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Case Report

Challenges in treating combined posterior hip dislocation and ipsilateral intertrochanteric fracture: a case report

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Abstract: The concomitant occurrence of posterior hip dislocation with an ipsilateral intertrochanteric fracture is an exceptionally rare and complex orthopedic injury that poses significant diagnostic and therapeutic challenges. This report presents two cases of this unusual injury pattern, each resulting from high-energy motor vehicle accidents. Patients presented with acute pain and functional impairment of the affected lower limb. Radiographic evaluation confirmed posterior dislocation of the hip associated with an ipsilateral intertrochanteric fracture. Prompt open reduction was necessitated to prevent iatrogenic complications and minimize the risk of avascular necrosis of the femoral head. Definitive fixation of the intertrochanteric fracture was achieved using a Dynamic Hip Screw (DHS) or Dynamic Condylar Screw (DCS), selected based on fracture morphology. Postoperative management focused on staged rehabilitation to optimize recovery. Both patients achieved satisfactory functional outcomes, with Harris Hip Scores of 78 and 82 at one-year follow-up, respectively. The aim of this case report is to present and analyze two rare cases of combined posterior hip dislocation with ipsilateral intertrochanteric fracture, highlighting the diagnostic complexities, surgical challenges and considerations for achieving favorable functional outcomes in the absence of standardized treatment protocols.

Keywords: Posterior hip dislocation, intertrochanteric fracture, complex hip injury, high-energy trauma, sciatic nerve entrapment

Introduction

Posterior hip dislocation with an ipsilateral intertrochanteric fracture is a rare and complex injury. The typical mechanism underlying this combined injury involves a high-energy impact, such as a motor vehicle accident, where axial force is transmitted along the femoral shaft when the hip is in a flexed, adducted, and internally rotated position. This results in a posterior dislocation of the femoral head. Simultaneously, the force and rotational stress transmitted through the proximal femur can lead to an intertrochanteric fracture. The shearing and twisting forces contribute to comminution and the formation of a calcar spike, especially in osteoporotic or weakened bone. This dual injury pattern reflects the substantial energy involved and necessitates individualized and carefully planned management strategies [1, 3, 4]. This combination of injuries presents unique challenges due to the biomechanical forces involved and the potential for complications affecting the femoral head, neck, and surrounding soft tissues [2]. While each injury alone demands meticulous management, their concurrent presentation significantly complicates the treatment approach and prognosis. Hip dislocations are classified based on the direction of displacement, with posterior dislocations accounting for approximately 90% of traumatic hip dislocations [5]. When accompanied by an intertrochanteric fracture, characterized by a fracture through the intertrochanteric line of the proximal femur, the complexity increases. Such cases require both fracture stabilization and precise joint alignment to preserve hip function and minimize the risk of avascular necrosis of the femoral head. The dual nature of these injuries poses significant challenges

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for Orthopaedic surgeons. Prompt reduction of the dislocation is essential to restore joint congruity and prevent complications such as sciatic nerve injury and vascular compromise. However, the presence of an intertrochanteric fracture often necessitates additional surgical stabilization, typically involving internal fixation. The rarity of this injury combination further complicates management, as limited literature is available to guide treatment protocols, leaving clinicians to rely on case-based experience and individualized strategies (**Table 1**). To contribute to the limited body of research on this challenging orthopaedic issue, this report highlights the clinical presentation, management, and outcomes of two patients with posterior hip dislocation and ipsilateral intertrochanteric fractures.

