

## CASE REPORT

# Osteonecrosis of acetabulum following total hip arthroplasty: A case report and literature review

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**Key Clinical Message**

Despite being rare, we have presented a case of osteonecrosis of acetabulum that followed total hip arthroplasty. It's crucial to act appropriately, as it emulates periprosthetic joint infection. The key point is that the osteonecrosis of acetabulum may necessitate revision and can be classified as aseptic loosening.

**Abstract**

Osteonecrosis of the femoral head is well known and managed with total hip arthroplasty (THA). Acetabulum osteonecrosis can be classified as a cause of painful THA and the cemented acetabular component is a feasible option. However, it seems that the osteonecrosis of acetabulum is sparsely alluded in literature. In this case report sustaining of the right hip pain following THA of 35-year-old woman is discussed.

**KEYWORDS**

acetabulum, avascular necrosis, hip prosthesis, osteonecrosis

## 1 | INTRODUCTION

Osteonecrosis of bone, a complex process of bone resorption and formation, is characterized by necrosis of bone cells.<sup>1</sup> There are numerous etiologies and risk factors nominated for such process. Vascular interruption, thrombotic occlusion, and extravascular compression lead to decrease of blood flow which leads to the avascular necrosis of bone.<sup>1</sup> The risk factors of osteonecrosis of the femoral head (ONFH) are included intra and extracapsular hip fractures, hip dislocations, sickle cell anemia, coagulation factor anomalies, applications of corticosteroids, alcohol consumption, pregnancy, radiation, bone marrow transplantation, hyperlipidemia, hyperuricemia, pancreatitis, leukemia, lymphoma, hypertriglyceridemia, and dysbarism.<sup>1-6</sup> The incidence of ONFH in general

population is uncertain and is not assessed well in the risk groups.<sup>7</sup>

Although ONFH is studied in some cases, the literature is far sparse on osteonecrosis of the acetabulum (ONA). In the present case report the ONA of a 35-years-old patient is discussed.

## 2 | CASE HISTORY AND EXAMINATION

A 35-year-old female was referred to our center suffering from right groin pain. She was undergone total hip arthroplasty (THA) due to ONFH following pregnancy 4 years ago. She had no history of fever and trauma. The patient claimed that she received a high dose of corticosteroid

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following Covid-19 infection. The passive right hip range of motion of her was near full, but painful at the extreme movement. In addition, the patient claimed that she suffered from a painful weight-bearing having an antalgic gait. The neurologic examination was normal with no sign or symptom suggestive of spinal radiculopathy.

### 3 | METHODS (DIFFERENTIAL DIAGNOSIS, INVESTIGATION, AND TREATMENT)

The late-onset pain, location, history, and examination of the patient were some clues of a low-grade peri-prosthetic joint infection (PJI). The patient radiographs demonstrated that she is suffering from a severe right acetabular sclerosis, in addition, the radiolucent line around the acetabular component was suggestive of loosening of the acetabular component (Figure 1).

The level of erythrocyte sedimentation rate and C-reactive protein was found to be 14 and 16, respectively. The <sup>99m</sup>Tc bone scan indicated that the patient has a mild hyper-flow at the right hip in angiography and blood pool phases, followed by intense uptake in the delayed phase imaging. Metal artifact reduction sequence (MARS) magnetic resonance imaging was not done because of unavailability of this instrument in the hospital. Also, the hip aspiration of the patient showed a negative result for PJI.

The overall finding suggested that the patient should undergo to two-staged arthroplasty. Severe avascular sclerosis of acetabulum was found after the acetabular component removal. Several specimens were assembled for microbiology culture to assess PJI and pathology assessment. A Cement spacer was also implanted and

post-operation CT scan was done to evaluate the acetabulum, confirming the presence of sclerosis (Figure 2).

The cultures were found to be negative for PJI, while pathology findings confirmed the presence of ONA (Figure 3).

The second stage of the treatment was done after 2 weeks of antibiotic therapy, including acetabular reaming which associated with a lack of bleeding and due to inappropriate bone ingrowth and ONA diagnosis the implantation of a cemented cup was performed.

### 4 | OUTCOME AND FOLLOW-UP

The patient returned to the hospital for a follow-up and radiography for routine monitoring after 1 year (Figure 4).



FIGURE 2 Sclerosis confirmed by computed tomography by demarcated area.



FIGURE 1 Preoperative X-ray shows sclerosis at acetabulum as shown by demarcated area.

