

## Infected Pseudotumor after a Metal-On-Polyethylene Total Hip Arthroplasty: Case Report

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### Abstract

### Case Report

Pseudotumors are an uncommon complication after a total hip arthroplasty. Although commonly associated with metal-on-metal implants, this complication can occur on other surface bearings. Clinical presentation is often unspecific, and a neoplastic or infectious origin must be ruled out. Here we describe a late presentation of an extensive, destructive granulomatous pseudotumor in a metal-on-polyethylene bearing that overinfected after a urinary tract infection.

**Keywords:** Pseudotumor, hip pseudotumor, infection, overinfection, metal-on-polyethylene, hip revision, complications.

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## INTRODUCTION

Pseudotumor following total hip arthroplasty is a well-known complication, mostly associated with the metal-on-metal bearings, but can also occur on a polyethylene-on-metal, ceramic-on-metal or even ceramic-on-ceramic bearing [1-4]. A pseudotumor is a non-neoplastic, non-infectious, periprosthetic soft tissue reaction causing a granulomatous mass or destructive cystic lesion [2, 5, 6]. Most of the diagnosed pseudotumors are asymptomatic and are an incidental finding during follow up [7, 8]. When symptomatic, hip discomfort, groin pain, antalgic gait, paresthesia, or pain due to loosening / instability of the components are the main complains [1, 7, 9]. The clinical presentation can mimic an infection or a malignant tumor, and therefore both diagnoses need to be excluded before the definitive diagnose is made [10-12]. Due to the extensive local tissue destruction, its complete excision can be difficult as well as the subsequent revision procedure [1, 7, 9, 11, 13].

## CASE REPORT

A 70-year-old male patient was observed in the emergency department due to a significant palpable mass on his left hip. He had a total hip arthroplasty replacement 14 year ago due to coxarthrosis. The patient denied previous complications, any fall or trauma, fever or other symptoms apart from the palpable mass. The X-ray, revealed a well-positioned,

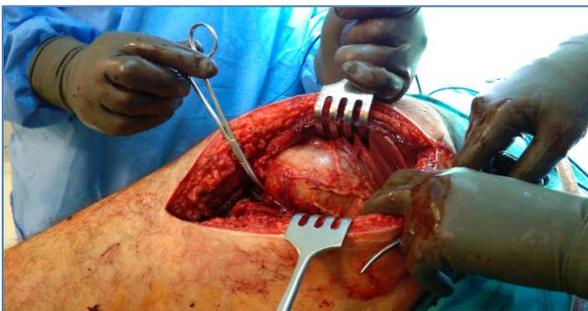
integrated prosthesis, with only a small femoral neck dent as the unique finding; the CT scan revealed 3 large liquid filled collections, with well demarked walls, the biggest with 24 x 8.7 cm, which origin was interpreted as a non-recent hematic collection (Fig. 1).



Fig-1: Initial evaluation with X-ray and CT Scan

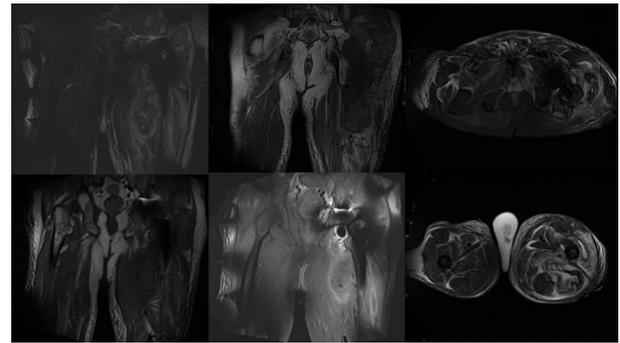
His blood tests were normal. Since he was clinically stable and had no other symptoms, he was

sent to the outpatient clinic for further studies, and an MRI scan was requested. During this period, the patient came back to the emergency department in a septic shock and was clinically unstable. Clinical history revealed a urinary tract infection 3 weeks before, treated with fosfomycin. He had a temperature of 38.9 °C, his leukocyte cell count was  $21.7 \times 10^9/L$  and CPR 23.98 mg/dL. Without any other apparent infection sites, an overinfection of the mass on his left hip was assumed. A needle aspiration was performed and purulent fluid was obtained, thus confirming the source of infection. Since he was clinically unstable, he was taken to the operating room for decompression and cultures. There, an invasive, capsulated mass was found on the lateral and posterolateral side of the femur, involving the tissues with no clear dissection plane to work on (Fig. 2).