Case 1

A 30-year-old female presented to the emergency department of our hospital with complaints of pain in the left hip region following a motor vehicle accident (**Figure 1**). The time from injury to presentation was approximately five hours. The patient, a pillion rider on a motorcycle, was struck by a car from the front. On examination, the left lower limb was externally rotated and shortened. Tenderness and edema were noted over the left hip area. Distal pulses were palpable, but there was no dorsiflexion of the ankle or toes, indicating potential sciatic nerve injury. Initial plain radiographs were insufficient to accurately determine the fracture pattern. A CT scan with 3D reconstruction revealed a posterior hip dislocation, an ipsilateral intertrochanteric fracture, and a femoral head fracture. The femoral neck, shaft, and posterior acetabular wall were found to be intact. After discussing the prognosis and potential complications with the patient and their family, informed consent was obtained, and the patient was scheduled for open reduction and internal fixation (ORIF) without attempting closed manipulation. The patient underwent surgery the following day. Using a Gibson approach with the patient in a lateral position, the hip joint was exposed. The posterior capsule was torn, allowing a fragment of the femoral head to displace posteriorly beneath the gluteus maximus. Another fragment was found within the acetabular cavity. The sciatic nerve was found entangled over the intact head fragment. Both fragments were reduced to the femoral head and temporarily held with K-wires. They were then secured using three Herbert screws. A Steinmann pin, used as a joystick, facilitated the reduction of the hip joint. The intertrochanteric fracture was reduced and fixed using a dynamic hip screw (DHS). The greater trochanter and abductor muscles were anchored using No. 5 Ethibond sutures. The posterior capsule tear and the short external rotators were repaired, and the wound was closed in layers. The postoperative course was uneventful. The patient was mobilized with a walker two days after surgery. Sutures were removed after two weeks. An abduction pillow was used for six weeks, and the walker was employed for 12 weeks. Partial weight-bearing was permitted at six weeks, followed by full weight-bearing at 12 weeks. Foot drop was managed with an ankle-foot orthosis (AFO). At six months, radiographs showed fracture union with no evidence of avascular necrosis (AVN) of the femoral head. The sciatic nerve had not recovered, and the patient achieved a Harris Hip Score (HHS) of 78, indicating good hip function with no significant pain.

Case 2