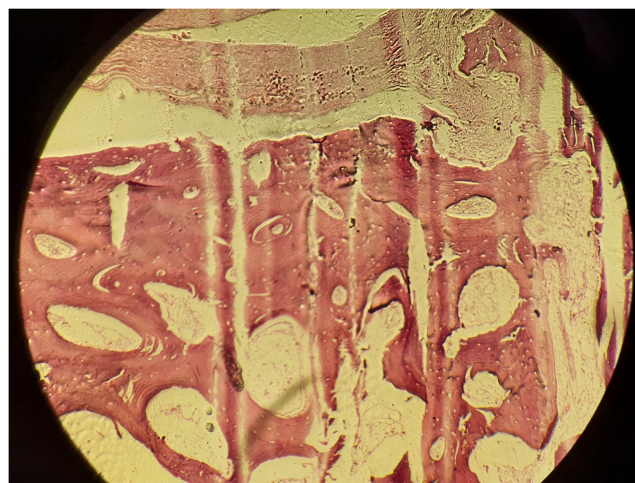


FIGURE 3 The osteonecrosis of acetabulum confirmed by pathology report.



**FIGURE 4** Postoperative X-ray with cemented acetabulum component.

In addition, she did not complain for any pain, the surgery team checked the Harris hip score (HHS) to be 81.

## 5 | DISCUSSION

Although ONFH was subjected to broad discussion in the literature but ONA remained out of attention. Acetabular osteonecrosis could be associated with aseptic loosening of the acetabular component; however, the primary involvement has been also reported.

Painful hip arthroplasty is well discussed in the literature with many related causes, including infection, loosening, instability, impingement, synovitis, bursitis, tendonitis, heterotopic ossification, stress fracture.<sup>8</sup> In addition, some non-peri-articular causes such as vascular claudication have been subjected to review, but ONA relation for causing the pain was not subjected to broad discussion. Nuclear imaging is helpful in diagnosing PJI and loosening, but in such scanning a positive imaging in the acetabulum could be even shown in asymptomatic patients up to 2 years.<sup>8</sup> Sclerosis on plain radiographs, and high uptake on bone scan could be suggestive for osteonecrosis.<sup>9</sup> The intraoperative finding (a vascularity of acetabulum) confirmed the diagnosis of ONA which, to best of our knowledge, it is the first report of ONA following THA.

The irradiation, rheumatoid arthritis and corticosteroids are considered as important predictors of ONA.<sup>6,10-17</sup> Eray, et al.<sup>18</sup> reported a case of renal

implantation which received corticosteroid and immunosuppressive treatment, showing right acetabulum osteonecrosis. Fink, et al.<sup>19</sup> reported four cases of ONA, concluding that it may be an accompaniment to ONFH. Albright, et al.<sup>20</sup> discussed two similar cases which were not associated with radiotherapy, one of which did not have any risk factor, and the other was due to consumption of alcohol and taking excessive doses of prednisolone. Chou, et al.<sup>15</sup> reported another case having a history of acute lymphoblastic leukemia and consumption of corticosteroid. In the study, an impaction bone graft as well as total hip arthroplasty for the management of the related case were used.

Although many risk factors are discussed in the literatures, but there are only two reports presented for ONA following hip arthroplasty. Kobayashi, et al.<sup>21</sup> reported an aseptic osteonecrosis of the acetabulum following the Austin-Moore hip prosthesis replacement, and Mersch and Lenz<sup>22</sup> studied a case of the acetabular necrosis after hemi-arthroplasty.

## 6 | CONCLUSION

In the present study, a case of osteonecrosis of the acetabulum following THA is reported. The findings revealed that the ONA could be classified as a cause of painful THA and aseptic loosening of acetabular component, also acetabular component revised with a cemented cup, due to inappropriate bone ingrown in the study case.

### AUTHOR CONTRIBUTIONS

**Reza Zandi:** Conceptualization; data curation; resources. **Shahin Talebi:** Investigation; methodology. **Saeed Nodehi:** Visualization. **Akbar Ehsani:** Writing – original draft; writing – review and editing.

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### CONFLICT OF INTEREST STATEMENT

The authors have no competing interests to declare that are relevant to the content of this article.

### DATA AVAILABILITY STATEMENT

The datasets analyzed during the current study are available from the corresponding author on reasonable request.

## ETHICS STATEMENT

Ethical approval granted from the Shahid Beheshti University of Medical Science Ethics Committee.

## CONSENT

Written informed consent was obtained from the patient for publication of her anonymized information in this article.

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