnostic algorithm to accurately diagnose FAI syndrome. This will facilitate orthopaedic referral, appropriately manage pain symptoms, as well as prevent unnecessary hernioplasties and possible complications.

Key Words
Femoral acetabular impingement, inguinal hernia differentials, cam impingement

Implications for Practice:

1. What is known about this subject?
First described by German authors Vulpius and Stoffel in 1913, Femoral Acetabular Impingement (FAI) syndrome is an increasingly recognised condition, with an estimated 20 per cent prevalence in patients with bone morphologies of the hip/acetabulum. Majority of presentations have features of both types of bone morphologies- Cam and Pincer impingement.

2. What new information is offered in this case study?
Cases of FAI syndrome masquerading as an inguinal hernia have rarely been reported in the literature. Recognition of atypical features in our case study raised a strong index of suspicion to further investigate other plausible differentials to an inguinal hernia. Hence this article aims to reiterate the importance of considering the wide range of differentials of groin pain, including the uncommon FAI syndrome.

3. What are the implications for research, policy, or practice?
All patients presenting to general surgeons with groin pain also need to be investigated for hip pathology, in particular FAI syndrome. This involves comprehensive hip as well as groin examination, specific tests and imaging. Subsequent treatment could relieve symptoms in majority of patients with FAI syndrome, as well as monitor the progression of joint damage. Unnecessary hernia repairs would not be performed either.

Background

Femoral Acetabular Impingement (FAI) syndrome is frequently misdiagnosed due to it being a relatively under-recognised condition by clinicians. With more diagnostic features of the bone morphologies associated with FAI syndrome discovered through advanced examination and imaging techniques, its diagnostic rate has increased.[1] However, we suspect awareness of the condition is still limited.

This case report highlights the importance of a detailed history, thorough examination including impingement tests, as well as diagnostic imaging to further investigate FAI syndrome as a cause of groin pain. Through our discussion regarding the pathophysiology of the Cam and Pincer morphologies associated with FAI syndrome, as well as the therapeutic management, we hope to increase awareness amongst clinicians.

The differential of FAI syndrome should be considered in patients with groin pain, even with positive imaging findings of other pathology. It is essential that general surgeons, to whom groin pain presentations are frequent, are able to recognise FAI syndrome and subsequently link the patient to orthopaedic and physiotherapy resources. This will prevent further deterioration in patient symptoms. Early and accurate diagnosis would also prevent unnecessary surgery such as inguinal hernia repairs.

Case details

A 51-year-old funeral director with a past history of appendectomy presented to clinic with a three-month history of right groin pain, worse with lifting caskets. Once triggered, the pain lasted several days. He denied any associated lump or gastrointestinal symptoms. An ultrasound by his general practitioner revealed a 4.7×3.8×2.7cm fat-containing reducible right indirect inguinal hernia.

With no palpable inguinal lump on Valsalva manoeuvre, we had a higher index of suspicion for other plausible differentials other than an inguinal hernia. A spinal and lower limb examination was performed- revealing a right positive anterior impingement test. Subsequent pelvic and spinal X-Rays depicted a cam-type FAI with associated degenerative changes (Figures 1 and 2). He was diagnosed with mild osteoarthritis of the hip secondary to cam-type FAI syndrome and commenced on non-steroidal anti-inflammatory drugs (NSAIDs) with activity modification. We observed gradual resolution of his symptoms over nine-months and discharged him from our clinic with ongoing monitoring with his general practitioner.

Discussion

A wide variety of different diseases can cause groin pain- osteoarthritis, avascular necrosis secondary to femoral fractures, bursitis, musculoskeletal strains, sciatica, lipoma, referred pain from the testes, psoas abscess, femoral artery aneurysm, and lymphadenopathy secondary to metastases/lymphoma/tuberculosis/HIV.[1] Joining this broad list of differentials is FAI syndrome, increasingly diagnosed over the past 17 years.[1] This is attributed to the rise of arthroscopic surgery in the early 2000s and Ganz et al. who first discussed surgical management of FAI syndrome in 2001.[1] He then hypothesised the link of the syndrome to the development of osteoarthritis in 2003.[1]

Given FAI syndrome's relatively anonymity, the 2016 Warwick Agreement[2] was crucial in providing a consensus on the diagnostic criteria and treatment principles of the condition. It defined FAI syndrome as a motion-related clinical hip disorder, secondary to premature contact between the acetabulum and proximal femur.[2]

There are two types of bone morphologies associated with FAI syndrome, known as Cam and Pincer. While these hip morphologies have a prevalence of approximately 20 per cent,[1,3] FAI syndrome affects only a small proportion of those with these morphologies. 86 per cent of these FAI syndrome presentations have a mixed picture of both Cam and Pincer morphology.[3]

An aspherical femoral head leads to cam impingement, whilst excess acetabular protrusion causes pincer impingement.[3,4] Table 1 adapted from Tannast et al.,[5] illustrates these differences and our patient- a middle-aged male with a classic pistol-grip Cam deformity on imaging.