A 55-year-old male presented to our hospital following a motor vehicle accident earlier the same day, complaining of severe pain in the left hip region (**Figure 2**). On examination, his vital were stable, and he did not report any other injuries. However, the left lower limb was externally rotated and shortened. Skin tenting was noted on the antero-medial aspect of the left proximal thigh. The distal neurovascular status was intact. X-rays revealed a posterior hip dislocation and an ipsilateral intertrochanteric fracture extending into the subtrochanteric region. Additional fractures were observed in the left inferior pubic ramus, the right superior pubic ramus, and the anterior column of the acetabulum. To further delineate the fracture pattern and aid in treatment planning, a CT scan with 3D reconstruction was performed. The scan revealed an intertrochanteric fracture with a sharp calcar spike impinging on the anterior soft tissues. The femoral head and acetabular wall were intact, and there was a minimally displaced fracture of the anterior column of the left acetabulum. Closed reduction was not attempted, and the patient was scheduled for surgery the following day. After informing the patient and his family about the risk of avascu-

Table 1. Literature of similar case reports of hip dislocation with ipsilateral intertrochanteric femur fracture

Author	Year	Age (years)/ Sex	Type of Dislocation	Type of IT fracture	Associated Injuries	Duration between Injury and Reduction	Reduction	Intervention	Follow-up	Union	AVN
Ul Haq R et al. [2]	2016	26/M	Posterior	Comminuted IT fracture	-	5 days	OR	ORIF with DHS	12 m	Yes	No
Ul Haq R et al. [2]	2016	36/F	Posterior	Comminuted IT fracture	Femur head fracture	1 day	OR	ORIF with 95° DCS	12 m	Yes	No
Fageir and Veettil [6]	2017	31/M	Posterior	Comminuted IT fracture		< 1 day	OR	ORIF with long T2 gamma intra-medullary nail	10 m	Yes	No
Uzun et al. [7]	2017	20/M	Posterior	Comminuted IT fracture	Transverse and posterior wall acetabular fracture with Lateral condyle fracture	3 days	OR	ORIF with Proximal anatomic femoral plate and CCS for IT fracture. Recon plates for acetabulum fracture. CRIF with CCS for Lateral condyle fracture	6 m	Yes	-
Cocolos et al. [8]	2018	49/M	Posterior	Stable IT fracture	-	-	CR	ORIF with DHS	-	-	-
Desai and Dhamangaonkar [1]	2019	19/M	Posterior	Comminuted IT fracture	I/L superior pubic rami fracture	2 days	OR	ORIF with DHS and TBW	1 y	Yes	No
Alraeh et al. [9]	2021	54/M	Posterior	Stable IT fracture	posterior wall acetabular fracture	< 1 day	CR	ORIF with DHS and Recon plates	1 y	Yes	No
Nohmi S et al. [10]	2022	67/M	Posterior	Comminuted IT fracture	posterior wall acetabular fracture	-	OR	ORIF with CMN and Recon plates	5 y	Yes	No
Singh et al. [3]	2023	50/M	Posterior	Comminuted IT fracture	-	< 12 hrs	OR	ORIF with CMN	3 y	Yes	No
Moon H et al. [11]	2024	80/F	Anterior	Unstable IT fracture	Anterior wall acetabular fracture	< 1 day	CR	ORIF with CMN	Lost to FU	-	-
Prabhat V et al. [12]	2024	66/M	Anterior	Comminuted IT fracture			-	Hemiarthroplasty with using long cemented distal press-fit revision stem		-	-

