TRANSVERSE ACETABULAR AND IPSILATERAL SEGMENTAL FEMORAL SHAFT FRACTURES IN A YOUNG MALE: RARE CASE REPORT

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ABSTRACT

Transverse acetabular and ipsilateral segmental femoral shaft fractures are rare. There are only a few reported cases of other similar patterns of acetabular and ipsilateral femoral fractures. They are usually high-energy injuries. We report a case of a transverse acetabular and ipsilateral segmental femoral shaft fractures in a young male following a road traffic accident. Management of these fractures poses a challenge to Trauma/Orthopaedic surgeons. The patient underwent acetabular reconstruction with plate and screws and locked retrograde intramedullary femoral nailing simultaneously with a satisfactory outcome in a low resourced referral hospital. Our approach and procedure of posterior column fixation in transverse acetabular fracture and femur fixation may be a primary option in managing such a case in low resource settings and indicates this is possible with adequate preoperative planning.

Key words: Transverse acetabular, Fracture, Segmental fracture

INTRODUCTION

Fractures involving the acetabulum and ipsilateral femur are rare. Acetabular and associated pelvic fractures account for approximately 1.5% of fractures in adults, with 2-5% of these fractures needing medical attention (1). There are also a reported incidences of 3 patients per 100,000 per year (2).

These fractures usually result from high-energy trauma, especially with multiple traumata in young adults. It has been reported in the literature that 12.4% of acetabular fractures are as a result of low energy mechanism and the remainder is high energy (3). Similarly, literature has also documented that acetabular fractures are most often due to automobile accidents caused by high energy mechanism (4).

However, the simultaneous occurrence of a transverse acetabular and ipsilateral segmental femoral fracture is extremely rare. The incidence of these complex injuries among the younger age group are increasing due to increasing high-energy impact road traffic accidents (4). A similar case in 2015 of ipsilateral acetabular femoral neck and shaft fractures (floating hip) in a young adult following fall from a height in a suicide attempt was reported with an outcome of non-union after an initial retrograde intramedullary nailing of the femur and fixation of the femur neck with cannulated screws (5).

The management of these injuries, especially the acetabular fracture poses a challenge to the Trauma/Orthopaedic Surgeon (6). Acetabular fractures are among the complex injuries treated by orthopaedic surgeons in which anatomic reduction is the most influential factor predictive of good clinical outcome, and is what surgeons usually strive for in the treatment of these fractures (6). It has been demonstrated in the literature that, in transverse acetabular fractures there are no significant differences in outcome between fixation of both posterior and anterior components compared to fixation of the posterior component alone (7).

More often than not, the fixation of these fractures is usually done early as long as the patient is stable to ensure a satisfactory outcome. It is also documented in the literature that delays in surgical intervention can negatively affect the extent of anatomical reduction that can be achieved (8). However, there has been a report of late fixation of a transverse acetabular fracture with vascular injury (femoral artery injury) in a patient who after

a week of injury had the fracture fixed and vascular reconstruction was done with a good outcome(9).

There are mixed results regarding the outcomes of managing acetabular fractures in the elderly. While some literature reported no significant difference in mortality between operative and non-operative management (10), others reported a higher 30-day and one-year mortality in non-operative compared to operative treatment (11).

In this study, we present the management of an extremely rare case of transverse acetabular and ipsilateral segmental femoral shaft fractures in a poor resource setting following a road traffic accident in a young adult male.

