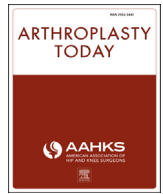




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## Case report

## Inflammatory pseudotumor after ceramic-on-ceramic total hip arthroplasty

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## ABSTRACT

We present a unique case of a symptomatic adverse local tissue reaction in a patient with a ceramic-on-ceramic total hip bearing surface. To our knowledge, this pathological finding has not yet been described in a ceramic-on-ceramic articulation without a cobalt-chromium alloy trunnion or modular neck component as a source of metal wear. We conclude that despite its mechanical mostly benign wear characteristics, ceramic wear debris is not entirely inert and may lead to the development of adverse local tissue reaction.

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## Introduction

Development of adverse local tissue reaction (ALTR) after contemporary total hip arthroplasty (THA) is uncommon outside of cobalt-chromium alloy articulations, but it remains significant complication. The term is used to describe a granulomatous or destructive cystic lesion which develops around a THA, and may have a pathologic appearance of predominantly granulomatous findings if the cause is particulate debris or necrosis [1], inflammatory exudate, and lymphocytes if the etiology is related to metal and/or corrosion debris [2]. The development of ALTR and pseudotumor formation is often related to patient discomfort and pain as the reaction causes not only a soft tissue mass, but also osteolysis, bone erosion, and significant damage to periarticular soft tissues, which can lead to total joint failure and instability.

It is well documented in the orthopaedic literature that ALTR may develop around metal-on-polyethylene implants due to taper corrosion [1,3,4] and more commonly, around metal-on-metal (MoM) bearing surfaces in THA [5–8]. There have been a few case reports of ALTR associated with ceramic-on-polyethylene implants, but they attributed to corrosion at the modular metal neck [9] or from metal debris from the porous coating of the stem [10]. There is no reported case to our knowledge of a pseudotumor related to a ceramic-on-ceramic (CoC) THA. The purpose of this study was to present a unique case of a pseudotumor in a CoC THA.

## Case history

In 2005, a 48-year-old woman underwent a left THA for idiopathic osteonecrosis of the femoral head. Given the patient's young age, the treating surgeon selected a cementless arthroplasty with a CoC articulation. The patient received a Stryker Trident (Stryker, Kalamazoo, MI) titanium acetabular component with a modular 32 mm alumina ceramic liner and 32 mm plus 0 alumina ceramic head. One titanium screw was placed for additional fixation of the cup. The ceramic liner is backed with a titanium alloy that is press fit into the titanium acetabular cup. The femoral component placed was a Stryker Secur-Fit HA (Stryker, Kalamazoo, MI) size 6 stem. This is a titanium stem with a hydroxyapatite proximal coating. The patient's post-operative