Abbreviations: IT - Intertrochanteric femur, M - Male, Fe - Female, OR - Open reduction, CR - Closed reduction, ORIF - Open Reduction and Internal Fixation, CRIF - Closed Reduction and Internal Fixation, AVN - Avascular necrosis, THR - Total hip replacement, CMN - Cephalo-medullary Nail, DHS - Dynamic Hip Screw, DCS - Dynamic Condylar Screw, CCS - Cannulated Cancellous Screw, Ex.fix - External Fixator, TIN - Tibia Interlocking Nail.

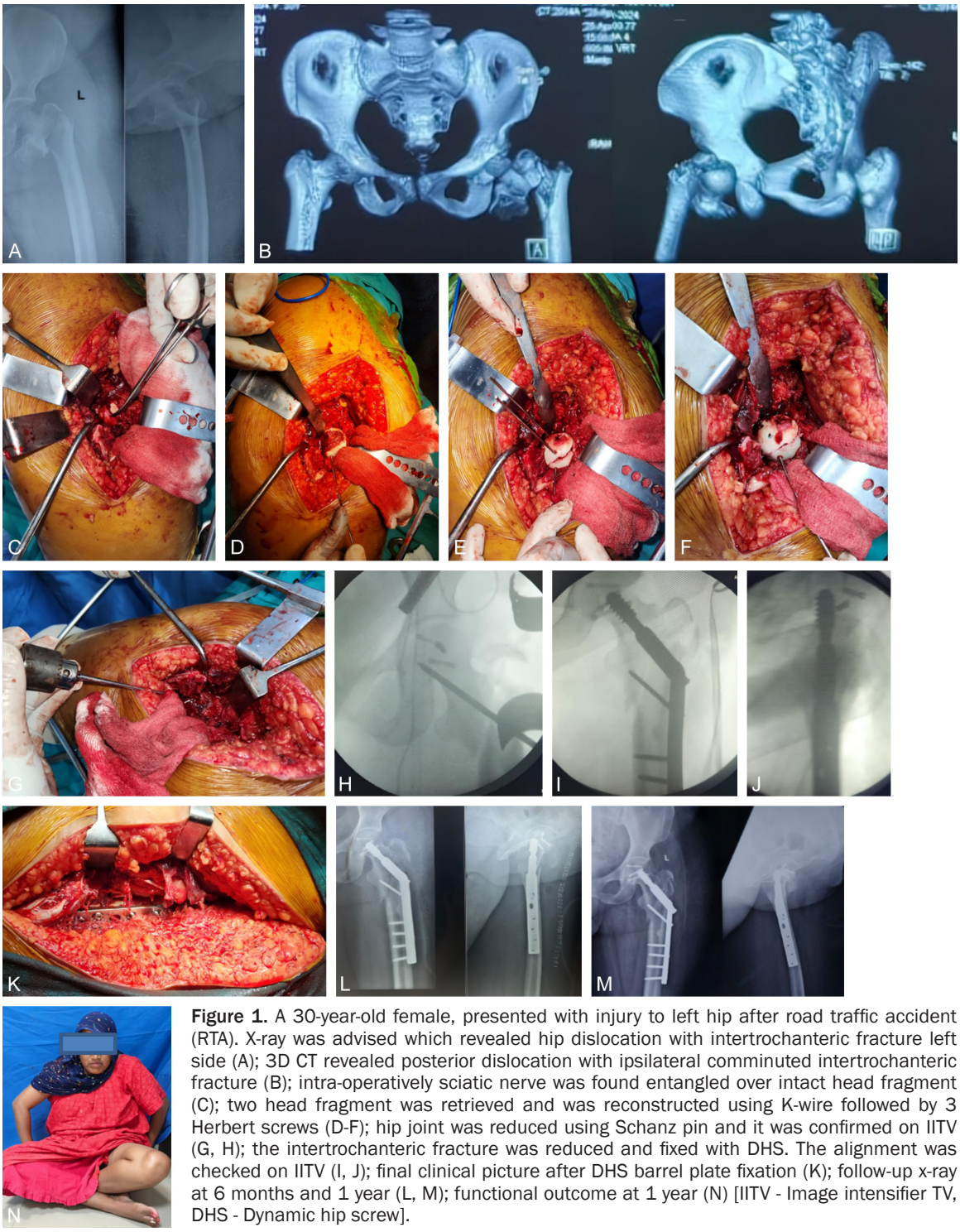

Figure 1. A 30-year-old female, presented with injury to left hip after road traffic accident (RTA). X-ray was advised which revealed hip dislocation with intertrochanteric fracture left side (A); 3D CT revealed posterior dislocation with ipsilateral comminuted intertrochanteric fracture (B); intra-operatively sciatic nerve was found entangled over intact head fragment (C); two head fragment was retrieved and was reconstructed using K-wire followed by 3 Herbert screws (D-F); hip joint was reduced using Schanz pin and it was confirmed on IITV (G, H); the intertrochanteric fracture was reduced and fixed with DHS. The alignment was checked on IITV (I, J); final clinical picture after DHS barrel plate fixation (K); follow-up x-ray at 6 months and 1 year (L, M); functional outcome at 1 year (N) [IITV - Image intensifier TV, DHS - Dynamic hip screw].

lar necrosis (AVN) of the femoral head and obtaining informed consent, an open reduction and osteosynthesis were planned. The surgery was performed using a postero-lateral approach with the patient in the lateral position. Upon adequate exposure, the femoral head was found to be torn from the posterior capsule and displaced through the short external rotators. The short external rotators were dissected, revealing the calcar spike protruding into the anterior soft tissues. The retinacular vessels and anterior capsule were carefully elevat-

