

# Iliopsoas Hematoma After Total Hip Arthroplasty Using a Minimally Invasive Modified Direct Anterior Approach

## A Case Report

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### Abstract

**Case:** The modified direct anterior approach (MDAA) is a recently popular surgical technique for total hip arthroplasty (THA), with well-documented challenges. Characterized as acute hip and back pain, we present the case of a 78-year-old woman who developed an iliopsoas hematoma after an MDAA THA and discuss the management of this incident.

**Conclusions:** Iliopsoas hematoma after THA poses a unique challenge and should be considered in patients with acute hip and back pain, with loss of strength on the affected limb after an MDAA THA.

Total hip arthroplasty (THA) is a common elective procedure that, thanks to developments in surgical technique and implant design, has become one of the most effective orthopaedic procedures<sup>1</sup>. Despite considerable literature on the matter, much controversy exists regarding the most effective THA surgical approach<sup>2</sup>. The direct anterior approach (DAA) and the modified direct anterior approach (MDAA) for THA have grown in favor in recent years, owing to claims of less surgical trauma, faster recovery, and better patient results<sup>2</sup>.

Instead of the intermuscular plane between the tensor fasciae latae (TFL) and sartorius muscles seen in a typical DAA, by avoiding completely the lateral femoral cutaneous nerve, proponents of the MDAA<sup>3</sup> claim that this technique is linked to less muscle injury, following an intermuscular and internervous pathway between the TFL, the tensor fascia and rectus femoris muscle, creating a “moving window”, protecting and preserving periarticular structures, allowing a faster patient recovery, and reduced postprocedural occurrence of hip dislocation. However, it is critical for surgeons who use this approach to grasp the potential risks and complications to reduce the chance of failure and patient injury<sup>4</sup>.

The iliopsoas muscle originates in the anterolateral surfaces of the lateral processes from L1 to L5, the iliac fossa, and the vertebral bodies from T12 to L5 and inserts in the lesser trochanter. It is a hip flexor innervated by direct fibers from L1 to L3. Owing to its closeness to the MDAA, including its manipulation and traction during the procedure, the psoas

muscle could present an injury, lesion, or hematoma that, due to its intimate relationship with the femoral nerve, may also result in a clinically important nerve compression or paralysis<sup>5,6</sup>.

We present a patient who developed groin pain after THA through MDAA because of a retroperitoneal hematoma secondary to a combination of anticoagulants and a probable iliopsoas muscle lesion caused by continuous traction, retraction, and rotation. To the best of our knowledge, this is the first published case of such a complication.

The patient was informed that data concerning the case would be submitted for publication, and she provided consent.

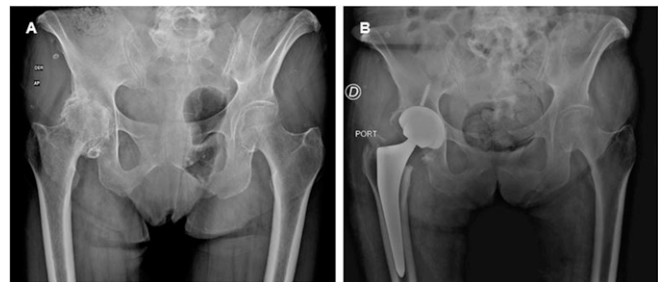


Fig. 1

**Fig. 1-A** Anteroposterior preoperative radiograph of the pelvis demonstrating severe end-stage osteoarthritis. **Fig. 1-B** Postoperative radiograph demonstrating the primary right total hip arthroplasty.

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**Keywords** hip anterior approach; THA; hematoma; iliopsoas; minimally invasive



Fig. 2  
Patient in a supinated position, with the right leg on a special hip-positioning table that allows for controlled internal and external rotation, extension, and adduction of the leg.

### Case Report

A 78-year-old woman was seen as a patient of the senior author, a hip, pelvis, and knee-certified surgeon. She presented with right hip end-stage osteoarthritis diagnosed based on limited range of motion, increased pain and stiffness when walking and standing up, and hip changes through a simple pelvis x-ray (Fig. 1-A); she had no history of other diseases or symptoms and had normal weight (body mass index 21). After a year of non-operative management of her hip, including anti-inflammatory drugs, and after a careful preoperative evaluation, including normal blood and coagulation tests, the patient elected to proceed with THA.