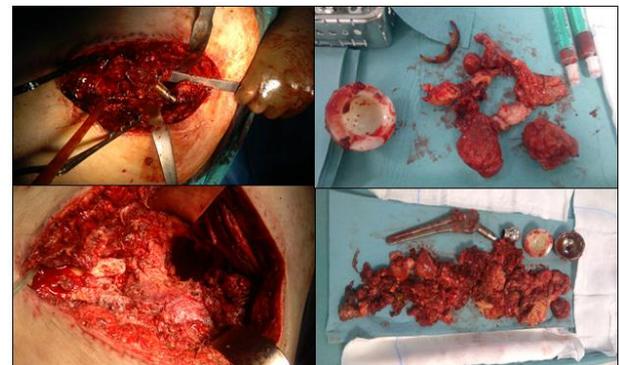
**Fig-2: Intraoperative image of the capsulated mass**

At that time, the definitive diagnosis of the origin of that mass was not made, and therefore, without being able to exclude a neoplastic origin, the surgeon decided for a 2-stage procedure before attempting to remove all the mass. Pus was drained (around 700 cc) and sent for culture, as well as tissue samples for the anatomopathological exam. After the surgery the patient was sent to the intensive care unit for further stabilization and started empiric IV antibiotic therapy with piperacillin-tazobactam and vancomycin. Blood and urine cultures, thoraco-abdominopelvic CT scan and an MRI were requested. The CT scan was negative for any primary / secondary lesions. The MRI showed an “large collection, 340 x 128 x 80 mm, very lobulated, heterogeneous, with hyposignal areas in both T1 and T2. The collection involves the entire articulation, in its anterior, external and posterior aspect and extends distally to the thigh. After contrast, it has peripheral enhancement, indicative of an inflammatory / abscessed collection. There are no suspicious images of expansive lesions. This aspect is compatible with an aggressive granulomatous disease related to the hip prosthesis” (Fig. 3).



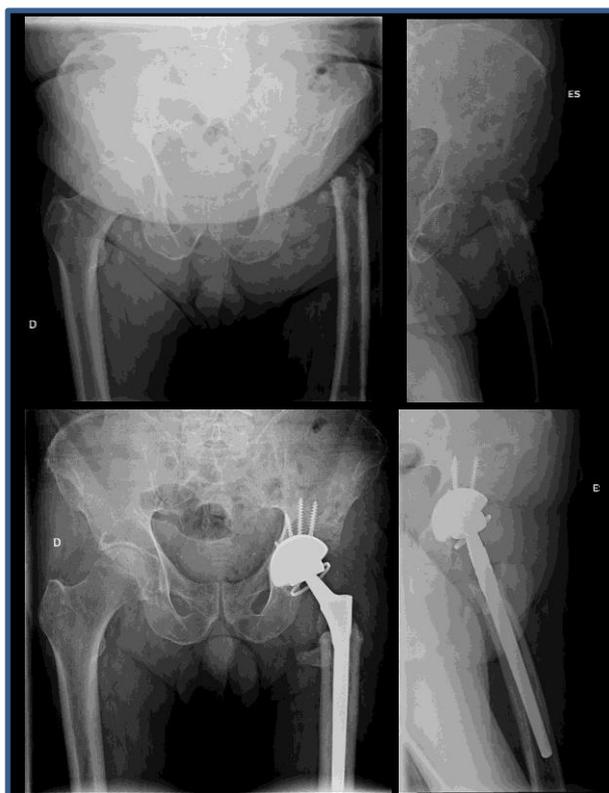
**Fig-3: MRI of the hip**

The blood, urine and pus cultures were all positive to *Escherichia Coli*. The histology evaluation described an “infectious process in a foreign body granulomatous reaction. No neoplastic infiltration was noted.” Having excluded a tumoral origin for the mass, he was submitted to explantation of the prosthesis and all the granulomatous / abscessed tissue (Fig. 4).



