CASE REPORT

'How to deal with this, that and the other?' An orthopaedic surgeon's unexpected encounter with a trio of problems in an elderly man

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SUMMARY

This is the first clinical report of a psoas abscess encountered during a routine hemiarthroplasty surgery for a femoral neck fracture in a man with a recent urinary tract infection. There were no prior symptoms to suggest a psoas abscess, which was present on the same side as the hip fracture, apart from a history of recurrent urinary tract infection. The surgery had to be altered intraoperatively to that of an excision arthroplasty of the displaced non-viable femoral head along with insertion of an antibiotic-impregnated cement spacer into the hip joint. Relevant microbiological studies confirmed a methicillin-sensitive *Staphylococcus aureus* psoas abscess with bacteraemia in addition to *Staphylococcus bacteriuria*, so 6 weeks of intravenous antibiotics were started. A planned second-stage hemiarthroplasty was undertaken and the patient recovered fully without complications. Primary infection of the urinary tract by *S. aureus* is rare. This case serves to remind clinicians that caution must be exercised in patients with recurrent infections, especially when such infections affect organs or areas close to the intended surgery site. This warrants thorough evaluation for an occult source of infection. A psoas abscess is an unusual cause of hip pain and accurate diagnosis relies on a high index of suspicion. The antibiotic-impregnated articulating cement spacer is a useful surgical adjunct after excision arthroplasty, it not only elutes a high concentration of antibiotics in the infected field, but also facilitates second-stage arthroplasty surgery by preventing muscle and soft tissue contractures from developing.

BACKGROUND

The pain arising from a fractured neck of femur in this case masked a psoas abscess. The urinary tract infection (UTI) in the patient could be the red flag and in circumstances such as this can either delay surgery or obviate the need for further imaging to obtain a diagnosis. It is an unusual cause of hip pain and accurate diagnosis relies on a high index of suspicion. The antibiotic-impregnated articulating cement spacer is a useful surgical adjunct after excision arthroplasty, it not only elutes a high concentration of antibiotics in the infected field, but also facilitates second-stage arthroplasty surgery by preventing muscle and soft tissue contractures from developing.

Primary infection of the urinary tract by *S. aureus* is rare. This case serves to remind clinicians that *S. aureus bacteriuria* can reflect presence

of bacteraemia or a possible abscess, as opposed to primary UTI alone, thereby warranting further evaluation for an occult source of infection.

CASE PRESENTATION

An 85-year-old man presented with a 3-day history of left groin pain, fever and rigours, malaise and anorexia. He sustained a mechanical fall while walking up a flight of stairs at home. His medical history was significant for recurrent sigmoid diverticulitis for which he underwent subtotal colectomy several years ago in his home country. He was referred to our tertiary orthopaedic unit from a neighbouring country for surgical management of osteoporotic left intracapsular neck of femur fracture (figure 1).

On examination, he had a low-grade fever with axillary temperature of 37.6°C and was haemodynamically stable. He was unable to weight-bear due to left groin pain. He lay supine with his left hip held in slight flexion, shortened and in external rotation. The range of motion of the left hip was

Figure 1 Plain radiograph of the left hip (anteroposterior view) on initial presentation showing a displaced intracapsular neck of the femur fracture.

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severely limited due to left hip pain. There was localised tenderness over the left groin. Systematic examination of the cardio-respiratory systems and abdomen was otherwise normal. Initial laboratory investigations revealed a normal white cell count of $7.6 \times 10^9/L$ (normal 3.40–9.60), normal haemoglobin level $12.9 \times 10^9/L$ (normal 12.9–17.0). C reactive protein (CRP) was significantly elevated at 110 mg/L (normal 0–10). Renal function was normal. Initial urinalysis on admission showed pyuria with urine white cell count of 22 per high-power field (normal 0–4) and erythrocyte count of 3 per high-power field (normal 0–2). Initial urine cultures grew methicillin-sensitive *S. aureus* (MSSA; 100 000 colony forming units/mL) and appropriate antibiotics were promptly started.

The patient became acutely confused on the third day of admission. Routine laboratory and imaging investigations with serum B12 and folate levels, thyroid function test, Venereal Disease Research Laboratory screen and CT of the brain results were negative. The cause of confusion was attributed to sepsis, presumably arising from the UTI.

The patient was scheduled to undergo a left bipolar hemiarthroplasty on the fifth day of admission. He underwent an uneventful general anaesthesia and was cleaned and prepared in the right lateral position for a standard lateral Hardinge approach to the left hip. After splitting the skin, subcutaneous tissue, fascia lata, gluteus medius and vastus lateralis sequentially in a longitudinal fashion, a standard T-capsulotomy was performed. An unexpected large extra-capsular collection of frank pus was encountered over the region of the lesser trochanter, with an obvious channel tracking upwards along the iliopsoas muscle. Relevant tissue samples were sent for routine microbiological and histological testing. The operation was converted to a girdlestone excision arthroplasty and the femur head size was measured and recorded. An articulating antibiotic-impregnated custom-moulded cement spacer was inserted after adequate surgical debridement (figure 2).

Figure 2 Cement spacer in situ.

Figure 3 Axial CT scan showing an articulated cement spacer in situ with a rim-enhancing fluid collection just posterior to the lesser trochanter consistent with abscess collection.

TREATMENT

Intraoperative tissue and subsequent blood cultures isolated MSSA, confirming the diagnosis of a left psoas abscess causing MSSA bacteraemia. A postoperative CT of the abdomen and pelvis affirmed the finding of a left iliopsoas abscess (figure 3). The patient was treated with 6 weeks duration of intravenous antibiotics via a peripherally inserted central catheter. The CRP returned to normal. Six weeks postoperatively, the patient underwent an uneventful second stage involving removal of the articulating spacer and insertion of an uncemented left bipolar hemiarthroplasty (figure 4).