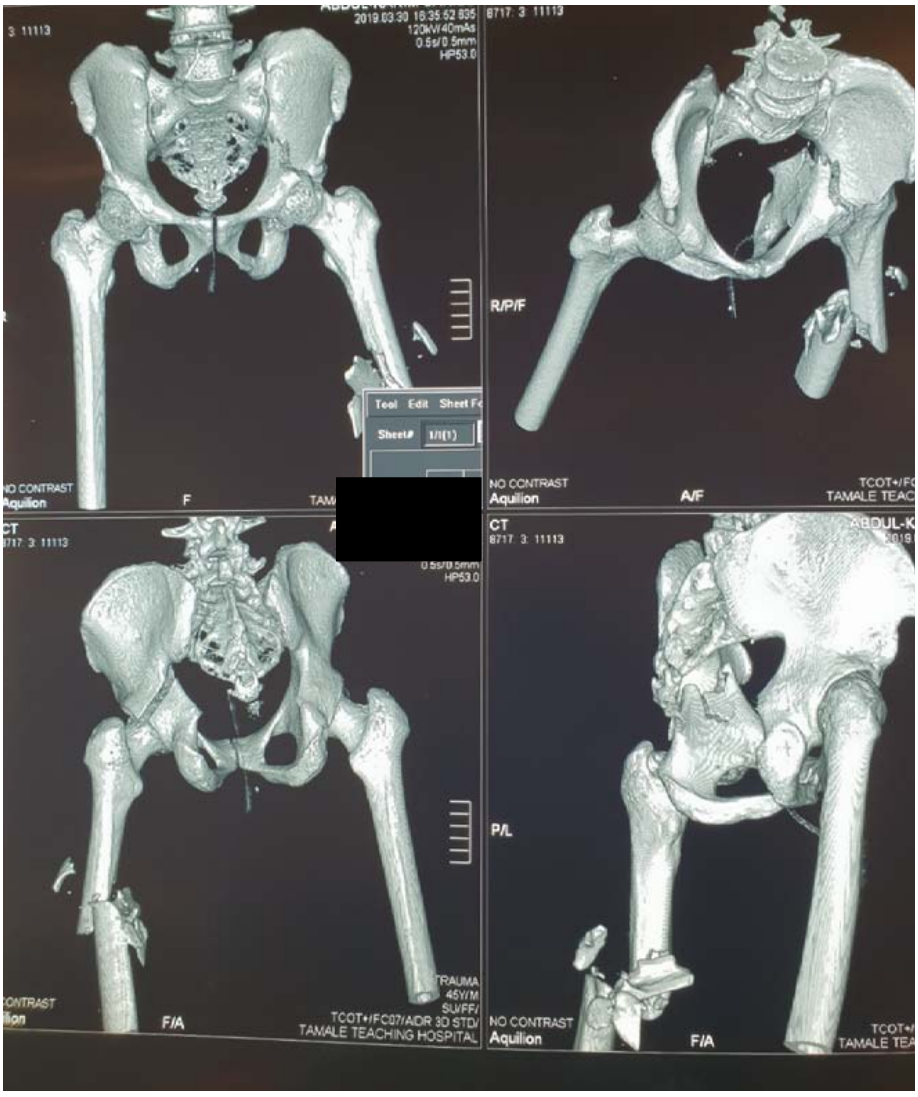
CASE REPORT

A 45 year old male presented to the Accident and Emergency Department on 28th March 2019 with a painful, swollen, deformed left hip and thigh. He was a passenger on a motorcycle without crushed helmet moving at a high speed and accidentally ran onto the back of a moving vehicle. He fell and landed on his left side, without loss of consciousness. He was brought to the Accident and Emergency Department two hours post injury .On evaluation, Glasgow Coma Scale (GCS) was 15/15, SPO2 was 100% at room air, pulse rate 110 bpm, RR 16cpm, and blood pressure 108/71mmHg. There was nothing significant on systemic examination. The left thigh was deformed, swollen, laterally rotated, and shortened about 3cm. There were bruises on the thigh and leg. The femoral, popliteal, posterior tibia, and dorsalis pedis pulses were present and normal. There was no neurological deficit. Patient had no comorbid conditions.

Laboratory Investigations and Imaging: HB = 7.3g/dl, WBC = 7.02 × 10 /L,PLT = 184 × 10 /L, Renal function: normal.

