

Septic Arthritis of the Hip Following Closed Acetabulum Fracture Treated Conservatively: A Case Report

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Abstract: Nowadays, fractures of the acetabulum associated with low energy trauma are common in older adults. The indication for surgical or conservative treatment depends on multiple factors, such as patient age and comorbidities, type and location of the fracture, and socioeconomic environment. Regardless of the treatment chosen, none is free of complications. A patient with a conservatively treated acetabular fracture that resulted in septic arthritis of the quadrilateral joint is described below.

Keywords: Acetabulum; Hematoma; Infectious arthritis

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1. Key concepts

1.1. What is known about the subject

It is uncommon to develop septic hip arthritis after a conservatively treated closed acetabulum fracture. Infections are more likely after an open fracture than after a closed fracture. Although there are reports of arthritis following hip fracture, the literature following acetabular fracture is sparse.

1.2. What this work contributes

When an infectious condition in the event of a torpid evolution of a hematoma is suspected, such as erythema, pain, increase in local temperature, aggressive surgical toileting should be performed, and correct cultures with corresponding antibiograms are essential for adequate antibiotic treatment.

Septic arthritis of any joint is a serious condition, with a significant increase in morbidity and mortality. Failure to detect such conditions early can lead to catastrophic consequences for the joint involved and the patient's life. In general, infection following an open fracture is more common than a closed fracture, and the latter is presented in this case study. We consider the rare presentation of this case to be important, because its rapid diagnosis and aggressive treatment is fundamental to therapeutic success.

2. Introduction

The incidence of acetabular fractures has increased 2.4-fold in those over 60 years of age in recent decades ^[1], and their annual mortality varies between 8% and 25% ^[2]. The treatment of these fractures depends on numerous factors, such as the type and location of fracture, the duration of fracture, and the general

condition of the patient. Both open reduction and internal fixation and total hip arthroplasty are valid options for surgical treatment ^[3]. However, the possibility of conservative treatment has been proposed for elderly patients with numerous comorbidities or poor general condition ^[4]. The development of a joint infection following conservative treatment of an acetabular fracture is an extremely rare complication. We present here a patient who developed an infected hematoma at her hip after conservative treatment of a closed, non-displaced acetabular fracture, which led to septic arthritis of the coxofemoral joint.

3. Case report

A 73-year-old woman, with no relevant medical history, consulted our emergency department for left coxalgia and inability to bear weight, which had persisted for 20 days. Anteroposterior radiograph of the pelvis (**Figure 1**) and computed axial tomography showed a fracture of the left acetabulum. Using the algorithm described by Mauffrey ^[5], the fracture was classified as a combined anterior column and posterior hemitransverse pattern, according to Judet and Letournel ^[6]. As the fracture had persisted for 20 days and did not have a displacement of more than 2 mm, conservative treatment was the primary option.



Figure 1. Anteroposterior (AP) X-ray of the pelvis showing fracture of the left acetabulum

Two weeks later, he presented with pain at the level of his left hip associated with oedema and local erythema (**Figure 2**). Laboratory tests showed increased inflammatory parameters (White blood cells [WBC]: 20125, C-reactive protein [CRP]: 405 mg/L, and ESD: 65 mm). A CT-angiography showed a 70 x 50 mm collection in his left thigh (**Figure 3A, B and C**), so surgical toileting was performed, and abundant purulent material was obtained. *Staphylococcus aureus* was isolated from the cultures obtained from the surgery. The patient was treated with oral antibiotics – cefazolin for 2 weeks.