With no history of congenital deformities, trauma, or excessive sport- it is likely the pathological contact between acetabular labrum and deformed femoral head manifested in his insidious right groin pain and limited hip movement. The literature confirms a typical gradual onset of groin pain in 83 per cent of FAI syndrome patients, worse with pivoting in sports or excess activity.[3] Pain may also only be felt in the back, buttock or thigh, and patients may describe mechanical symptoms of clicking and stiffness.[2] The wide variation in location and nature of pain often makes the initial diagnosis difficult. This repetitive impingement causes hip joint degeneration which may contribute to osteoarthritis.[1,4,6]

Many clinicians have insufficient knowledge regarding this relatively newly-recognized condition; its long-term natural history still unknown.[4] In one study, it took an average of 4.2 doctors before FAI syndrome was diagnosed; with 13 per cent of patients already having unsuccessful surgery at another anatomical location.[4] Thus, with ambiguous symptoms as mentioned above, and in the absence of an inguinal lump, we recommend further comprehensive examination of adjacent regions.

Our patient's pain was reproducible with the highly sensitive, albeit non-specific, anterior impingement test- performed by hip flexion, internal rotation and adduction.[6,7] Other tests for hip range of movement such as the posterior impingement test (extending the hip with external rotation), C sign (holding the lateral hip between abducted thumb and index finger), and the Patrick Fabere Test (pain on a flexed, abducted and externally rotated leg) are also useful.[6] Assesing gait, single leg control and muscle tenderness around the hip/groin completes the exam.[6]

Antero-posterior X-Ray of the pelvis can exclude differentials such as osteoarthritis, acetabulum dysplasia, femoral head osteonecrosis, fracture and pelvic instability in the symphysis pubis.[3,6,7] Cam and pincer morphology also have several imaging features on antero-posterior pelvic and lateral femoral neck X-rays. [7] The 'crossover sign' of the posterior and anterior walls of the pelvis assesses acetabular protrusion in pincer types, and femoral head sphericity in cam types.[7] In Figures 1 and 2, our patient had a flattened femoral head, the deformity appearing like a pistol-grip. As per the Warwick agreement guidelines, our radiographs were centred of the pubic symphysis, without rotation and with neutral pelvic tilt, so as to avoid misinterpretation.[2]

Given these cam and pincer morphologies are common and a variant on bone morphology, they may often be un-reported by the radiologist. This is likely because most cam and pincer morphologies do not often lead to symptoms. However, as our patient had associated degenerative changes, his cam-deformity was reported. It is important to note that the presence of cam/pincer morphology, in the absence of the symptoms and signs, does not constitute to FAI syndrome.[2]

We speculate that our patient's ultrasound finding of an indirect inguinal hernia is likely a cord lipoma. Often, a surgeon will not recommend hernioplasty for ultrasound-proven hernias in the absence of clinical findings.

Deemed unnecessary, he did not have proximal femur axial radiographs, to further assess head-neck offset and alpha angle in Cam-deformities[1] as he clearly had it on antero-posterior pelvic X-Rays. Other potential investigations include a hip MRI (Magnetic Resonance Imaging) arthrogram to assess cartilage damage and labral tears.[7] This involves serial images of the hip joint post-injection of a contrast medium under local anaesthetic to better evaluate the joint capsule, articular surfaces of the bone and cartilage.[7]

Treatment outcomes for FAI syndrome are internationally assessed via the international Hip Outcome Tool (iHOT), Hip and Groin Outcome Score (HOS) and Hip and Groin Outcome Score (HAGOS).[2] Initial treatment options for FAI syndrome include activity modification, physiotherapy, NSAIDs, and corticosteroid injections.[7,8] There is currently no evidence-based reports on treatment outcomes regarding activity modification and medical management. Physiotherapy-based rehabilitation could improve symptoms for at least two years.[9]

If these conservative measures are unsuccessful, surgical management to correct hip morphology or resect/reconstruct labral/cartilage damage can be performed.[5,8,10,11] Surgery for cam-type FAI syndrome involves femoral osteoplasty whilst pincer types require peri-acetabular osteotomy.[5,8,10,11] Our patient's pain improved with NSAIDs and reduced casket-lifting, thus surgery was not indicated. Importantly, surgery may not alleviate all his symptoms as current literature provides no clear outcomes on surgery in the older patient with FAI syndrome, unlike the young athlete.