Figure 1

Preoperative 3D CT scan showing the ipsilateral transverse acetabular and femur fractures



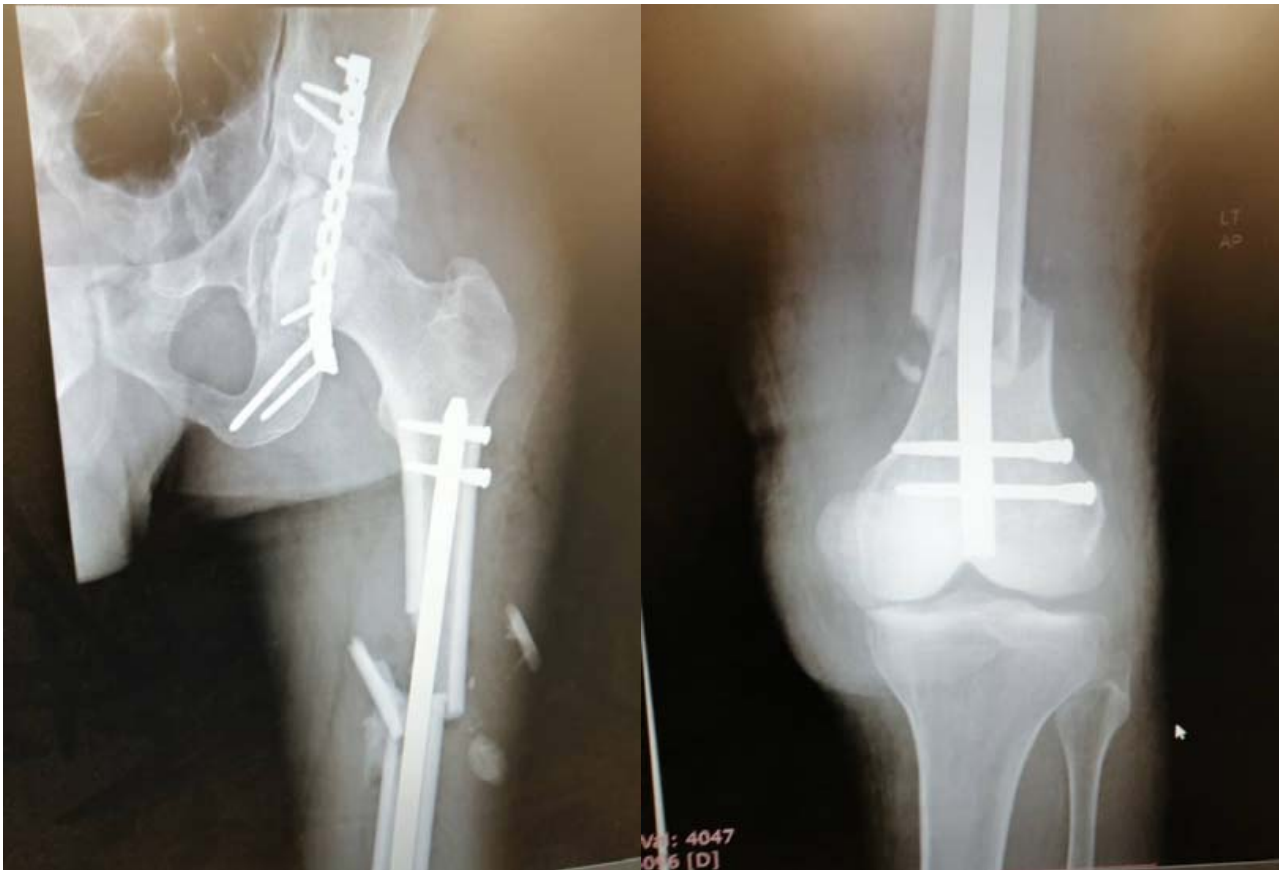
A diagnosis of closed transverse acetabular fracture (transtectal) and ipsilateral segmental fracture of the left femoral shaft was made.

Management

The patient was resuscitated and optimized with intravenous fluids and transfusion of three units of blood to an HB of 10.5g/dl before surgery on 8th April 2019. The segmental femoral shaft fractures were exposed and reduced through two lateral mini-incisions over the fractures and stabilized by locked retrograde intramedullary nailing through a lateral parapatellar tendon incision. Proximal and distal locking screws were inserted. Then in a semiprone position, the posterior column of the acetabulum was exposed through Kocher-Langenbeck incision. The posterior column was directly reduced with the aid of Schanz screws in the ischial tuberosity and K-wire and stabilized with 3.5mm reconstruction plate and screws. Both surgeries were done in a single setting. Total surgery time was 3 hours, 15mins with about 600mls of blood loss. Intravenous cefuroxime was given as prophylactic antibiotic for 24 hours. The immediate postoperative period was uneventful.

