

# Recurrent Anterior Dislocation of the Hip combined with Ipsilateral Intertrochanteric Fracture of the Femur

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## Abstract

The hip joint is characterized by high anatomical stability. Therefore, hip dislocation usually attributed to a high-energy traumatic incident and may be associated with acetabular fractures or fractures of the femoral head, neck or shaft. Additionally, traumatic anterior dislocation of hip joint is rare; moreover, cases combined with ipsilateral intertrochanteric femur fractures are even rarer and information concerning them is limited to case reports. Recurrent anterior dislocations are extremely rare and have been reported only in individual case reports. This paper reports a case of recurrent anterior hip dislocation following satisfactory reduction and fixation for managing traumatic anterior hip dislocation combined with an ipsilateral intertrochanteric fracture of the femur, and reviews the relevant literature.

**Keywords:** Hip, Femur, Fracture, Dislocation.

## Introduction

Recurrent hip dislocations account for 0.3–1.2% of all hip dislocations, with the majority being posterior dislocations; recurrent anterior dislocations are extremely rare and have only been reported as isolated cases<sup>1,2,3</sup>. Anterior hip dislocation combined with ipsilateral intertrochanteric femoral fractures is also rare and information regarding them is limited to individual case reports<sup>1</sup>.

We encountered a case of recurrent anterior hip dislocation following satisfactory reduction for hip dislocation and open reduction and internal fixation with an intramedullary nail for the intertrochanteric femur fracture. To date, no diagnostic protocol has been established for such high-energy trauma, and no established treatment protocol for recurrent anterior hip dislocation has been described in the literature. This case report and review of the relevant literature aim to contribute to the knowledge base for such cases.

## Case Description

An 80-year-old female presented to our emergency department with right hip pain following a roll-over incident while riding an electric wheelchair. On physical

examination, the right femoral head was detected by palpitation in the groin area and the right hip was externally rotated and abducted. Plain radiographs revealed right hip dislocation with the femoral head located in the anterosuperior region of the acetabulum and a type III Evans ipsilateral intertrochanteric femur fracture (Fig. 1). Computed tomography confirmed an anterior wall fracture of acetabulum; however, no femoral head fracture or intra-articular fragment was observed, resulting in the diagnosis of type IC anterior hip dislocation according to the Epstein classification<sup>4</sup> (Fig. 2).

Three hours after the injury, closed reduction using the Allis maneuver was attempted; however, this attempt was unsuccessful and surgical treatment was planned. Under general anesthesia, the patient was placed in a supine position, and axial traction was maintained using a fracture table. Successful reduction was achieved using manual force posteriorly with the palm on the femoral head. Subsequently, a lateral approach was used to expose the fracture site. A Zimmer Natural Nail

(Zimmer, Warsaw, IN, USA) was used for fixation (Fig. 3).



Figure 1: Plain radiographs show anterior dislocation of the hip joint (Epstein type IC) combined with ipsilateral intertrochanteric femur fracture (Evans type III) in an 80-year-old female.

