

Osteonecrosis of acetabulum following total hip arthroplasty; a case report and literature review

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Introduction

Osteonecrosis of bone, a complex process of bone resorption and formation, is characterized by necrosis of bone cells¹. There are numerous etiologies and risk factors nominated for this situation. Vascular interruption, thrombotic occlusion, and extravascular compression lead to decreased blood flow, and the reason will be avascular necrosis (AVN) of bone¹. Intracapsular or extracapsular hip fractures, hip dislocations, sickle cell anemia, coagulation factor anomalies, corticosteroids, alcohol, pregnancy, radiation, bone marrow transplant, Hyperlipidemia, hyperuricemia, pancreatitis, leukemia or lymphoma, hypertriglyceridemia, and dysbaric situation are the risk factors of AVN¹⁻⁶. The incidence of AVN in the general population is uncertain and was not assessed well in risk groups⁷.

Although osteonecrosis of the femoral head (ONFH) has been studied, the literature is so far sparse on osteonecrosis of the acetabulum (ONA). Here, we aim to report on a case of ONA.

Case presentation

A 35-year-old female was referred to our center with right groin pain. She had undergone total hip arthroplasty (THA) four years ago due to ONFH following pregnancy. She had no history of fever and trauma. She received a high dose of corticosteroid following Covid-19 infection. The passive right hip range of motion was near full, although painful at extremes of movement. She had a painful weight-bearing with an antalgic gait. The neurologic examination was good, and no sign or symptom suggestive of spinal radiculopathy. The late-onset pain, the location, history, and examination grew us suspicious of a low-grade peri-prosthetic joint infection (PJI).

Her radiographs demonstrated a severe right acetabular sclerosis, and a radiolucent line around the acetabular component suggestive of loosening of the acetabular component (Figure 1).

Her ESR was 16, and her CRP was 14. 99m-Tc bone scan revealed mild hyper-flow at the right hip in angiography and blood pool images, and intense uptake in delayed images. Due to the unavailability of metal artifact reduction sequence (MARS) magnetic resonance imaging (MRI), in our center, it had not been done. In the next step, hip aspiration took place for her, which was negative for PJI.

So, we decided to do two-staged arthroplasty. After the acetabular component removal, we faced severe sclerosis of acetabulum, which was avascular. Several specimens were assembled for microbiology culture to assess peri-prosthetic joint infection (PJI) due to high suspicion, and pathology. A Cement spacer was also implanted. Post-op CT scan was done to evaluate the acetabulum also confirmed sclerosis (Figure 2).

The cultures were negative for PJI, and pathology confirmed the ONA (Figure 3).

After two weeks of antibiotic therapy the second stage was done. Acetabular reaming was associated with a lack of bleeding. Since, we decided to implant a cemented cup for her in that situation, by ONA diagnosis

due to inappropriate bone ingrowth.

At one year postoperatively, the patient returned for a follow-up visit, and Radiographs were obtained at this time for routine monitoring (Figure 4). She had no complaints and her Harris hip score was 81.

Discussion

Although osteonecrosis of the femoral head had been discussed, ONA remained out of attention. There are few reports of ONA in the literature, and had not been discussed as well. This phenomenon may lead to the aseptic loosening of the acetabular component; however the primary involvement had been reported.

Painful hip arthroplasty is well discussed, and many causes have been nominated⁸. Infection, loosening, instability, impingement, synovitis, bursitis, tendonitis, heterotopic ossification, stress fracture, and distant causes other than peri-articular such as vascular claudication, are the causes mentioned⁸. However, the ONA is not mentioned. Nuclear imaging is helpful in diagnosing PJI and loosening, but it can be positive in the acetabulum even in asymptomatic patients up to two years⁸. Sclerosis on plain radiographs, and high uptake on bone scan can be suggestive of osteonecrosis⁹. The intraoperative finding (avascularity of acetabulum) confirmed the diagnosis. To our knowledge, this is the first report of ONA after THA.

One of the important predictors of ONA is irradiation^{10–14}. Rheumatoid arthritis and corticosteroids are the other risk factors^{6,15–17}. Eray et al.¹⁸ reported a case of renal implantation who received corticosteroid and immunosuppressive treatment that showed right acetabulum osteonecrosis. Fink et al.¹⁹ reported four cases of ONA, and concluded that, this may be an accompaniment to ONFH. Albright et al.²⁰ reported two cases of ONA not associated with radiotherapy. One of them had no risk factor, and another was an alcoholic with excessive doses of prednisolone usage. Chou et al.¹⁵ reported a case of ONA with a history of acute lymphoblastic leukemia and corticosteroid use. They used an impaction bone graft as well as total hip arthroplasty for the management of this patient.

As many risk factors are discussed, but there are two reports of ONA following hip arthroplasty. Kobayashi et al.²¹ reported an aseptic osteonecrosis of the acetabulum following the Austin-Moore hip prosthesis replacement. Mersch and Lenz²² reported a case of the acetabular necrosis after hemiarthroplasty.

Here, in our study, we report on a case of osteonecrosis of the acetabulum following THA. The ONA can be classified as a cause of painful THA, and aseptic loosening of acetabular component. In this case we revised acetabular component with a cemented cup, due to inappropriate bone ingrowth.

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Figure legends

Figure Pre operative X-ray shows sclerosis at acetabulum

Figure Sclerosis confirmed by computed tomography

Figure osteonecrosis of acetabulum confirmed by pathology report.

Figure Post operative X-ray



