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Case Report

Removal of protruding screws in a painful total hip arthroplasty: A case report☆,☆☆

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ABSTRACT

Persistent pain after total hip arthroplasty can be challenging for the orthopedic surgeon. We present a case of a 56-year-old female with an uncommon cause of persistent pain after total hip replacement, due to protruding screws with the subsequent impingement of surrounding soft tissues. The patient presented persistent groin pain after total hip revision surgery. After ruling out infection and loosening, an infiltration of iliopsoas muscle was performed, with only temporary improvement. The magnetic resonance depicted the conflict of the screws with the surrounding soft tissues, in close relation to the iliopsoas muscle, the external obturator muscle and the sciatic nerve. Revision surgery was performed, removing the screws, and implanting a new liner with complete remission of symptoms. Our case presents an atypical cause of pain due to surrounding tissue lesions by offending screws with complete resolution after only screw removal. In the clinical study of persistent pain following a total hip replacement, screws length, and protrusion should be considered and ruled out as a possible and treatable etiology. Removal of the screws after cup integration can be a conservative and effective strategy to treat the pain.

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Introduction

Persistent pain after total hip arthroplasty (THA) can be challenging for the orthopedic surgeon. The causes leading up to this symptomatology may include infection, components loosening, soft tissue impingement, polyethylene wearing, fracture of periprosthetic components, and osteolysis [1]. A close study to rule out each one of these must be performed in the presence of such cases. We present a case of an uncommon cause of persistent pain after total hip replacement surgery, due to multiple protruding screws; with the subsequent impingement of surrounding soft tissues, affecting the iliopsoas muscle, the external obturator muscle and nerve, and the sciatic nerve.

Case report

A 56-year-old female complaining of severe and persistent pain after 2 years of a revision surgery of a left THA performed using lateral Hardinge approach modified by Moskal. The previous surgery consisted of a partial hip exchange associated to a tenotomy of the iliopsoas. The initial surgery had been performed one year earlier, for coxarthrosis using the same approach as later on. The need for revision was aseptic loosening of the cup and psoas impingement. The patient referred a hard to locate pain initiating around the groin and distally irradiated toward the anterior area of her thigh; occurring mainly with movement, specifically with flexion and adduction of the thigh, affecting her daily activities and limiting ambulation. Consequently, there was a decrease in physical activity and a progressive general hypotrophy of the left hip muscles, with no improvement after conservative measures including physical therapy. She also referred lateral and posterior pain, much less intense, and without the same frequency.

On physical examination it is important to remark the height and weight of our case study, being 150 cm tall and weighing 46 kg (Body mass index of 20,44 kg/m^2). Pain was only present with active movements, being able to flex pain free up to 120° passively. Radiograph imaging showed a cup (Pinnacle Bantham, DePuy) without signs of loosening, with a 52° abduction angle and the presence of 4 screws, in combination with a short stem (SMF, Smith&Nephew) and a 28 mm ceramized metallic head (Oxinium, Smith&Nephew) (Fig. 1).

Blood tests including C-reactive protein and erythrocyte sedimentation rate were within normal range. Due to the persistence of intense pain, computed tomography (CT) imaging was obtained (Fig. 2), ruling out collections around the joint as well. A small sample of periprosthetic fluid was obtained through CT guidance, for microbiological study showing no germs in cultures.

Despite the absence of a clear relation to a psoas impingement and considering the fact that the psoas tenotomy had already been performed; we still proceeded to do an infiltration of the zone of iliopsoas muscle over the anterosuperior rim of the cup with bupivacaine and a long-release corticosteroid (Trigon Depot 1 mL) guided by ultrasonography, for treatment and diagnostic purposes. The procedure provided a minor temporary sedation of pain and thus improvement of the symptoms. The patient was once again referred to physiotherapy, without any further clinical improvement.

For further study, a magnetic resonance with MARS (metal artefact reduction sequence) was obtained, depicting the conflict of the screws with the surrounding soft tissues, in very close relation to the iliopsoas muscle, the external obturator muscle and the sciatic nerve (Fig. 3). The lack of improvement with conservative treatment, associated with these findings led us to a surgical approach.

On surgery, not only the stability of the cup was verified, but also its correct positioning. Furthermore, the anterior border of the cup did not protrude, eliminating this as a possible cause of impingement of the psoas muscle. Hence, the cup was left in place and thereafter all the screws were removed without any intraoperative complications. A new liner (Marathon Pinnacle Bantham, DePuy) and head (Oxinium, Smith&Nephew) were implanted. The elevated rim of the liner was placed in a posterior-superior position. The intraoperative maneuvers for testing stability were satisfactory and leg-length was assessed both clinically (comparison of knees, quadriceps muscle tension, and kick-off test) and using intraoperative radiograph to evaluate the relationship of the lower trochanter and the ischium.