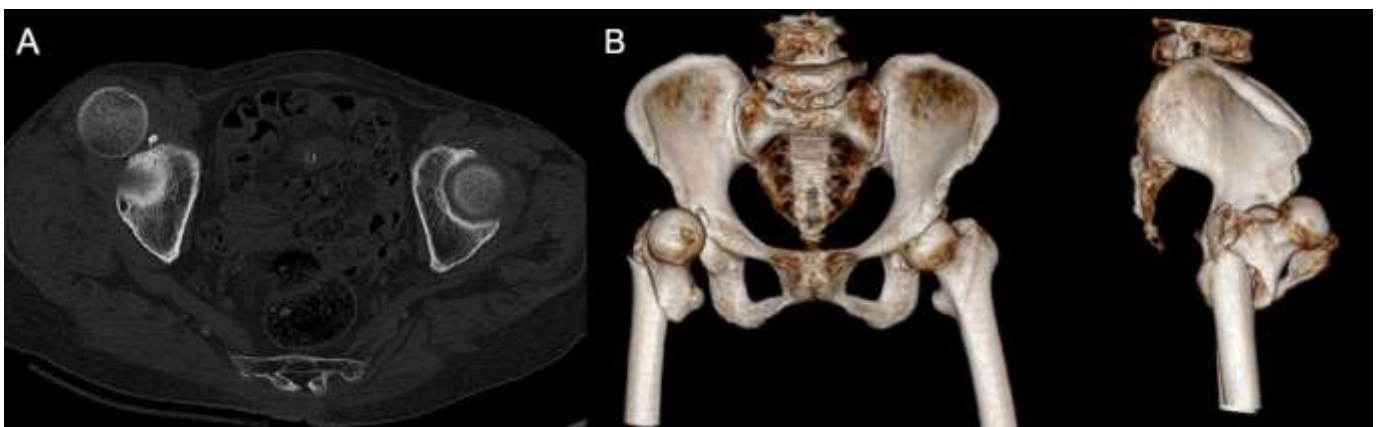


Figure 2: (A) Axial section of the computed tomography scan shows acetabular anterior wall fracture combined with anterior dislocation of the hip joint. (B) Three-dimensional reconstruction computed tomography images show anterior dislocation.



Figure 3: The postoperative plain radiographs show a satisfactory closed reduction for anterior hip dislocation and open reduction and internal fixation with intramedullary nail for intertrochanteric femoral fracture.

The joint capsule was not incised during this procedure. Postoperative plain radiographs revealed center-edge angles of  $27^{\circ}$  on the right and  $27^{\circ}$  on the left, anteversion angles of  $21^{\circ}$  on the right and  $26^{\circ}$  on the left, and neck-shaft angles of  $130^{\circ}$  on both sides. The patient was prescribed bed rest for two weeks, followed by initiation of wheelchair ambulation. However, in the fourth postoperative week while being transferred in a wheelchair, the patient suddenly complained of severe right hip pain. Subsequent plain radiographs confirmed anterosuperior hip dislocation. Immediate reduction using the Allis maneuver was performed without difficulty (Fig. 4).

To avoid weight-bearing on the hip joint, skeletal traction through the proximal tibia was applied and additional four weeks of bed rest was prescribed. Appropriate position of the femoral head within the acetabulum was confirmed by the plain radiographs taken in the eighth postoperative week, thereby allowing the patient to resume wheelchair ambulation, and the

Table 1: Demographic and ophthalmic features of the patients

patient was discharged. On the fourteenth postoperative week, the patient was readmitted to the cardiology department of our hospital for treating atrial fibrillation. The patient continued to ambulate with a wheelchair, and there were no specific trauma incidents post-discharge. However, during routine follow-up radiography, another anterior hip dislocation was identified and promptly reduced using Allis maneuver (Fig. 5).

We planned to determine the cause of the recurrent anterior dislocation by using magnetic resonance imaging (MRI) and arthrography and devise an appropriate treatment plan. Unfortunately, the patient died due to pneumonia-induced sepsis in the fifteenth postoperative week before these investigations could be performed.



Figure 4: Plain radiographs show anterior recurrent dislocation of the hip joint (A) and post-reduction status by Allis maneuver (B) at postoperative weeks 4.

