Bilateral displaced acetabular fractures associated with an open book injury of pelvis

H Mahdane1*, M Elidirissi1, A Mardy1, M Shimi1, A Elibrahimi1, A Elmrini1

Abstract
Introduction
A displaced bilateral acetabular fracture associated to an “open book injury” and sacroiliac disruption is a very rare lesion association in the same patient. We report a case of bilateral displaced acetabular fractures associated with an open book injury of the pelvis.

Case report
A 40-year old male taxi driver who presented after a highway accident who presented a right sacroiliac joint disruption, pubic diastasis and bilateral displaced acetabular fracture who were treated by surgical stabilization, with a good result in two years.

Discussion
The present report highlights a complex pelvic trauma. This fracture pattern does not fit into any of the standard classifications of acetabular and pelvic fractures individually. Despite a higher magnitude of the total surgical stabilization plan, we planned the procedure at one time. After using two posterior approaches to stabilize the acetabular fractures, the external fixator was used to stabilize the pubic diastasis. Closed reduction was performed before the final tightening of the frame. The patient was an excellent clinical result after surgery.

Conclusion
In our experience and as per the existing indications of surgery, the displaced bilateral acetabular fracture and the grade 3 pubic diastasis were provided for surgical stabilization.

*Corresponding author
Email: hicham.mahdane@gmail.com

1 University Hospital Center Hassan II, Fez, Morocco

Introduction
A displaced bilateral acetabular fracture associated to an “open book injury” and sacroiliac disruption is a very rare lesion association. All the existing reports of the bilateral acetabular fractures in the literature are of low energy injuries resulting after epileptic seizures/myoclonus or as a non-traumatic entity in the severely osteoporotic patients1,2,3,4,5,6.

There is only one report in the literature of high energy traumatic injury causing a combination of displaced bilateral acetabular fractures, an open book injury of the pelvis and sacral fracture in the same patient7.

In our case report, we present a post-traumatic displaced bilateral acetabular fracture associated with a grade 3 disruption of the pubic symphysis and a right-sided sacroiliac joint disruption. Such a complex injury is very rare, and can be a therapeutic challenge for the surgical team.

Case report
A 40-year old male taxi driver presented in the emergency department after a highway accident. (The car of the patient, who did not put the seat belt, was overthrown after hitting a tree).

There was a history of momentary loss of consciousness. There was no bleeding from nose/ear/mouth. There was no episode of vomiting, and urine was clear. The patient was haemodynamically stable with an initial blood pressure of 110/70 mmHg.

He received initial resuscitation with implementing 2 peripheral venous catheters, urinary catheter, a pelvic binder and bilateral skeletal traction through proximal tibial Steinman’s pins. The patient haematocrit level was observed and remained stable throughout his admission. The CT scan of the head was normal. There was no injury to the trunk. Neurological and vascular exams were unremarkable. X-ray pelvis (Figure 1) showed right-sided sacroiliac joint disruption, pubic diastasis of 31 mm and bilateral acetabular fracture.

A CT scan with 3D reconstruction showed a pubic diastasis with sacroiliac disruption on the right side, posterior column fracture of right acetabulum, and posterior wall fracture of the left acetabulum (Figure 2A and Figure 2B). The pelvic trauma was an “open book” injury (classified B1.2 type according to the classification of Tile amended by AO), as seen after a heavy Antero-posterior impact to the groin (pubis), with external rotation of the hemipelvis.

The patient was admitted in our department of bone and joint surgery. We directly planned for definitive fixation of fractures. On the 5th day after trauma, the patient was operated for all their fractures at the same time.

The first surgery was performed by using a Kocher Langenbeck approach through proximal tibial Steinman’s pins. The patient haematocrit level was observed and remained stable throughout his admission. The CT scan of the head was normal. There was no injury to the trunk. Neurological and vascular exams were unremarkable. X-ray pelvis (Figure 1) showed right-sided sacroiliac joint disruption, pubic diastasis of 31 mm and bilateral acetabular fracture.

Figure 1: Plain X-ray showing: right sacroiliac disruption (arrow A), right acetabular fracture (arrow B), pubic diastasis (arrow C) and left acetabular fracture (arrow D).
on a patient in left side decubitus to stabilize the right acetabular fracture; we used for this a 6 holed anatomical screwed plate. After closure of the wound, the left acetabular fracture was secondary approached after positioning the patient in right side decubitus. Through the same approach (Kocher Langenbeck), we stabilized the posterior wall of the acetabulum with two 4,5 mm screws.

