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### Case Report

# Fracture of the acetabulum with femoral artery injury presenting late: A case report

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#### ABSTRACT

This study reports a rare case of both column acetabulum fracture with femoral artery injury that presented late and was managed with arterial reconstruction and fracture fixation.

A thirty-one year old man sustained both column acetabular fracture on the left in a motor vehicle accident. On admission there was no obvious neuro-vascular deficit. During surgery for the fracture after 7 days of the injury the femoral artery was found to be severely crushed with no blood flow. The anterior column of the acetabulum was stabilised followed by resection and reconstruction of the femoral artery. The post-operative period was uneventful and he was discharged normally. At 6 months from injury the fractures had united well with excellent limb circulation and good lower limb function.

Femoral artery injury with acetabular fracture is rare and late presentations are unreported hitherto. The results of fracture stabilisation and vessel reconstruction seem to be excellent. Literature of similar injuries is reviewed.

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## Introduction

Displaced acetabular fractures are among the most complex of all orthopaedic injuries [1]. Major arterial injury is fortunately a rare association of these fractures and the mortality of such lesions is extremely high. On the other hand venous injuries and bone bleeds causing rapid exsanguination are a relatively common accompaniment to such high velocity pelvi-acetabular trauma [2]. An extensive review of literature revealed only two patients of femoral artery injury associated with acetabular fractures involving the high anterior column who survived the trauma though there are several reports of external iliac artery trauma [3]. There are no reports of late presentation of vascular lesions in pelvic trauma to the best of our knowledge. The authors report a case of both column fractures of the acetabulum with femoral artery injury that presented late and was successfully managed with vascular reconstruction and fracture fixation.

## Materials and methods

Mr. HMSAJ, a 31 years old man presented to a tertiary care centre in the Middle East with both column fractures of the left acetabulum following a road traffic accident. He had no other major systemic trauma. He was initially admitted to a peripheral hospital and after hemodynamic stabilisation transferred to our centre 3 days after the injury. The fracture itself was managed with skin traction at the peripheral institution. Clinical examination revealed moderate swelling and ecchymosis of left inguinal region with scrotal hematoma. On admission to our centre he did complain of numbness in the left lower limb but without objective neurological deficits and intact dorsalis pedis and posterior tibial pulsations in the leg, though feeble.

His X-rays and CT scans with 3-D reconstruction revealed the full extent of his bony injury. It was a high anterior column fracture along with the posterior column injury Fig. 1. He was taken up for surgery for his acetabular fracture on the 7th day following the injury with a plan of anterior fixation followed by posterior fixation if necessary. Under general anesthesia, while marking the surgical incision for the Letournel's ilio-inguinal approach, it was observed that the femoral artery was palpable on the affected side only above the inguinal ligament but feeble due to soft tissue edema.

Once the skin and subcutaneous tissue were incised, it was observed that the underlying soft tissues including the external oblique aponeurosis and the inguinal ligament were totally shredded with profuse amounts of clotted blood in the tissue planes Fig. 2. The femoral artery and vein were fully exposed. The femoral vein appeared contused with dark bluish discoloration and femoral artery was attenuated to a fine filament just anterior to the fractured anterior column Fig. 3. Pulses were absent immediately distal to the injured segment that was approximately an inch long with visible thrombus.

The vascular surgeons were informed immediately and in collaboration with them the surgical strategy was reviewed. A temporary Fogarty Catheter was passed into the femoral artery to restore the blood supply.

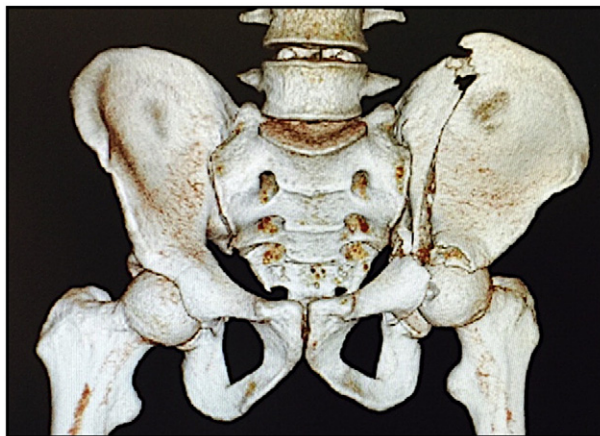
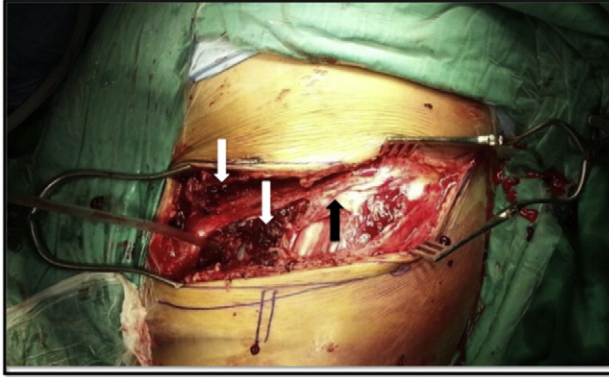