According to the preference of the senior author, an MDAA was used, with the patient in a supinated position, with the right leg on a special hip-positioning table (Anterior Minimally Invasive Surgery Table, Medacta International) that allows for controlled internal and external rotation, extension, and adduction of the leg (Fig. 2). No difficulties were encountered during the surgery, nor with hip dislocation or relocation of the implant. A minimal incision was used, requiring robust external rotation of the femur to 130° during femoral stem broaching and placement (Figs. 3-A and 3-B). Press-fit femoral Quadra-H No. 6

Standard and press-fit acetabular 52-mm Versafitcup components (Medacta International) with a single acetabular screw were used (Fig. 1-B). Ten hours after surgery, the patient started walking using a walker, referring mild pain on the incision site, and according to the thromboembolic prophylaxis therapy guidelines<sup>7</sup>, 40 mg subcutaneous enoxaparin was initiated 12 hours postoperatively. A postoperative blood test showed a decrease of 1.4 g/dL of hemoglobin (hemoglobin: 13.5-12.1 g/dL; hematocrit: 29.6%) and normal coagulation (prothrombin time: 12.35 seconds; international normalized ratio: 1.0 and 180,000 platelets). She continued to have 4 physiotherapy sessions during her hospital stay and was discharged with minimal pain on the right thigh on the second postoperative day, walking with full support of the right pelvic limb, and continued daily anticoagulation therapy based on 40 mg enoxaparin, according to the previously mentioned guidelines. The patient's immediate postoperative period at home was uneventful; she continued to use a walker and received 2 physiotherapy sessions, still referring pain on the right thigh and lower back; however, 10 days later, she was admitted to the emergency department with an acute decline in mobility, severe lower back and right hip pain, and a loss of strength in the right pelvic limb.

Physical examination revealed decreased strength of the quadriceps muscle, pain on palpation of the scar area, ischial tuberosity, the iliotibial band and the adductor muscles, passive mobility arches of the hip with 90° flexion and 20° abduction with pain referred to the hip and lower back; sensitivity was preserved, and no clinical or radiographic evidence of hip prosthetic dislocation. During this hospitalization, an antero-posterior pelvic radiograph and a venous Doppler were obtained, which ruled out thrombosis and prosthetic hip dislocation, but an abdominal and pelvic computed tomography scan demonstrated a retro pelvic mass in the psoas muscle. Later, a magnetic resonance image of the lower abdomen and pelvic area revealed a right retroperitoneal hematoma surrounding the iliopsoas muscle with extension to the right pelvic limb (Figs. 4 and 5).

The patient was kept under close medical supervision with conservative treatment, suspending anticoagulant treatment during hospitalization, monitoring worsening of symptoms (pain and quadriceps strength), the size of the hematoma

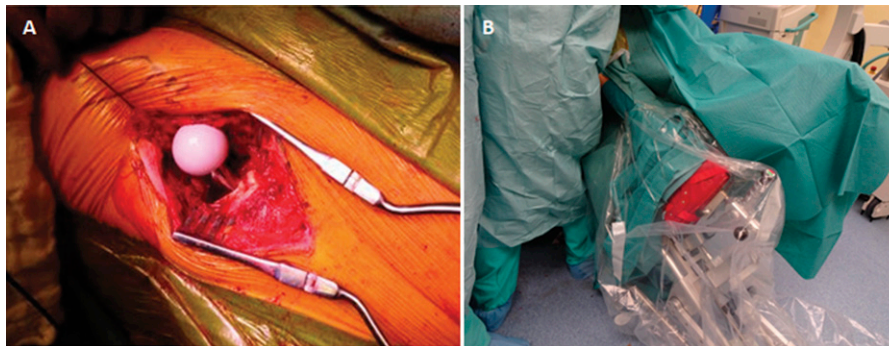


Fig. 3  
Transoperative images showing a minimally invasive anterior approach, (Fig. 3-A) femoral stem and definite ceramic head in place (Fig. 3-B) with a 130° rotation exposure given by the special hip-positioning table.

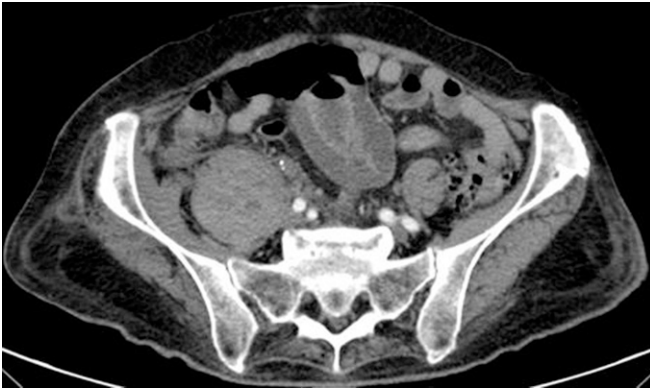


Fig. 4  
Simple abdominal computed tomography axial section showing the marked difference in diameters of both psoas secondary to a hematoma of the right muscle.