The second stage of the surgery was performed after stabilization of the acetabular fractures. The patient was installed in dorsal decubitus position, after reduction of the pubic diastasis by external manipulation under fluoroscopy control; the pelvic ring was fixed by an external Fixator (Figure 3A). The stability of the pins was tested clinically and by checking plain radiographs taken in the operating theatre to see that the pins were in bone.

As a prophylaxis against ectopic ossification, the patient was administered 75 mg indomethacin daily for 8 weeks.

Due to bilateral injury, the patient was allowed mobilization in the bed only for 3 months. The external Fixator was removed after an 8 weeks. Mobilisation on crutches began after 3 months and continued with aggressive physical therapy to help strengthen his legs.

At 2 years post injury, all the fractures showed the evidence of union (Figure 3A and Figure 3B). The functional result was excellent, and patient was able to walk painlessly without any support. The Harris hip score was 97,5 on right side and 97 on the left side, and the patient returned to the pre-injury occupation.

Discussion

The present report highlights a complex pelvic trauma, resulting from multidirectional forces; an "open book" injury is resulting from Antero-posterior compression, and bilateral acetabular fracture from axial loading of the semi-flexed hip. This fracture pattern does not fit into any of the standard classifications of acetabular and pelvic fractures individually.

In the literature, this type of injury has been documented only one time, with displaced bilateral acetabular fractures, an open book injury of the pelvis and sacral fracture, this patient was operated with 2-stage surgery.

The first surgery was performed by using a combined posterior and anterior surgical approach to stabilize the left acetabular fracture with anterior and posterior plates, and an anterior Pfannstiel approach for the pubic diastasis which was fixed with a reconstruction plate. Using a cautious attitude and to decrease the surgical stress to the patient, the second stage of the surgery was performed after 7 days of the first surgery. The right acetabular fracture was fixed with anteriorly applied reconstruction plate through the ilioinguinal approach.

Despite a higher magnitude of the total surgical stabilization plan, we planned the procedure at one time. After using two posterior approaches to stabilize the acetabular fractures, the external fixator was used to stabilize the pubic diastasis, closed reduction was performed before the final tightening of the frame.

External fixator continues to be essential tools in the urgent treatment of high energy pelvic fractures. In our centre, we use, whenever possible, the external fixator to stabilize pelvic fractures, for some of these cases this can be the definitive treatment as the external fixation will give good alignment and sufficient stability for walking.

In agreement with the literature, we see that definitive stabilization of pelvic fractures may be achieved with external fixation in certain rotationally unstable but vertically stable injuries, it's more applicable to stable "open book" pelvic fractures in which there is an intact posterior tension band. The external fixation is also used for internally rotated injuries, and to control haemorrhage in vascular injuries.

Conflict of interests: None declared.

All authors contributed to conception and design, manuscript preparation, read and approved the final manuscript.

All authors abide by the Association for Medical Ethics (AME) ethical rules of disclosure.
In open pelvic fracture or abdominal injury with peritoneal contamination, the use of an external fixator allows control of this fracture pattern and decreases the potential infection rate.

In our case, the use of external fixation not only allowed us stable reduction, but also the possibility of operating the patient at one time, reducing blood loss during surgery, and reducing operative time, thus decreases the surgical stress to the patient.

We used Harris’ hip score for the evaluation of functional results because it was rated as a successful tool for measuring the outcome of acetabular fractures. At final follow-up, the excellent clinical result of our patient can be attributed to the anatomical reduction, and precocious stabilization of the acetabular fractures (5th day); since the stabilization of acetabular fractures after a delay of more than 2 weeks has been reported to give inferior results. At final follow-up, the excellent clinical result of our patient can be attributed to the anatomical reduction, and precocious stabilization of the acetabular fractures (5th day); since the stabilization of acetabular fractures after a delay of more than 2 weeks has been reported to give inferior results.

Conclusion
In our experience and as per the existing indications of surgery, the displaced bilateral acetabular fracture and the grade 3 pubic diastasis were provided for surgical stabilization.

Consent
Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

References