Figure 2. Soft tissue involvement of the supero-lateral aspect of the left thigh

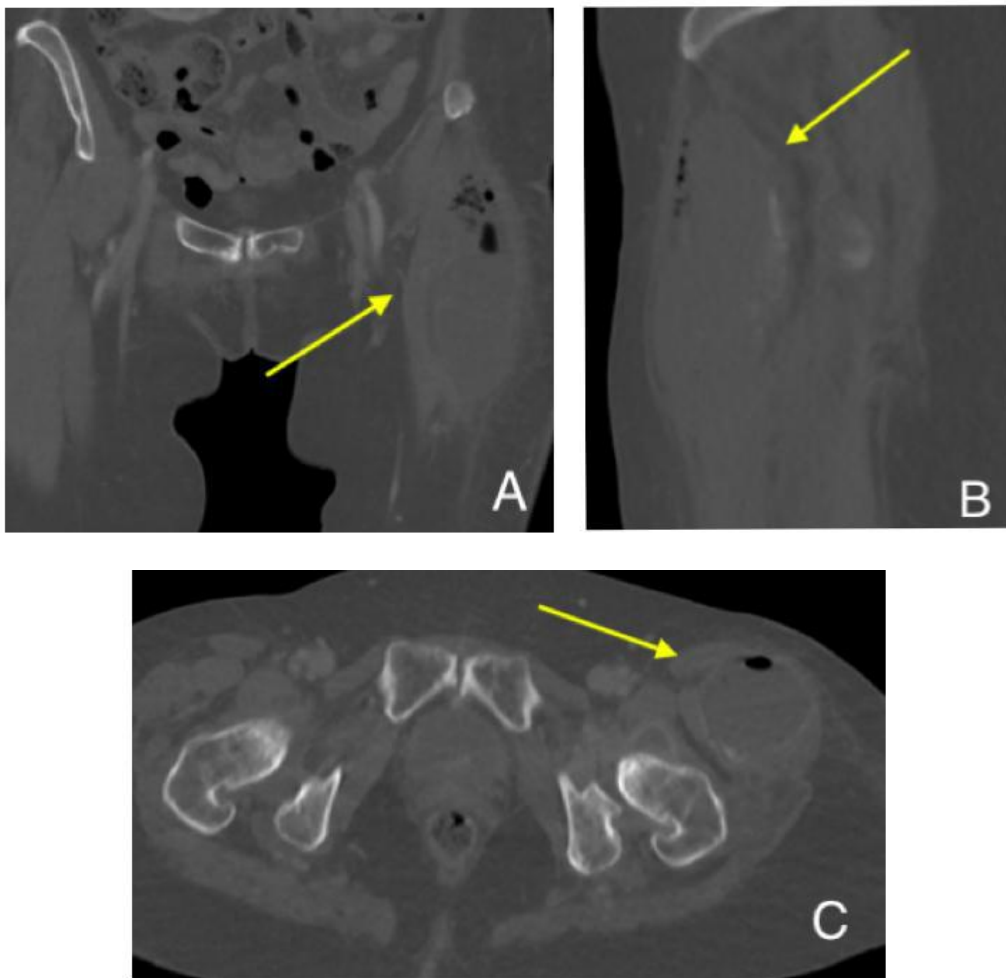


Figure 3. CT scan showing soft tissue collection at the level of the left hip. (A) Coronal, (B) sagittal, and (C) axial slices

At the 45-day follow-up, the patient reported episodes of fever. A new pelvis X-ray showed large erosive changes at the level of the left coxofemoral joint (**Figure 4**).



Figure 4. AP X-ray of the pelvis showing erosive changes at the level of the left coxofemoral joint

A new CT scan showed persistence of the collection at the same level, so a sample of the collection was extracted, and *Staphylococcus aureus* was isolated again. Due to the persistence of the infection, resection arthroplasty (Girdlestone) was performed, along with placement of an antibiotic-loaded cement spacer (**Figure 5**). The patient underwent antibiotic treatment, which was intravenous ceftriaxone and oral rifampicin for 65 days.



Figure 5: AP radiograph of pelvis with cement spacer in left hip

After an improvement was seen in the inflammatory laboratory parameters, with considerable decreases in CRP and ESD, a hybrid left total hip arthroplasty (THA) was performed. A 56 mm uncemented tantalum cup was inserted due to Paprosky type IIC acetabular bone defect [7], with a 36 mm polyethylene insert, a 36 mm + 0 metal head, and a size 0 vancomycin cemented stem (**Figure 6**).



Figure 6. AP X-ray of the pelvis showing left CTA

Sample cultures taken at the last procedure were tested negative. The patient completed another 30-day antibiotic treatment with ceftriaxone and rifampicin and showed good postoperative progress. At the annual follow-up, the patient was asymptomatic and was able to ambulate without assistance, with a Harris score of 80.