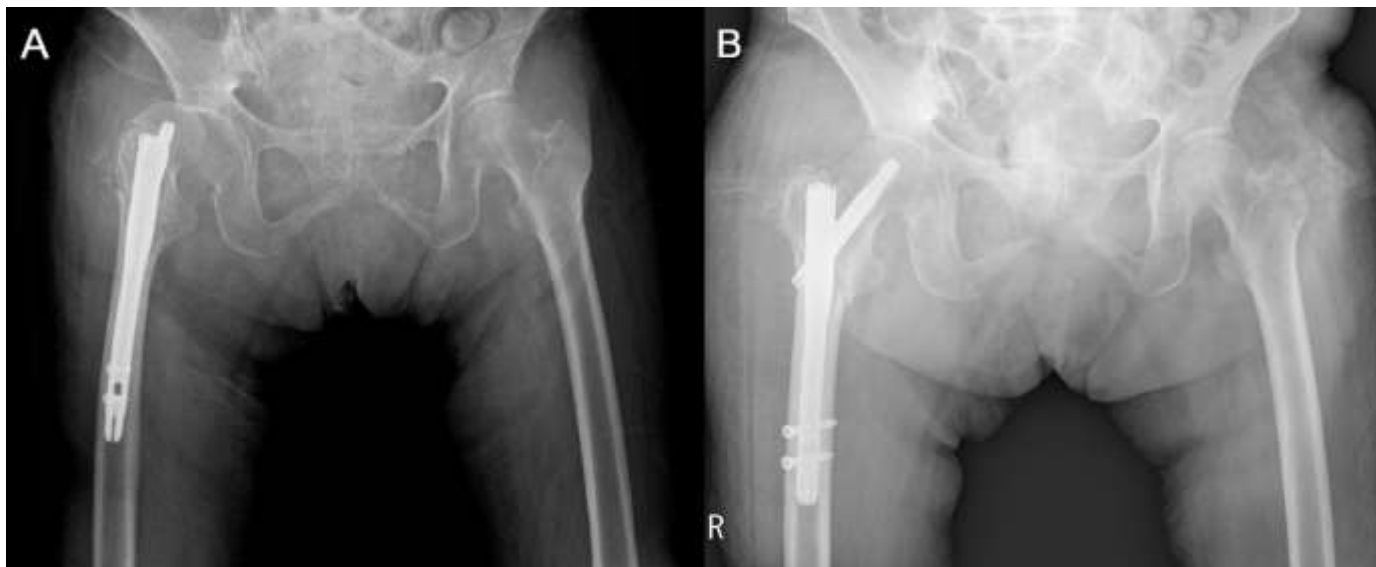


Figure 5: Plain radiographs show anterior recurrent dislocation of the hip joint (A) and post-reduction status by Allis maneuver (B) at postoperative weeks 14.

## Discussion

The hip joint is characterized by high anatomical stability. Therefore, hip dislocation usually attributed to a high-energy traumatic incident and may be associated with acetabular fractures or fractures of the femoral head, neck or shaft<sup>1</sup>. And anterior hip dislocation occurs as a result of abduction and external rotation forces applied to the hip joint, with abduction force being the most critical factor<sup>1,4</sup>. In situations of forced abduction, the femoral neck and greater trochanter are engaged with the acetabulum, and leverage forces act in an outward direction on the femoral head, causing forceful displacement into the anterior joint capsule<sup>4</sup>. In our case, it is postulated that anterior dislocation occurred due to abduction and external rotation forces with the hip in extension, and intertrochanteric femur fracture occurred due to continuous external rotation forces or direct posterolaterally directed forces applied on the intertrochanteric region of the femur after anterior dislocation.

The predisposing factors for recurrent dislocation include developmental dysplasia of the hip, acetabular fractures, paralysis<sup>2,5,6</sup>. And extensive soft tissue damage, delayed reduction, and inappropriate immobilization duration may be related factors<sup>2</sup>. Liebenberg and Dommissse<sup>7</sup> reported the existence of a pseudo-cavity in the ruptured joint capsule as a cause of recurrent dislocation. The ruptured area of the joint capsule functions as a one-way valve; the femoral head

may be displaced into a low-pressure pseudo-cavity under specific circumstances where intra-articular pressure increases, resulting in recurrent dislocation. In such cases, computed tomography or arthrography can be used to identify the ruptured site of joint capsule and surgical closure of the pseudo-cavity can prevent recurrent dislocation.

Syed et al.<sup>8</sup> reported a case of anterior hip dislocation in a patient with intertrochanteric femur fracture and following open reduction and internal fixation using dynamic hip screw. The anterior dislocation was attributed to excessive postoperative anteversion of the femoral neck and open reduction through complete detachment of the anterior joint capsule. In our case, anatomical reduction of the intertrochanteric femur fracture was achieved without opening the joint capsule, and the postoperative anteversion angle was measured at 21°, thereby excluding the possibility mentioned above.

