

Clinical Management, Prognosis, and Outcomes of Bilateral Acetabular Fractures: A Case Report

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Abstract

Background: Bilateral acetabular fractures are a rare type of acetabular fracture, and due to the scarcity of information regarding these types of fractures, managing bilateral acetabular fractures presents significant challenges. We presented a 25-year-old man with bilateral acetabular fractures (left transverse fracture of the acetabulum and right posterior column fracture of the acetabulum) secondary to severe trauma following a road accident with no other pelvic damage.

Case Report: Because the displacement was more on the patient's left side (although the patient's pain was more on the right side), the open reduction and internal fixation (ORIF) surgery was first performed on the left side, and secondary ORIF surgery was performed on the right side, under general anesthesia with Kocher-Langenbeck approach for both sides.

Conclusion: Due to the increase in road traffic accidents (RTAs) and improper safety of cars, especially in developing countries, this type of fracture may be repeated in the future, and regarding the complexity and comorbidities associated with this type of fracture, the high experience of the surgeon and detailed investigations are required to achieve successful results.

Keywords: Acetabulum; Fractures; Wounds and Injuries

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Background

Bilateral acetabular fracture is a rare type of acetabular fracture and typically results from severe and high-energy trauma, often associated with severe injuries sustained in road traffic accidents (RTAs) (1-3). The literature also identifies other causes of bilateral acetabular fractures, including those occurring after epileptic seizures, from low-energy trauma, or as non-traumatic fractures in osteoporotic individuals and elderly patients with acetabular insufficiency (1, 3-11). These types of fractures can be accompanied by conditions such as hip dislocation and other vital organ injury, and as a result, they can be life-threatening due to excessive blood loss (2, 12, 13).

On the other hand, due to the rarity of this type of fracture among trauma patients, not many studies have been conducted in this field, and there are no detailed guidelines for the management of these patients in the literature (2, 14, 15). As a result, due to the scarcity of information regarding these types of fractures, managing bilateral acetabular fractures presents significant challenges (2).

We presented a 25-year-old man with bilateral acetabular fractures resulting from severe trauma following an RTA without any additional pelvic damage.

Case Report

A 25-year-old man without past medical conditions was admitted to our hospital three days after an RTA as the patient's car had hit another car head-on with high energy which pushed the patient into the back seat. He was first admitted to another center after the accident for emergency management with multiple trauma diagnoses.

The patient's main complaints were abdominal, chest,

and bilateral lower limb pain. Moreover, he had restricted movement in both lower limbs. The patient also had head trauma and loss of consciousness at first. On entering the primary center, vital signs were as follows: blood pressure (BP) = 110/70, respiratory rate (RR) = 16, O₂ saturation = 90%, pulse rate (PR) = 110, and temperature (T) = 37.1 °C. The calculated injury severity score (ISS) for the patient was 21.

He was transferred to the intensive care unit (ICU) due to head and chest trauma and received serum therapy, pack cell (one unit), and other supportive treatments. The radiological assessment was performed after the patient's hemodynamic state stabilized. In the brain computed tomography (CT) scan that was performed for the patient, the result was normal, and no evidence of brain damage or bleeding was visible. In the chest CT scan, mild pulmonary contusion and mild pneumothorax was reported for the patient. Bilateral fractures in the hip and retroperitoneal hematoma were detected in the abdominopelvic CT scan. The patient also had a laceration of about 1 cm on the chin, which was sutured and did not require any other treatment.

In our center, the patient's vital signs on arrival were as follows: BP = 110/60, RR = 18, O₂ saturation = 97%, PR = 92, and T = 36.8 °C. Due to the bilateral hip tenderness on examination, X-rays [oblique and anteroposterior (AP)] and a three-dimensional (3D) CT scan of the pelvis were done, and the following diagnoses were revealed: (i) left transverse fracture of the acetabulum and (ii) right posterior column fracture of acetabulum according to Letournel classification of acetabular fractures (16) (Figures 1 and 2).

Neurovascular examinations, which included pulses and examination of the sciatic, peroneal, and tibialis nerves (sensation and movement), were performed before and after surgery for the patient, which were completely normal.

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Figure 1. Initial pelvis radiographs [anteroposterior (AP)] before surgery

The patient was administered a daily subcutaneous injection of 40 milligrams of Clexane during hospitalization, with monitoring of disseminated intravascular coagulation indicators. The treatment discontinued one day prior to the operation.

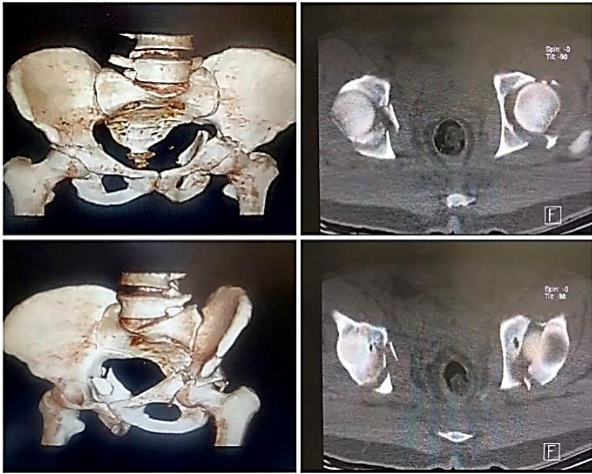


Figure 2. Three-dimensional (3D) reconstruction computed tomography (CT) scan images showing left transverse and right posterior column fracture of acetabulums

The patient's pain was more on the right side, but due to more displacement on the left side, primary open reduction and internal fixation (ORIF) surgery was performed on the left side, and secondary ORIF surgery was performed on the right side, under general anesthesia with Kocher-Langenbeck approach for both sides (Figures 3 and 4).