**Fig-4: Intraoperative images of the local tissue destruction and the material excised from the hip**

Apart from the small dent in the femoral neck, the polyethylene, acetabular cup and femoral head did not have any other apparent corrosion. New sample tissues were taken and sent for evaluation, which were negative for neoplastic cells, reporting only local inflammatory process and granulomatous reaction. After the procedure, he was treated for 6 weeks with definitive IV antibiotic therapy with ceftazidime, presenting a good response locally and systemically during this period. He was then discharged with negative inflammatory markers and was followed up in the outpatient clinic. After 10 months, with no signs for recurrence, a total hip arthroplasty revision was done through a posterolateral approach. Due to the loss of the greater trochanter and subsequently the abductors, an uncemented constrained cup was used as well as an uncemented diaphyseal stem (Fig. 5).



**Fig-5: Pre and post-operative X-rays of the revision total hip arthroplasty**

There were no immediate postoperative complications. Rehabilitation was done according to a standard hip revision protocol and the patient was discharged home after 5 days. At the latest follow up, he had a painless hip, although presenting with a Trendelenburg gait and a 2 cm dysmetria. He had no signs of recurrence, either of infection or of pseudotumor.

## DISCUSSION

Pseudotumor can occur with any hip implant bearing, and physicians should be aware of that possibility in the follow up after any total hip arthroplasty. Its etiopathology is not yet well understood as neither is its natural history [11, 13-15]. Literature supports that the fluid-filled lesions (cystic type) are usually of less clinical importance, but the solid (mixed type) are associated with a higher probability of clinical symptoms [8, 16, 17]. Nevertheless, both lesions can lead to severe local soft tissue reactions with well documented local destruction, which can lead to extremely complicated surgery options, including the need for a hemipelvectomy [1, 7, 9, 11, 18, 19].

There are published guidelines for metal-on-metal hip arthroplasty follow-up [20], but there is no consensus following other hip arthroplasty bearings neither for the optimal treatment after the diagnosis of a pseudotumor [7, 8, 20]. Even so, there is some trend to perform hip revision surgery when the hip is

symptomatic, there is a large pseudotumor or when the metal ion levels are elevated [7, 9].

We present a case where the long-standing pseudotumor got over-infected after a common urinary tract infection. There are only few cases reported of pseudotumors with superimposed infection, which can lead to further soft tissue damages [12, 21]. In our case, the patient was in septic shock, and an urgent surgery was needed to stabilize him before any further diagnostic studies could have been done.

Intra-operatively this anomalous soft tissue reaction infiltrated everything in its vicinity, both soft tissue and bone, and without clear margins, muscular, tendons and bone were due to be lost during its clearance. As in other pseudotumor cases, extremely careful dissection had to be carried out around main vascular and neurological structures, in order to avoid further iatrogenic lesions.

With the removal of the implants, pseudotumor and all nonviable / infected tissue, followed by proper antibiotic therapy, the patient remained symptom free and no recurrence was noted. While planning to do the reconstruction revision, we had to take into account that the proximal femur was gone, and with it, the gluteal muscular insertion. This required extra attention to the expected instability after revision. A constrained cup was the ideal solution to deal with the abductor insufficiency, and a diaphyseal stem fixation was needed to provide primary and secondary femoral stability. Even with the noticeable Trendelenburg gait, the final result was a painless hip and the patient was pleased with the result.

## CONCLUSION

There are very few cases describing extensive granulomatous pseudotumor associated with a metal-on-polyethylene, and none depicting an over-infection of the pseudotumor on this type of bearing surface. This combination can lead to an extensive destruction of the nearby tissues, and can occur as a late presentation, with minimal symptoms. An implant induced sarcoma or infection must be ruled out before the definitive diagnosis can be made. During the reconstruction procedure special care should be taken to prevent future dislocations due to muscle insufficiency.

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