The preoperative pain resolved a few hours after the procedure. Physical therapy started the day after surgery, beginning to sit and walk, with an uneventful postoperative evolution. The patient was discharged on day 4 after surgery. The use of crutches was recommended for 3 weeks, and continuing with 1 crutch 3 weeks after. At the 3-year follow-up, the patient maintains a satisfactory clinical and radiologic (Fig. 4) evolution, continues to be free of pain, ambulation with the aid of a single crutch only for long distances and having improved a preoperative Merlé dÁubigne score of 8 (2-5-1) to a 15 postoperatively (6-5-4).

Discussion

Persistent pain after THA is present in up to 6% of the procedures [2], its diagnosis can be related to loosening of the components (67%), infection (21.7%), iliopsoas impingement (4.8%), and bursitis (1%) among other even less frequent etiologies [1].

Most of the cases clinically compatible with iliopsoas impingement can be related to prominence, malpositioning (retroverted or laterally positioned) of the cup or extrusion of cement [3]. Nevertheless, some cases remain unsolved due to the lack of these findings [2]. Conventional approach begins with conservative measures such as physiotherapy and NSAIDS (nonsteroidal anti-inflammatory drugs), followed by infiltration with long release corticosteroids and iliopsoas tenotomy in refractory cases. In the present case, an infiltration with bupivacaine and a long release corticosteroid provided a minor transitory relieve of the pain and improvement of the symptoms, keeping in mind that the more aggressive treatment of the tenotomy of the psoas had already been performed during the previous revision surgery.

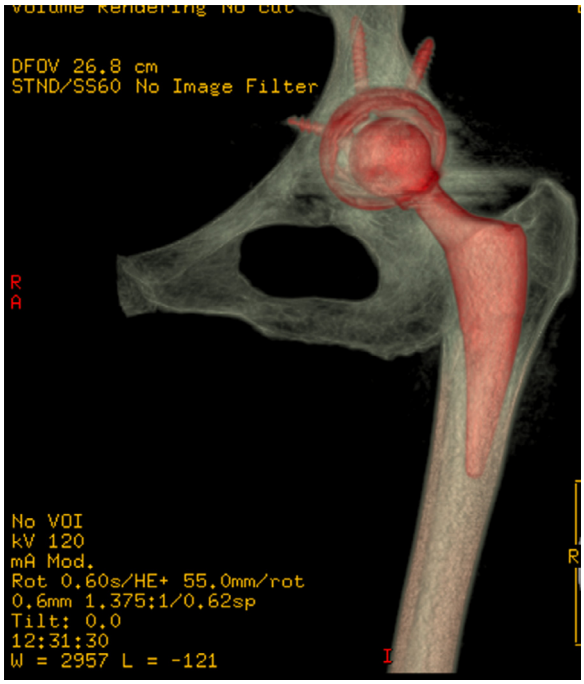

Fig. 2 – Three-dimensional reconstruction of computed tomography. Computed tomography with 3-D reconstruction, showing the protrusion of 2 of the screws.

The drilling of holes for the anchoring of screws and pegs or the protruding material itself has inherited possible complications, as does any procedure. Being the most feared, the vascular injury, because of its life-threatening potential both intra- and postoperatively; although very unlikely with a frequency of only about 0.3% [4]. To prevent such complications, it is of utmost importance to know the acetabular geometry of the safer zones for placing the screws of a cup [5].

Incorrect positioning has been described to directly endanger the iliac vessels, the sciatic nerve, iliopsoas muscle and tendon and internal obturator muscle and thus the obturator vein, artery, and nerve [6,7]. Anatomical studies have demonstrated the dimension of the internal obturator muscle, as of only 2–4 mm thick, therefore providing very minimal protection for the neurovascular structures beneath it [6]. This could very well explain a partial lesion of the obturator nerve, caused by the offending screw, with the consequent affection of adduction and pain in the anteromedial area of the thigh, as in our case at hand.

Secondary indirect and late onset nerve lesions can also be consequence to the formation of asymptomatic hematomas provoking manifestations as a result of compression [8]. Vascular lesions can also take place later on, as described by Rodriguez et al. who presented a case of late perforation of the external iliac artery attributable to an acetabular screw without loosening of any components and without the formation of a pseudoaneurysm. Clinically presenting as late onset ischemia of the extremity, that was solved by the removal of the tip of the screw associated with vascular repair via retroperitoneal approach [9].