Figure 3. Radiograph after the first open reduction and internal fixation (ORIF) surgery (left side)



Figure 4. Radiograph after the second open reduction and internal fixation (ORIF) surgery (right side)

The post-operative 3D scan and radiography revealed satisfactory findings, and two days after the second operation, the patient was discharged. After the surgery, weight-bearing was not allowed, and the patient was kept in a wheelchair for three months due to a bilateral fracture. Physiotherapy to prevent muscle atrophy of the quadriceps, hamstring, and abductors was recommended, and follow-up radiography was done after one month.

Discussion

The cause of bilateral acetabular fractures in this study was an RTA. In the review of the literature, there are different causes, including fractures during epileptic seizures, high-energy trauma, osteoporosis, and fractures in the elderly. Most bilateral acetabular fracture case reports were with seizure or osteoporosis (3-5, 7-9). Nodzo et al. reported an adolescent with an immature skeleton who had bilateral acetabular fractures with low-energy trauma (6). Among the causes of this type of fracture, those caused by high-energy trauma are very limited, and only a few cases were found in the review of the literature. Kenmegne et al. in a retrospective study reported 18 cases of traumatic bilateral acetabular fracture due to trauma (17). In a review study, Mousafeiris et al. investigated 37 bilateral acetabular fracture studies and the most common injury mechanisms were high-energy injuries and seizures, respectively (18).

One of the reasons for the rarity of this type of fracture is that a unique force pattern and degree are needed to make it (14). The present case had left transverse and right posterior column of acetabulum fractures, and according to the previous studies in the field of the fracture pattern, possible force, and hip position during the injury, it is possible that applied force was along the axis of the femoral shaft and hip was flexed. Additionally, transverse and posterior column fractures occur when the hip is abducted 50 degrees and 15 degrees, respectively (16). Ingle et al. reported a 28-year-old man with bilateral fractures of the anterior column of the acetabulum with high-energy trauma following RTA (2).

In another study, Boussarki et al. reported two cases with bilateral acetabular fractures resulting from a traffic accident. In the first case, the fracture involved the anterior wall of the left acetabulum and the posterior wall of the right acetabulum. In the second case, the fractures included the posterior wall of the right acetabulum and a transverse fracture of the left acetabulum (14). Further, Kenmegne et al. reported a 48-year-old woman with

fractures of both columns of the left acetabulum and posterior wall plus transverse of the right acetabulum following RTA (1). In another case report study, Smith et al. reported a case of a 27-year-old woman with anterior wall fracture on the left acetabulum and column fractures on the posterior and right, managed with ORIF surgery on the right side, while the left side was managed conservatively (19).

About 18%-19% of acetabular fractures are associated with head and chest injuries (20). In our case, the patient came with head trauma, chest injury, and loss of consciousness. Consistent with our case, in the previous cases of bilateral acetabular fractures due to trauma, there was often chest and/or head injury (1, 2, 14).

In the present case, head and chest trauma happened because of the mechanism of the accident and the simultaneous contact of the head with the windshield and the chest with the steering wheel. Probably, due to the type of force that causes bilateral acetabular fractures, bilateral fractures are more likely to be associated with head and chest injuries compared to unilateral fractures.

Controversial management was suggested for bilateral acetabular fractures; cementless total hip arthroplasty (8, 9, 21, 22), conservative management (4, 7), and ORIF as gold standard treatments are some options for this type of fracture (1, 9). In the present case, ORIF was considered, and we used the Kocher-Langenbeck approach for both acetabulums. We had to put an additional push plate on the right side for a better reduction.

One of the most important challenges in the mentioned case is the timing of the surgery, and early surgery can be associated with better results (1). When ORIF surgery is considered, ideally, it should be performed within four days, and it is better not to delay more than three weeks (16, 23, 24). However, usually, in these patients, due to time spent in the primary center for initial stabilization, possible other injuries according to the severity of the trauma, and waiting for some laboratory markers to normalize, it is likely to be a challenge to perform surgery at the ideal time (1). In our case, considering all these issues, the first surgery was performed 14 days after the accident.

Conclusion

The present case was one of the few cases of bilateral acetabular fracture resulting from an RTA, which was effectively treated with ORIF surgery on the left and right side with the Kocher-Langenbeck approach for both sides, respectively. Due to the increase in RTAs and improper safety of cars, especially in developing countries, this type of fracture may be repeated in the future, and regarding the complexity and comorbidities associated with this type of fracture, the high experience of the surgeon and detailed investigations are required to achieve successful results.

Conflict of Interest

The authors declare no conflict of interest in this study.

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