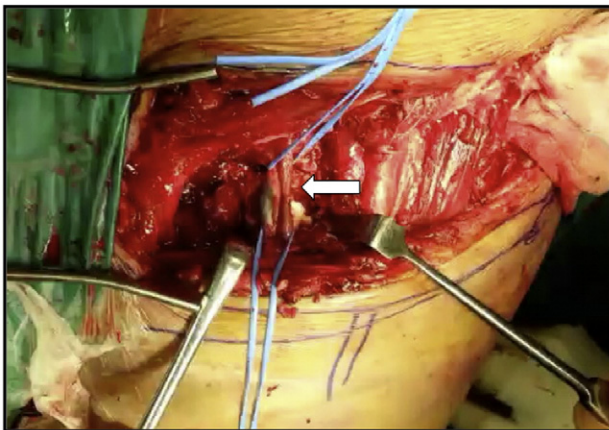
Fig. 1. Three-D reconstructed CT image of the injury depicting the bi-column fracture.



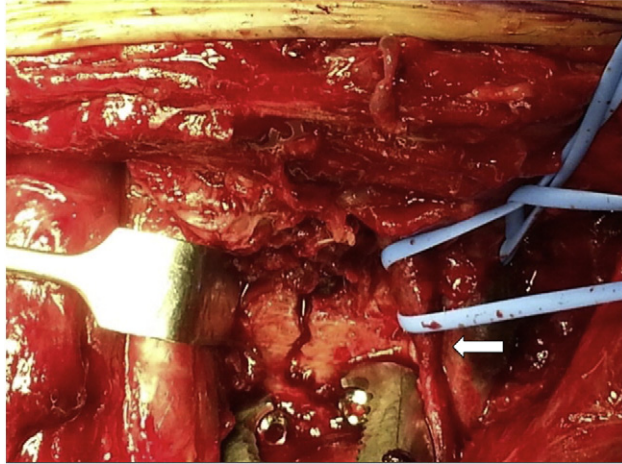
**Fig. 2.** At exposure through the ilio-inguinal approach extensive hematoma of the tissue planes and ruptured External Oblique aponeurosis are seen – white and black arrows respectively.

First through the lateral window of the ilio inguinal approach, the iliac wing part of the fracture was reduced and fixed with a 3.5 reconstruction plates. Then with 2 screws on either side of the transverse portion of the anterior column fracture and Farabeuf clamps the fracture was reduced along with the keystone at the top of the ischial buttress Fig. 4. A second 6-holed reconstruction plate was used to fix the iliac wing and then a 10-holed reconstruction plate was used to buttress the reduced transverse portion of the anterior column. The reduction and fixation were found satisfactory under image intensifier and the posterior column also fell into place. The vascular surgeons then took over. The femoral artery showed a segment 6–7 cm in length to consist of only Tunica Adventitia as the Tunica Intima was cut and retracted to both sides. The affected segment was therefore excised and the damaged part of the artery was reconstructed by anastomosis with a PTFE graft (Bard, Tempe, USA) Fig. 5. The inguinal ligament and aponeurosis of the External Oblique that were damaged were reconstructed with Premilene hernia mesh (B Braun, Tuttlingen, Germany) and the incision closed over suction drains.

His postoperative period was uneventful and he was mobilised in bed. The drains were removed on the second day. Heparinisation was continued for 14 days. It was changed to oral Warfarin at the time of discharge 15 days from surgery. He was advised to continue mobilisation in bed, as the posterior column fracture was not fixed. He was reviewed at 6 weeks both clinically and radiologically and found to have early healing of the fracture and he was mobilised out of bed with crutches, non-weight bearing on the left lower limb



**Fig. 3.** The Femoral artery and vein are seen isolated. The vein appears contused but the artery is thinned out with intramural thrombus and discoloured – white arrow.

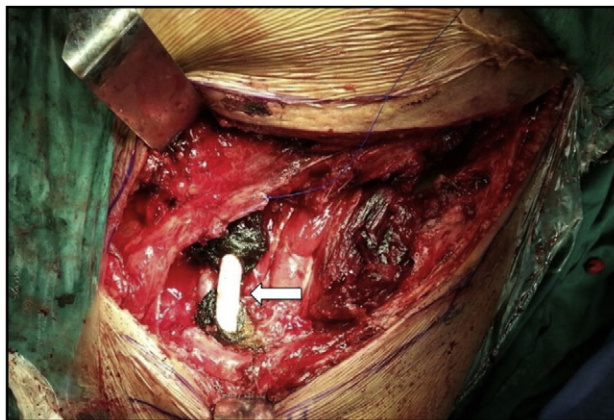


**Fig. 4.** The anterior column fracture is reduced and held with Farabeuf's clamps. The attenuated artery is seen (white arrow).