4. Discussion

Acetabulum fractures in older patients are common in emergency rooms. The multidisciplinary approach to this type of pathology is the key to successful treatment [2]. Individualization of each patient by taking into account the patient's age, medical history, functionality, and bone quality, is essential to formulate an appropriate therapy. Different strategies can be used to address this pathology, such as open reduction internal fixation (ORIF), CTA, or conservative treatment. Regardless of the treatment chosen, the goal is to achieve an acceptable mobility, relieve pain and reduce immobilization time.

Septic arthritis of the hip is a rare complication of acetabulum fracture, with little literature available. In our case, this condition developed after an acetabulum fracture was treated conservatively. We believe that the hematoma produced by the fracture predisposed the terrain for a possible accumulation of germs, which later led to the infectious condition.

Cases have been reported in the literature of patients with hip fractures who developed infectious arthritis while awaiting surgery. Chewakidakarn *et al.* [8] described a case of a patient with a pathological fracture of the femoral neck, diagnosed 15 days after the initial trauma. The patient had no signs of local inflammation but had pain and was unable to walk, associated with increased inflammatory parameters in the laboratory. The patient was diagnosed with infectious arthritis intraoperatively due to the large amount of purulent material in the joint, and a two-stage surgical treatment was carried out.

In addition, Hearth *et al.* [9] reported two cases of septic arthritis secondary to fractures of the proximal femur in patients awaiting surgery. Both patients were elderly and had multiple clinical comorbidities. The germ isolates were *Staphylococcus aureus* in one case and *Proteus* in the other. Both patients died in the immediate postoperative period.

There are different risk factors for triggering a joint infection. Conditions that interfere with the patient's immunity such as diabetes mellitus, cirrhosis, oncological diseases, hypogammaglobulinemia, or intravenous drug use may increase the incidence of septic arthritis. Joint degeneration and diseases such as rheumatoid arthritis with prolonged corticosteroid treatment may also lead to infection [10]. In our case, the patient had no previous disease, only coxofemoral joint degeneration.

A joint infection is challenging for an orthopedic surgeon, and it is necessary for the surgeon to know a few treatment methods for it. Chen *et al.* [11] described 28 patients with septic arthritis who received treatment in two stages: resection arthroplasty followed by prosthetic implantation. 14 % of the patients were reported to have recurrent infections, and up to 36% experienced complications, demonstrating the complexity of completely eradicating a joint infection. The most frequently isolated germ in the series was oxacycline-resistant *Staphylococcus aureus*. Bauer *et al.* [12] also described two-stage treatment for hip and knee infections. They recorded an 87% success rate with this therapy, with *Staphylococcus aureus* also being the most prevalent germ.

Another treatment alternative is two-stage surgery, which is the placement of an antibiotic-loaded cement spacer. This option allows the specific germ to be identified, the antibiotic treatment can be adjusted according to the antibiogram, and then the implant can be placed. Success rates of up to 89% have been reported for this method [13]. Failure of this treatment may be due to old age, high preoperative CRP levels, and bacterial resistance [13]. Our patient had a preoperative CRP of 2 mg/L, and no highly resistant germs were evident in the cultures.

In our case, although the origin was a fracture of the acetabulum and not a fracture of the femoral neck, the latter alternative was chosen. The first surgical toileting performed was not sufficient, as 45 days later, the patient intercurrent with pain and fever showing a large erosive involvement of the coxofemoral joint in imaging studies. The isolated germ was *Staphylococcus aureus*, coinciding with existing reports in the literature.

The two-stage surgical treatment with antibiotic-loaded cement spacer and subsequent CTA, in addition to intravenous antibiotic treatment, was successful in this case. However, the results should be interpreted with caution and more reports like this one are needed to standardize appropriate routine therapeutics.

5. Conclusion

Septic hip arthritis following an infected hematoma from a closed acetabulum fracture is a rare complication. We found no reports in the literature showing hip joint infection associated with a hematoma from a conservatively treated acetabulum fracture. It is essential to consider this complication in the presence of a torpid course with groin pain, fever, and signs of local inflammation. Rapid identification and accurate diagnosis are necessary for successful treatment. *Staphylococcus aureus* was the isolated germ, and an adequate antibiogram is useful to avoid resistance to antibiotic treatment. Two-stage treatment using an antibiotics-loaded cement spacer is a valid option to combat the infection. Finally, it is worth stressing the importance of performing aggressive surgical toileting to eradicate the infection to the biggest extent and avoid future complications.

Disclosure statement

The authors declare no conflict of interest.

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