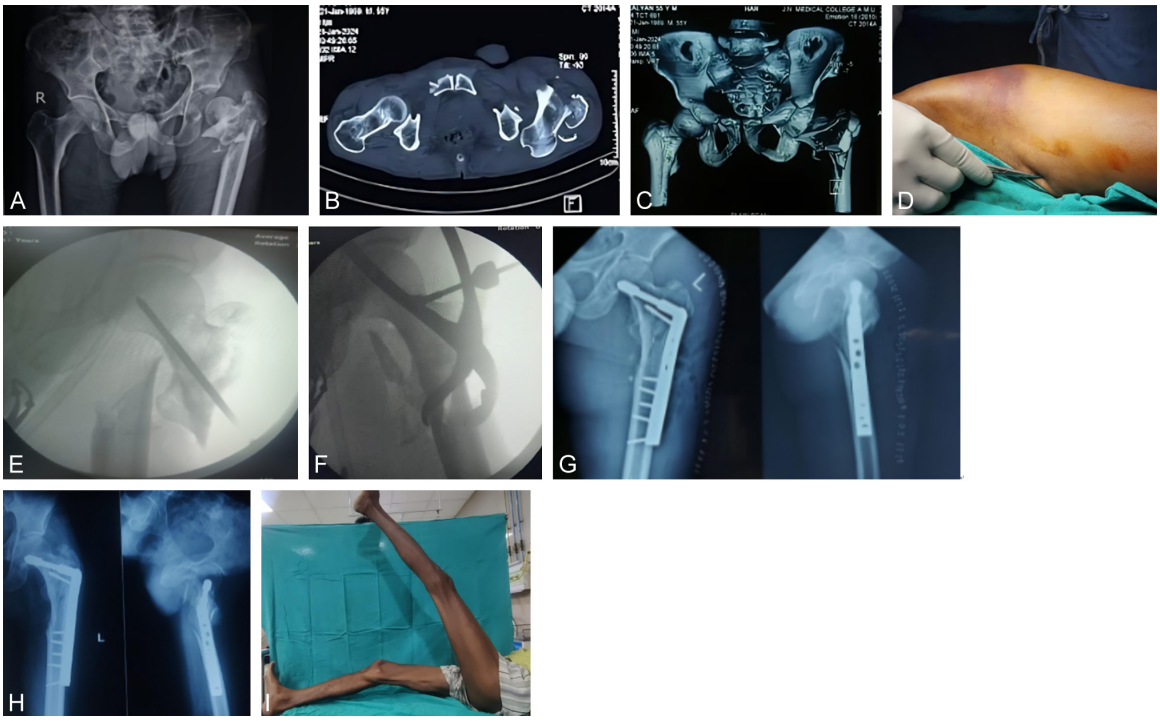

Figure 2. A 55-year male presented after injury to left hip following MVA. X-ray showed hip dislocation with ipsilateral IT fracture (A); CT scan with 3D reconstruction revealed posterior hip dislocation with IT fracture on left side. Note the medial spike of the proximal fragment [arrow] (B, C); the medial spike was marked using haemostat intra-operatively (D); IITV picture after reduction of hip joint (E); the IT fracture was reduced using bone clamp and later fixed with DCS (F); x-ray at 6 month and 1 year follow-up (G, H); functional outcome at 1 year follow-up (I) [MVA - Motor vehicle accident, IT - Intertrochanteric, IITV - Image intensifier TV, DCS - Dynamic condylar screw].

ed subperiosteally. To facilitate reduction, a Schanz pin was inserted into the proximal head fragment. The fragment was externally rotated while palpating the calcar spike for guidance. The reduction was confirmed under fluoroscopy. The intertrochanteric fracture was stabilized using a Dynamic Condylar Screw (DCS). The posterior capsule and external rotators were repaired, and the wound was closed in layers. Postoperatively, hip ranges of motion (ROM) exercises were initiated on the first day. The patient was restricted from weight-bearing for eight weeks, after which gradual weight-bearing was permitted. An abduction brace was used for six weeks. At the one-year follow-up, radiographs confirmed complete fracture healing with no evidence of femoral head AVN. The patient achieved a Harris Hip Score (HHS) of 82 at one year, indicating good hip function with no significant pain.

Discussion

An ipsilateral intertrochanteric fracture combined with a posterior hip dislocation is a rare and high-energy injury that presents significant challenges in both management and outcomes [2]. This unusual injury pattern is typically caused by motor vehicle accidents or falls from considerable heights, where force is transmitted along the femur, driving the femoral head posteriorly while simultaneously fracturing the intertrochanteric region [1]. The coexistence of these injuries complicates reduction, fixation, and postoperative rehabilitation due to their complex nature. Avascular necrosis (AVN) of the femoral head, which occurs in approximately 10-20% of hip dislocation cases, can often be prevented by prompt reduction of the displaced hip, ideally within six hours [3]. However, delayed or inadequate reduction significantly increases the risk of AVN, adding to the challenges of managing these injuries [1]. Reduction manoeuvre must also be performed cautiously to avoid exacerbating the intertrochanteric fracture. In both cases presented, open reduction was performed the day after trauma, followed by surgical stabilization of the fracture to maintain joint congruity and femoral alignment.