(Figs. 6, 7). At 3 months from surgery he was reviewed when clinically and radiologically the fracture had united with good femoral and distal pulses and with good range of movements of the hip. He had mild restriction of internal rotation of the hip joint movements. He was advised partial weight bearing ambulation. When last reviewed at 6 months he was fully weight bearing with the fracture completely united and he had no residual symptoms in the leg. He had recovered near normal range of movements of the hip and the distal pulses were normal in the left leg.

## Discussion

Major vessel injuries occur in approximately 1% of patients with pelvic fractures and these injuries have mortality rates as high as 75% to 83% with as many as 60% of these deaths occurring as a result of exsanguination [2,3]. Most vascular injuries are venous lesions and even those arterial injuries rarely affect the Femoral artery. The Superior Gluteal, Pudendal and Obturator arteries are the commonly injured arteries [4]. There have been small series of cases recording external iliac artery injury in pelvis fractures that were managed by aggressive vascular intervention [5–7]. Carillo and coworkers reported 8 cases of external iliac artery injury accompanying pelvic trauma and 1 patient died in their series [5]. Pascarella reported 6 cases of similar



**Fig. 5.** On completion of the vascular reconstruction with PTFE graft (white arrow).

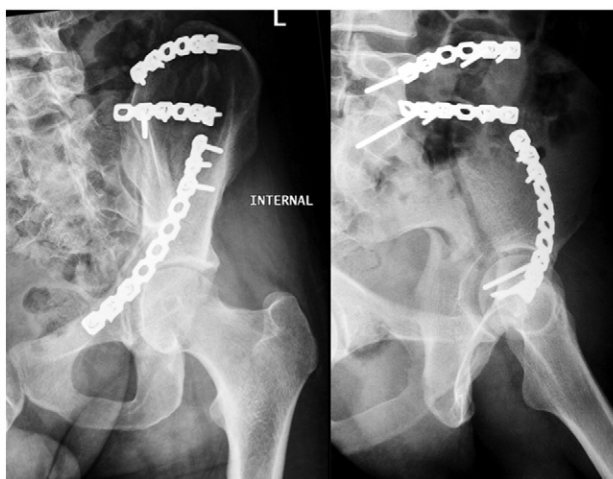


**Fig. 6.** Post operative X-ray showing the fixation of the anterior column of the acetabulum.

injuries and all cases survived [6]. Both authors recommend aggressive imaging protocols and embolisation based on CT angiographic studies. Literature reports only 2 surviving cases of femoral arterial injuries suggesting the rarity of these lesions [8]. Most reports on pelvic and acetabulum fractures do not focus on the mechanisms of injury, nor do they attempt to correlate specific vascular injuries with specific pelvic fractures. Early localisation and control of hemorrhage are dependent on the surgeon's knowledge of mechanisms and sites of vascular injuries associated with specific injury patterns [7,9].

In the case which the authors encountered, there was no objective evidence of any vascular deficit in the affected limb preoperatively suggesting that either the injury was incomplete or the collaterals were adequate to sustain the viability of the limb. For this reason a 3D CT scan was not utilised for vascular mapping, rather the situation was faced intra-operatively. However at surgery the segment of the artery was seen completely occluded by thrombus along with intimal tear suggesting that the reason for the viability of the leg was to be collateral circulation alone.

This case suggests that a high index of suspicion of ilio-femoral artery injury should be entertained by the clinician treating patients with anterior column acetabular fractures sustained from antero-posterior



**Fig. 7.** A. Obturator oblique view shows excellent reduction of the anterior column. B. Depicts iliac oblique view post operatively; note there is minimal residual gap in the posterior column without affecting the congruity of the joint.

compressive forces even when distal pulsations are palpable. The presence of bruising in the inguinal region may be the only clue to the sinister underlying injury. The 3-D CT scan angiography is a useful tool that may help in confirming the diagnosis pre-operatively if there is suspicion of, or if suggested by the fracture pattern or clinical signs. Some trauma centres perform mandatory vascular studies in all pelvi-acetabular injuries and such a protocol may have its merits [3,9].

## Conclusion

The authors report a case of femoral artery injury associated with both column fractures of the acetabulum that presented late. Related literature is also reviewed. Vascular injuries with acetabulum fractures are infrequent but catastrophic injuries, which requires a high index of suspicion and the diagnosis is aided by 3D CT angiography and immediate intervention involving the Orthopaedic and Vascular surgeons for a successful outcome.

## Conflict of interest

The authors declare no conflict of interest.

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