Figure 4 Definitive left hip implant in situ.

OUTCOME AND FOLLOW-UP

The patient was last reviewed at 8 months postoperatively, and was fully ambulant and pain-free using a walking stick.

DISCUSSION

This is the first clinical report of a psoas abscess complicating a femur neck fracture. The psoas abscess was first described by Mynter, who referred to it as psoitis, in 1881.¹ The psoas muscle originates from the transverse processes and lateral aspects of the vertebral bodies between the 12th thoracic and the 5th lumbar vertebrae, and travels downwards across the pelvic brim, where it joins the iliacus muscle to insert in the lesser femoral trochanter. The psoas bursa is located between the psoas muscle tendon insertion at the lesser trochanter and the hip capsule (figure 5). An infection from the psoas abscess can thus travel to the hip joint via this bursa. A retroperitoneal muscle, the psoas muscle is closely located to numerous other organs, including the aorta, appendix, iliac lymph nodes, jejunum, pancreas, renal pelvis, sigmoid colon and ureters. It has a rich blood supply that is believed to predispose it to haematogenous spread from sites of occult infection.

Psoas abscesses can be primary or secondary infections.² Primary psoas abscess occurs probably as a result of haematogenous spread from an occult infection. An increase in the number of cases of primary psoas abscess has been noted in recent years, especially in immunocompromised patients such as intravenous drug abusers and confirmed HIV-infected persons.^{3 4} Secondary psoas abscess occurs when an adjacent retroperitoneal or intra-abdominal infection gains access to the psoas muscle. Crohn's disease has been found to be the most common cause of secondary psoas abscess, in up to 73% of cases.⁵ Other associated diseases include diverticulitis,

appendicitis, pancreatitis, colonic carcinoma, vertebral osteomyelitis and UTI.⁶ In the present case, the patient's history of recurrent diverticulitis could have been a predisposing factor for development of psoas abscess.

The predominant pathogen of primary psoas abscess is *S. aureus* in up to 88% of cases, followed by streptococci (5%), and *Escherichia coli* (3%). A history of recent muscle trauma was revealed in 20% of cases.⁶ A mixed culture of enteric bacteria, such as *E. coli*, *Streptococcus* spp., *Enterobacter* spp. and *Salmonella enteritidis* are the most common causes of secondary psoas abscess. Secondary psoas abscess caused by *Mycobacterium tuberculosis* is a rarity in the USA, but in many developing countries where tuberculosis remains a challenge, it continues to be a significant pathogen.⁶

The symptoms are often insidious and non-specific. Fever is the most common symptom, with abdominal pain, hip flexion and abdominal, flank or groin mass, being present in under 50% of patients.^{5 7 8} Other symptoms include chills, psoas spasms and presentation with a mass. Laboratory investigations revealing a rise in white cell count, erythrocyte sedimentation rate and serum urea nitrogen level can also serve as markers for psoas abscesses. A physical examination can additionally provide assistance in diagnosing a psoas abscess. The position of greatest comfort is the supine position, with the knee flexed and hip externally rotated as this relaxes the psoas muscle and relieves pain.

A CT of the abdomen and pelvis is the ideal image of choice as it is diagnostic in 80–100% of cases. In comparison, ultrasonography is only diagnostic in 70% of cases.⁹ This may be owing to the possible presence of bowel gas obscuring the retroperitoneal space making ultrasonography a less ideal tool. CT scanning, with its superior abilities to visualise retroperitoneal spaces, makes visualisation and evaluation of the deeply located psoas abscess more feasible. In addition, the edge of the abscess typically enhances with intravenous contrast.¹⁰

Treatment of psoas abscesses involves antibiotics and abscess drainage.^{6 10–14} This may be performed via open drainage, or percutaneously via CT guidance. Until knowledge of the specific pathogens and antimicrobial sensitivities of the microbiology cultures are attained, broad-spectrum antibiotics should be prescribed. Some authors have suggested that targeted antibiotics can be used to treat abscesses up to 60 mm;¹² but without aspiration, these antibiotics are usually 'best guess' rather than targeted therapy. *Staphylococcus* and enteric organisms should be

Figure 5 Anatomy of the psoas major muscle in relation with the hip joint.

Learning points

- ▶ A psoas abscess is an unusual cause of hip pain and accurate diagnosis relies on a high index of suspicion.
- ▶ The antibiotic-impregnated articulating cement spacer is a useful surgical adjunct after girdlestone arthroplasty, it not only elutes a high concentration of antibiotics in the infected field but also facilitates second-stage arthroplasty surgery by preventing muscle and soft tissue contractures from developing.
- ▶ Primary infection of the urinary tract by *Staphylococcus aureus* is rare. This case serves to remind clinicians that *S. aureus bacteriuria* can reflect presence of bacteraemia or a possible abscess, as opposed to primary urinary tract infection alone, thereby warranting further evaluation for an occult source of infection.

covered by clindamycin, anti-staphylococcal penicillin and aminoglycoside.

Primary infection of the urinary tract by *S. aureus* is rare. This case serves to remind clinicians that *S. aureus bacteriuria* is often a reflection of bacteraemia, as opposed to that of a primary UTI alone, thereby warranting further evaluation for an occult source of infection. A psoas abscess is an unusual cause of hip pain^{5 7 8} and accurate diagnosis relies on a high index of suspicion. The antibiotic-impregnated articulating cement spacer is a useful surgical adjunct after girdlestone arthroplasty, as it not only elutes a high concentration of antibiotics in the infected field but also facilitates second-stage arthroplasty surgery by preventing muscle and soft tissue contractures from developing.^{15–18}

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Competing interests None.

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