Two studies assessing mid-term outcomes for arthroscopic surgery reported symptom improvement in FAI syndrome up to five years.[12,13] However, Steppacher et al. reported longer-term results for open surgery; 80 per cent of their patients with surgical hip dislocation had improved symptoms for at least 10 years.[14] Despite favourable outcomes, these three studies[12-14] were at high risk of bias due to small sample sizes and poor-design. Randomised controlled trials (RCTs) comparing the outcomes of arthroscopic surgery with conservative management or 'placebo' surgery (diagnostic arthroscopy or arthroscopic washout) for FAI syndrome are currently underway, with results pending in the next 1–2 years. In particular, 2 of the RCTs are being conducted in Australia- Aus FASHIoN and HIPARTI with sample sizes of 120 and 140 respectively. This will enable us to further evaluate the surgical impact and correlation with hip osteoarthritis development.

The prognosis of FAI syndrome is uncertain, with the long-term natural history of the condition still unknown. It is also unknown which sub-group of patients with cam and pincer morphologies will develop the clinical condition of FAI. There are also no high-grade studies regarding the clear association of FAI syndrome to hip osteoarthritis and if treatment can decrease the risk of osteoarthritis or prevent it altogether.[2] Hence more prospective studies are needed in the field of FAI syndrome.

Conclusion

It is essential for general surgeons to recognise and diagnose FAI syndrome accurately, to avoid mistaken identities and unnecessary inguinal hernioplasties. Often, these are the patients with ongoing groin pain post-operatively. Our case illustrates characteristic features of cam-type FAI syndrome, proving comprehensive history and examination of adjacent regions is necessary in the absence of an inguinal lump. Larger studies comparing long-term efficacy of conservative versus surgical interventions, and FAI syndrome's impact on the process of hip osteoarthritis are awaited.

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PEER REVIEW

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CONFLICTS OF INTEREST

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PATIENT CONSENT

The authors, *Tan E, Durgakeri P,* declare that:

1. They have obtained written, informed consent for the publication of the details relating to the patient(s) in this report.
2. All possible steps have been taken to safeguard the identity of the patient(s).
3. This submission is compliant with the requirements of local research ethics committees.

Figure 1: Antero-posterior pelvic X-Ray demonstrating a right pistol-grip deformity in Cam type FAI

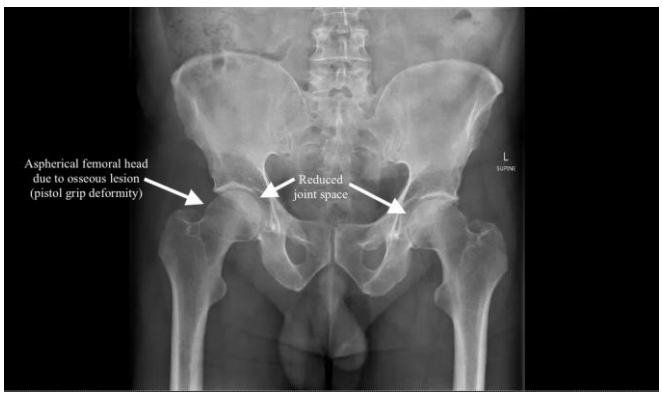

Figure 2: X-Ray of the abducted right hip further demonstrating a Cam type FAI with probable osteoarthritis

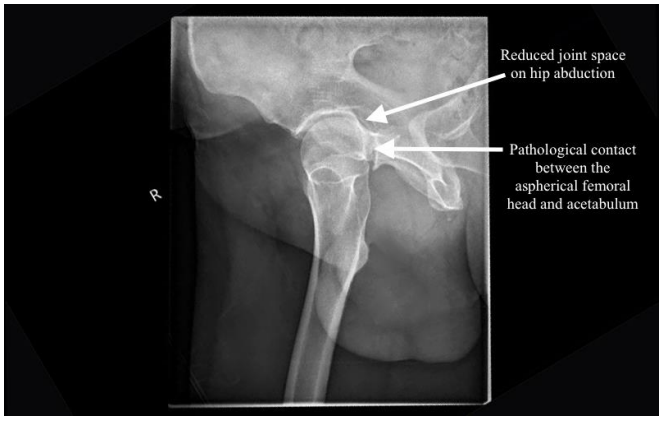

Table 1: Table depicting the differences between Cam and Pincer impingement

FAI Types	Pincer	Cam
Cause	Acetabular	Femoral
Osseous morphology	Excess acetabular protrusion over the femoral head	Aspherical head causing a decreased femoral head-neck offset
Sex distribution (M:F)	Middle aged women 1:3	Young men 14:1
Average age	40 years	32 years
Radiaographic signs	Crossover sign Posterior wall sign Ischial spine sign	Pistol-grip deformity Head-neck offset <8mm Alpha angle >50 degrees
Associated pathology	Post-traumatic acetabular dysplasia, bladder exstrophy, Legg-Calve-Perthes disease, slipped capital femoral epiphysis, coxa profunda	Legg-Calve Perthes disease, slipped capital femoral epiphysis, coxa vara