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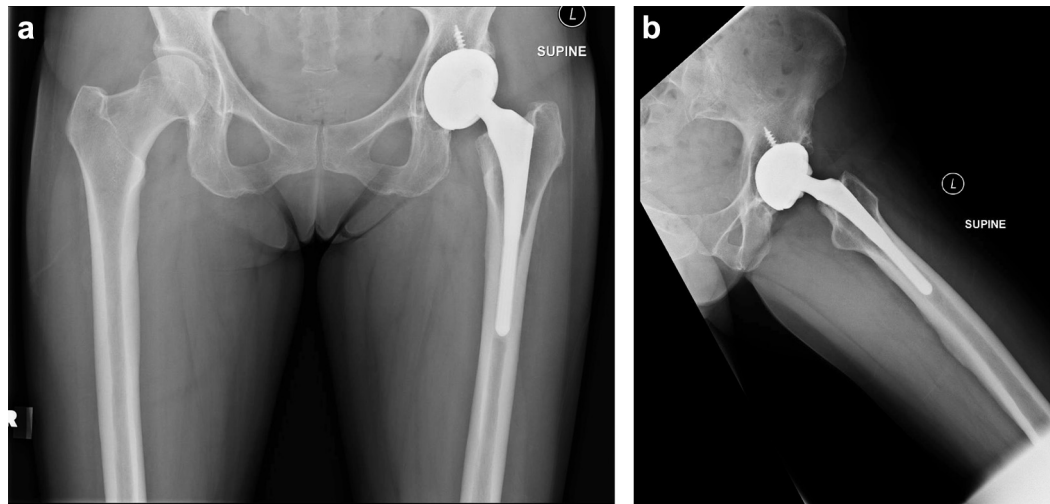
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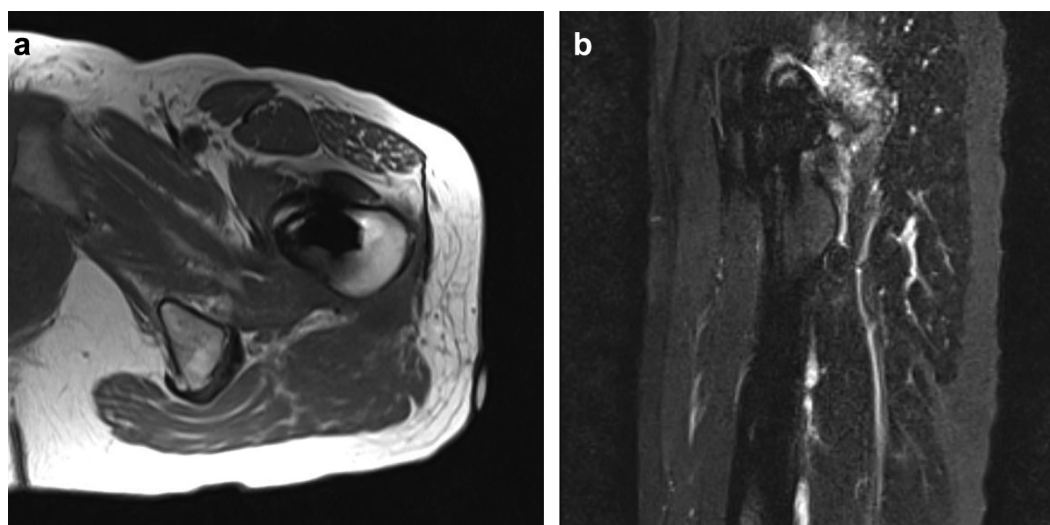
**Figure 1.** Anteroposterior (AP) pelvis (a) and frog lateral (b) left hip at presentation showing no evidence of loosening, osteolysis, or apparent complication.

course was unremarkable, and reportedly without infectious complications. Postoperative radiographs showed both components were in acceptable position; however, with a cup abduction of 52°–55° as measured in an anteroposterior pelvis obtained in the supine position.

In January of 2014, then 54 years old, the patient presented for evaluation of a painful total hip. Medical history was significant for peptic ulcer disease, uterine fibroids, and prior episode of viral meningitis due to herpes zoster infection. She denied excessive alcohol use or exposure to steroids. Recent autoimmune workup was negative for any inflammatory conditions. She reported a feeling of “grinding” since implantation, and progressive discomfort and “fullness” since the time of implantation. Current radiographs when compared with immediate postoperative radiographs did not show any evidence of loosening or migration (Fig. 1). Physical examination revealed full extension with flexion of the hip to 110°, with a painful flexion arc beyond 60°. Patient was able to externally rotate to 30°, and internally rotate to 15° at 90° of flexion. A metal artifact reduction protocol magnetic resonance imaging showed a 5.3 × 4.4 × 2.4 cm heterogeneous fluid collection

consistent with the appearance of a pseudotumor (Fig. 2). Blood tests showed a white blood cell count of 7.3, a normal differential, and otherwise were within normal limits. Chromium and cobalt levels were obtained, both were found to be normal at 0.2 and 0.2 ppb, respectively. Erythrocyte sedimentation rate and C-reactive protein were within normal limits. The patient denied constitutional symptoms and the wound showed no erythema, swelling, or drainage. The patient was followed up clinically for 10 months without improvement of her symptoms despite physical therapy and anti-inflammatory medications. After discussion of risks of the procedure, the patient elected to have the CoC articulation revised.

A pseudotumor was found measuring 5 × 4 × 3 cm protruding from the joint space just inferior to the repaired piriformis tendon (Fig. 3). It contained caseous appearing material (Fig. 4), which was aspirated and sent for pathology. The stalk of the pseudotumor was then tied off and sent for pathology (Fig. 5). Cultures were obtained at the time of revision, including fungal and acid fast cultures, all of which returned as negative. No abnormal markings or discoloration were present on femoral head before initial dislocation; however, during the dislocation metal transfer from the acetabular cup did



**Figure 2.** Axial T2 (a) and sagittal short tau inversion recovery (STIR) sequence (b) magnetic resonance imaging (MRI) showing pseudotumor formation with communication with the hip.

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