In both cases presented, closed reduction was not attempted due to specific concerns regarding fracture instability and the risk of iatrogenic injury. The presence of a comminuted intertrochanteric fracture compromised the proximal femur's structural integrity, making forceful manipulation potentially hazardous. In Case 1, preoperative imaging revealed femoral head fragments and capsular disruption; intraoperatively, the sciatic nerve was found entangled over an intact head fragment - an injury that could have been exacerbated by blind manipulation. In Case 2, a prominent calcar spike was noted impinging on anterior soft tissues, raising concerns about possible neurovascular damage if closed reduction were attempted without direct visualization. Open reduction offered controlled exposure, enabling precise handling of intra-articular fragments, protection of vital structures, and stable fixation, all of which were critical to achieving favorable outcomes and minimizing the risk of avascular necrosis or further displacement. The standard treatment for intertrochanteric fractures involves open reduction and internal fixation to ensure stability. However, managing these fractures alongside a posterior hip dislocation introduces additional risks, including mal-alignment, non-union, and impaired function. The sequence of managing a combined posterior hip dislocation with an ipsilateral intertrochanteric fracture requires careful intraoperative planning and prioritization. In both cases, open reduction of the dislocated hip was performed first. This approach allowed restoration of joint congruity, relieved tension on neurovascular structures - particularly the sciatic nerve and permitted retrieval and reconstruction of intra-articular femoral head fragments, as seen in Case 1. Proper alignment of the proximal femur was also essential to facilitate stable fixation of the intertrochanteric component. Once the femoral head was anatomically reduced and secured, internal fixation of the intertrochanteric fracture was performed using either a Dynamic Hip Screw (DHS) or a Dynamic Condylar Screw (DCS), depending on the fracture morphology and need for angular stability. Addressing the dislocation first also prevented interference between femoral head fixation (Herbert screws) and the planned trajectory of the lag screw for fracture fixation. This sequence ensured optimal outcomes by prioritizing neurovascular safety, accurate reduction, and biomechanical stability for fracture healing. These fixation methods allowed for early mobilization and contributed to favourable outcomes. The rarity of this injury combination limits the availability of standardized treatment protocols, leaving most surgeons to rely on case reports and small series for guidance. Despite advancements in surgical techniques, patients with this injury remain at higher risk for complications such as joint stiffness, heterotopic ossification, and post-traumatic arthritis. Rehabilitation protocols require a careful balance between promoting joint mobility and protecting the fracture fixation. Typically, restricted weight-bearing is advised until sufficient healing is confirmed.

Key points considered while managing the above two cases were: 1. Proper placement of Herbert screws in the femur head needs to be considered as it may obstruct the trajectory of the lag screw of the DHS/DCS. 2. A closed reduction should not be attempted in an emergency without first ensuring a proper understanding of the anatomical orientation thorough planning beforehand. 3. The close relationship between the calcar spike and nearby neuro-vascular structures must be carefully evaluated and blunt dissection should be performed prior to attempting reduction. 4. Additionally, preserving the anatomical integrity is crucial to facilitate a potential arthroplasty procedure in the future if needed.

While hip dislocation with ipsilateral intertrochanteric fracture has been reported in literature, our case series offers unique insights that add clinical value. In the first case, intraoperative identification of the sciatic nerve entangled over an intact femoral head fragment is a rare and critical finding with significant implications for nerve preservation. Additionally, the reconstruction of femoral head fragments using Herbert screws, with careful planning to avoid interference with the trajectory of the lag screw, demonstrates advanced intraoperative decision-making. Both cases highlight the rationale for avoiding closed reduction in the presence of fracture instability - an important consideration often underemphasized in previous reports. By detailing technical pearls, including calcar spike dissection and fixation strategy (DHS vs. DCS), and providing one-year functional outcomes using the Harris Hip Score, this report contributes practically rele-

vant information for orthopaedic surgeons managing similarly complex injuries. Moreover, the dual-case presentation allows for a comparative perspective, enriching the limited body of literature on this rare injury pattern.

In conclusion, posterior hip dislocation with an ipsilateral intertrochanteric fracture requires timely and individualized treatment to address both injury components effectively. Further research and long-term follow-up are essential to better understand optimal treatment strategies and factors influencing prognosis in these complex cases.

Disclosure of conflict of interest

None.

Abbreviations

DHS, Dynamic Hip Screw; DCS, Dynamic Condylar Screw; AVN, Avascular Necrosis Hip; ROM, Range of Motion.

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