The female gender seems be more prone to such complications, as it has been repeatedly shown to be more frequent in different studies of risk factors [10,11]. The basis for the hypothesis lays on the fact that smaller size individuals, with slimmer muscle tissue, and shorter limbs in general will therefore have shorter nerves; reaching the limit for potential elongation and therefore damage of the neural tissue more easily. In experimental models, the tolerance for elongation has been reported to be up to 6 % of the nerveś length, there-

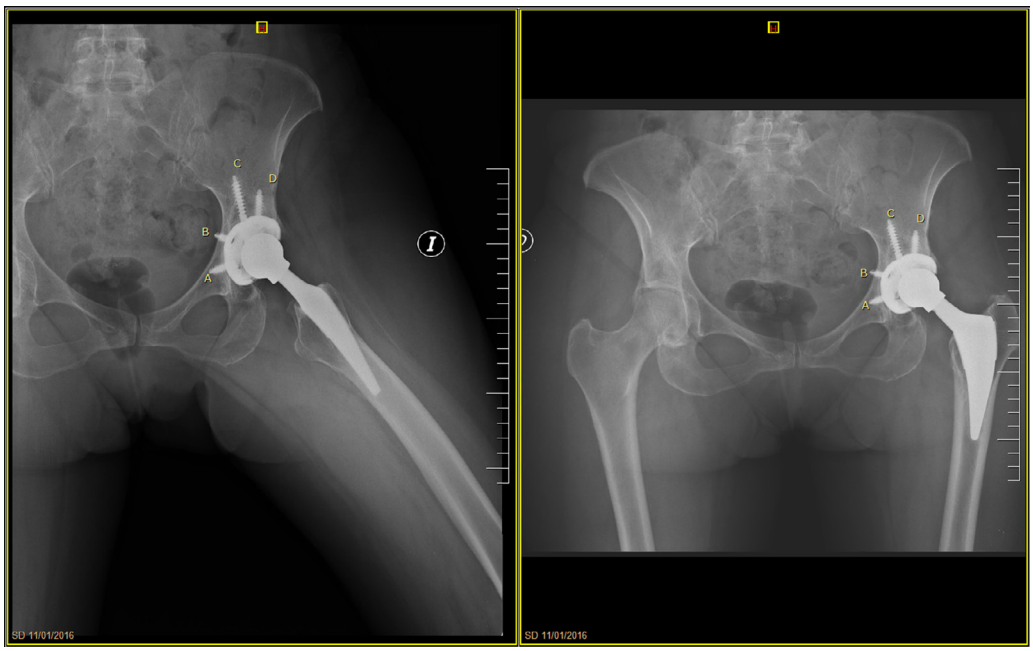

Fig. 1 – Radiological preoperative study. Preoperative radiological axial and anteroposterior views of the hip. Showing no signs of loosening and the presence of 4 acetabular screws (Lengths: A 20 mm, B 20 mm, C 30 mm, D 25 mm).

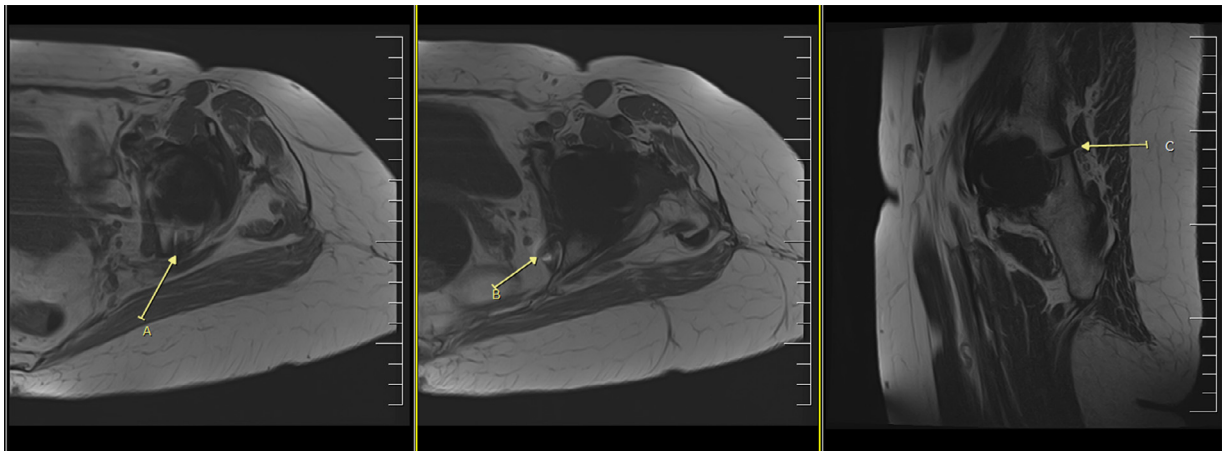

Fig. 3 – Magnetic resonance with MARS (metal artefact reduction sequence). Details of magnetic resonance depicting the conflict of the screws with the surrounding soft tissues. Posterior conflict caused by a 20 mm screw in close relation to the sciatic nerve (A), medial conflict caused by a 30 mm screw in close relation to (B) iliopsoas muscle, and (C) the external obturator muscle.