In our case, the patient had an acetabular anterior wall fracture. According to the literature, acetabular fractures are predominantly treated surgically, except when the patient's overall condition precludes surgery. However, for non-displaced or minimally displaced fractures, nonoperative treatment may be considered<sup>9</sup>. In our case, the acetabular anterior wall fracture had an anterior displacement of more than 10 mm, which was smaller than 1cm<sup>3</sup>, making fixation challenging.

Matta et al. introduced the concept of the "roof arc

angle" to determine the need for operative treatment in acetabular fractures<sup>9</sup>. Kim<sup>9</sup> mentioned that if the roof arc angles on the antero-posterior, obturator oblique, and iliac oblique views are  $>45^\circ$ , nonoperative treatment is possible. In our case, all the roof arc angles were found  $>45^\circ$ , thereby leading to the consideration of nonoperative treatment; however, the possibility of recurrent dislocation due to anterior joint capsule damage occurred at the time of injury or labral injury accompanied by an acetabular anterior wall fracture cannot be ruled out. MRI and arthrography can be used to confirm joint capsule damage. Laorr et al.<sup>10</sup> stated that MRI can help assess the potential causes of recurrent dislocation, such as muscular injuries, fractures, labral tears, and soft-tissue interpositions in the early stages of traumatic hip dislocation. In our case, MRI could have aided in assessing potential joint capsule damage, labral tears, and other associated injuries.

The treatment methods for recurrent anterior hip dislocations are limited to those mentioned in case reports. Scudese reported good results in a patient with recurrent anterior hip dislocation without accompanying fractures, with a hip spica cast for 8 weeks, following manual reduction<sup>3</sup>. Schweitzer et al.<sup>5</sup> confirmed the absence of fractures and hip dysplasia in a patient with recurrent anterior hip dislocation through radiography and computed tomography, and identified the redundancy of the anterior capsule through MRI and computerized tomographic arthrogram. They subsequently performed capsulorrhaphy and femoral derotational osteotomy using an anterior approach, resulting in favorable outcomes. Trousdale<sup>6</sup> initially performed derotational subtrochanteric femoral osteotomy and intramedullary nail fixation in a patient with recurrent anterior hip dislocation and a history of systemic lupus erythematosus. However, the treatment was unsuccessful, and the patient subsequently underwent capsulorrhaphy and periacetabular rotational osteotomy, resulting in good outcomes.

Identifying the underlying pathology is essential for preventing recurrent dislocation. However, no established protocol exists in the literature for diagnosing the cause of recurrent dislocations. Plain radiographs can help detect hip dysplasia<sup>3,5,6</sup>, while computed tomography can confirm acetabular fractures and femoral neck anteversion<sup>3,5</sup>. Additionally, arthrography can identify the presence of contrast agent leakage in the anterior joint capsule, which can be

beneficial for diagnosing joint capsule damage<sup>2,3</sup>. MRI can also be aid in identifying damage to the joint capsule, soft tissues and acetabular labrum surrounding the hip joint<sup>5,9</sup>.

Although the authors attempted conservative treatment for recurrent anterior hip dislocation, it was unsuccessful. The recurrent anterior hip dislocation could have been attributed to the damage to the joint capsule or labrum and we had planned to perform MRI and arthrography. However, we were unable to carry out these procedures owing to the death of the patient due to pneumonia-induced sepsis.

### Conclusion

Cases of anterior hip dislocation combined with ipsilateral intertrochanteric femur fractures are rare, and there have been no reported cases of recurrent anterior dislocation following such an event. In instances where hip dislocation is accompanied by fractures, a high-energy traumatic injury with the potential for recurrent dislocation should be considered. Early and accurate diagnosis and appropriate treatment are crucial to prevent recurrent dislocations.

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### Conflict of Interest Disclosures

Authors declare no conflict of interests.

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None.

### Authors' Contributions

Hansol Moon - Data analysis, manuscript preparation  
Inhwa Baek - Study design, manuscript preparation  
Seongyo Nam - Data analysis, literature review, manuscript preparation.

### Ethical Statement

Not applicable.

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