with magnetic resonance, and hemodynamic monitoring. During this hospitalization, a blood test showed anemia (hemoglobin: 9.8-8.6 g/dL; hematocrit: 29.6%) and normal coagulation 24 hours after enoxaparin has been discontinued (prothrombin time: 12.25 seconds; international normalized ratio: 1.1 and 161,000 platelets). Without presenting clinical symptoms at any time that warranted blood transfusion or hemodynamic instability, she was discharged home after 4 days, with the intensity of her hip and lower back discomfort reduced, as well as enhanced strength of the knee and hip flexion and the capacity to walk 300 feet without pain. At the most recent follow-up, 1 year after surgery, the patient reported complete symptom relief and hip range of motion. She has had no hip dislocations, symptoms, or radiographic evidence of implant loosening.

### Discussion

Iliopsoas hematoma is a rare condition that can have serious repercussions if left undetected and untreated. The recognition and treatment of an iliopsoas hematoma after THA through a minimally invasive MDAA has not yet been reported. This complication is worth discussing because it can be caused or aggravated by muscle and leg manipulation with the special surgical table and the anticoagulant drugs required for postoperative thromboprophylaxis. The literature shows that anticoagulant therapy alone can generate a retroperitoneal spontaneous hematoma, but in the presence of a definite muscle trauma antecedent (traction, retraction, and rotation of the psoas muscle), the latter is more important<sup>8,9</sup>.

Current evidence is unclear about which prophylactic strategy (strategies) is (are) optimal or suboptimal against venous thromboembolism. The use of a multimodal protocol, including early mobilization, mechanical prophylaxis, and chemoprophylaxis, as prescribed in all our patients undergoing arthroplasty, is widely accepted<sup>7</sup>. After this incident, shifting our chemoprophylaxis from subcutaneous enoxaparin to oral agents, such as aspirin or apixaban, seems a safer strategy.

Intraoperative hip dislocation and femoral stem placement during arthroplasty using a modified anterior approach

are accomplished using traction and external rotation, in this case, using a special surgical table. Significant rotational and traction vectors are unintentionally placed into the hip tendons, potentially inducing or aggravating muscle and tendon lesions, as was the situation in this case<sup>10,11</sup>. After this incident, we avoid femoral external rotation  $>120^\circ$  and gross traction.

Furthermore, less invasive incisions necessitate more effort to combat soft tissues during the surgery. Larger incisions could lower rotational forces transferred through the hip and the risk of tendon and muscle injury. Similarly, using an alternative method, such as traction without the use of a special table, may put less strain on hip muscles and tendons.

The presence of coagulopathies (most notably hemophilia A), the use of anticoagulants, and traumatic events in the region (direct trauma, falls, and surgery), particularly in the elderly, are the major risk factors for an iliopsoas hematoma<sup>12-14</sup>. The most important symptoms are the gradual onset of pain in the iliac fossa on the affected side that may or may not radiate to the pelvic limb, a positive psoas sign (reflex flexion of the hip when extending it because of iliopsoas irritation), and the presence of femoral nerve palsy (paresthesias in the anterior region of the thigh, knee flexion weakness, and the absence of patellar reflex) caused by its compression because it passes through the iliopsoas compartment, and in more severe cases, evidence of acute abdomen and hemodynamic instability. The classic Wunderlich triad for a retroperitoneal hematoma (lower back pain, flank mass, and hypovolemia) is present in less than 20% of the cases, which makes the initial diagnosis difficult<sup>15-17</sup>.



Fig. 5  
Simple magnetic resonance coronal section of the lumbar spine in T2 sequence showing an increase in volume and hyperintensity of the right psoas at the level of L5-S1.



Treatment for retroperitoneal hematomas ranges from drainage of the hematoma to monitoring of the neurological injury. If radiological examinations do not clearly show the existence of active bleeding or hematoma compressing the femoral nerve, nonsurgical treatment is indicated unless the symptoms worsen. However, urgent surgical decompression is strongly advised in patients developing neurological deficits because delays in the surgical evacuation of hematoma and femoral nerve decompression can result in lifelong disability. Nonetheless, the natural evolution of the injury is spontaneous resolution<sup>9,18,19</sup>.

### Conclusion

In general, iliopsoas hematoma, even if it is a rare condition, should be regarded as a cause of acute postoperative pain and femoral nerve palsy in patients who underwent THA using an anterior approach, considering the external rotation and gross

traction the approach requires, especially if treated with heparin or other anticoagulant drugs that may have a higher chance of bleeding and bleeding-associated complications. The described case has significant clinical relevance because this incident is to be added to the list of complications that should be recognized by the orthopaedic surgeon who performs the anterior hip approach. ■

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