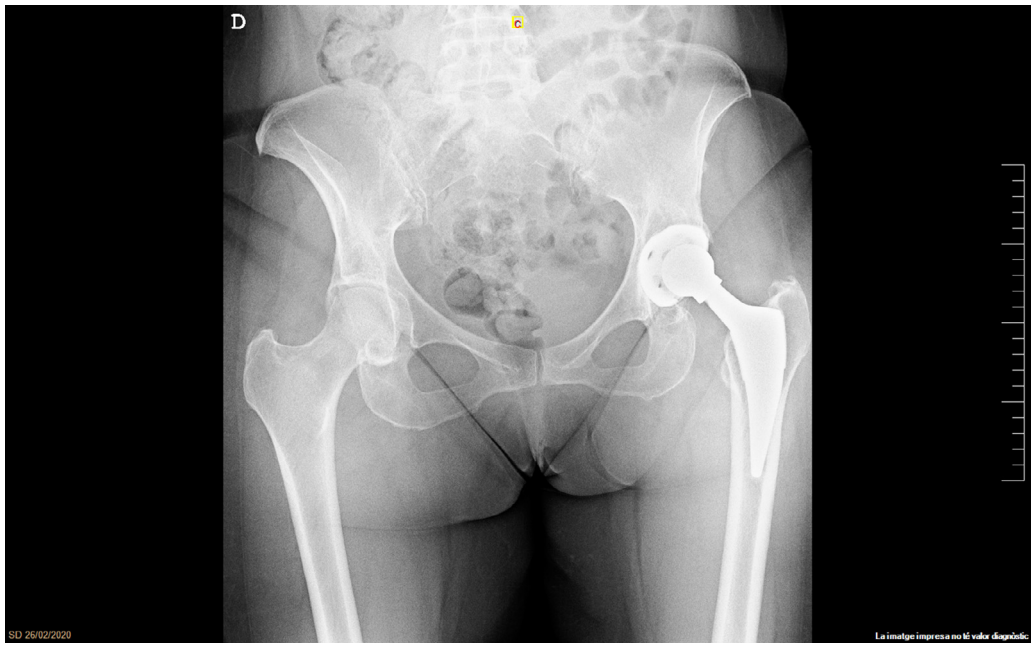

Fig. 4 – Satisfactory radiographic control at the 3-year follow-up. Postoperative anteroposterior image after removal of the screws maintaining the cup and exchanging the head and liner, procedure that allowed the complete resolution of the pain.

fore the absolute value of the limit for elongation would be significantly smaller in smaller individuals [12].

The presence of long offending screws causing pain and complete pain resolution after screws removal has not been previously published, to the best of our knowledge. The lack of this finding more frequently could be explained by the fact that the position of the soft tissue endangered is dynamic, hindering its finding in static studies like CT and MRIs. We have only been able to find 2 somewhat similar cases. One recently published where an 80-year-old patient with severe pain and paresthesia of his right buttock, having images compatible with a possible sciatic nerve lesion, who underwent an endoscopical resection of the tip of the screw with clinical improvement [13].

The other related case was presented at the Spanish Hip Surgery Society (SECCA, Sociedad Española de Cirugía de Cadera) in 2015 by Del Vat et al [14], the authors described a painful impingement of the iliopsoas tendon by a protruding screw. After its removal, exchanging liner and head, the patient became pain-free. Bricteux et al studied 12 cases of il-

iopsoas impingement, in 4 of these they found that the screws were protruding anteriorly in front of the Ilion, coming in contact with the posterior aspect of the iliopsoas tendon [15].

According to the hypothesis of a greater predisposition of the female gender or otherwise smaller individuals, this case illustrates the possibility that acetabular screws of conventional length can protrude out of the bone resulting offensive to surrounding muscle tissue and neurovascular structures, in short stature patients. The removal of the screws resulted in the resolution of the pain and symptomatology, allowing to start early joint motion and rehabilitation, and finally providing a good functional outcome.

Conclusion

Acetabular screws may entail either vascular, neurological or muscular complications. We present a case of persistent groin pain due to an uncommon cause of soft tissue lesion by offending screws, with transient relieve after corticoid infiltration but complete resolution only after screw removal, maintaining the resolution of pain at the 3 years follow-up.

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