Figure 2

Immediate postoperative X-ray of the patient



He started hip and knee joint exercises passively on postoperative day two. He gradually graduated to full joint mobilisation and muscle strengthening exercises, before he was eventually mobilized out of bed. He was discharged home two weeks after surgery and then reviewed at 6 weeks, 3 months, 6 months, and 12 months. Due to the high cost of CT scans in our setting, healing was assessed clinically by the absence of pain when patient is walking and with the absence of obvious fracture lines on the plain radiographs.

Dynamization of the nail was done by the removal of the static screw, six months after surgery when healing of the femur fracture was delayed, and he was encouraged to continue weight bearing.

During review at 12 months, the patient was walking without support and had a non-painful limb, full knee flexion of about 115 degrees, and can squat.

Figure 3

12 months postoperative X-rays of patient's healed proximal left femur and acetabular fracture

Figure 4

12 months postoperative X- rays of the patient left distal femur

DISCUSSION

A reported case of a patient who sustained a transverse acetabular and ipsilateral segmental femoral shaft fracture following a road traffic accident. The challenge to the management of this patient was whether to fix both fractures on the same setting or to do a stage fixation. Secondly,the fracture to fix first was another issue. We decided on a single staged procedure since the patient was physiologically stable after optimization and skilled and experienced hands were available. The femur was fixed first by a mini-open procedure with two separate incisions laterally over the fracture sites about 3-5cm each by a retrograde approach in a supine position and locked without the use of an image intensifier (sign nail technique) after which the acetabular fracture was fixed posteriorly since the transverse acetabular fracture displacement was marked posteriorly, using the Kocher-Langenbeck approach in a semi-prone position. The decision on which fracture to fix first and with what approach to use sometimes is not straight forward as some proximal femoral fractures in young people would have to be given priority. These sometimes alter the approach available to the surgeon when it is time to fix the acetabulum. In this case, the associated fracture did not pose that challenge. We, however, chose to approach the fracture retrograde because of its distal supracondylar positioning contrary to the usual ante-grade approach (12).

The femur was fixed first to provide a good fulcrum for traction to aid reduction of the acetabular fracture and to provide an anatomical lead to the location of the external rotators of the hip for adequate exposure. In our case, the transverse acetabular fracture was managed by fixation of only the posterior column using Kocher-Langenbeck approach alone which is different compared to a similar acetabular fracture which was managed by fixing both columns using modified Stoppa and Kocher-Langenbeck approaches (5), however, with comparable results. This choice of management is also supported by the findings of Giordano *et al* (7), which reported similar outcomes for either a single column or both columns fixation of transverse acetabular fractures. Additionally, in either fixation, one of the most important good prognostic factors is anatomical reduction, and orthopaedic surgeons should therefore strive for this (7).

Transverse acetabular and ipsilateral segmental femoral shaft fractures are extremely rare and usually result from high-energy trauma. These injuries mostly occur as part of polytrauma. Fortunately, this patient did not sustain other injuries. The results obtained from this technique for transverse acetabular and segmental femoral shaft fracture reconstructions are satisfactory. We believe the technique is ideal for the given circumstance and can be the primary treatment option for these fractures in low resource settings in experienced hands.

CONCLUSIONS

Transverse acetabular and ipsilateral segmental femoral shaft fractures are extremely rare and are high-energy trauma, especially in multiple trauma patients. Additionally, treatment of these fractures poses challenges to trauma and orthopaedic surgeons. We believe that critical preoperative planning and femoral shaft fixation with retrograde locked intramedullary nailing followed by fixation of the transverse posterior component of the acetabulum alone provides satisfactory results, and is therefore an appropriate surgical option for this fracture pattern.

Conflict of interest: The authors declare that there is no conflict of interest regarding the publication of this paper.

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