

Case Report

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Fixation of Acetabulum Fractures via modified Stoppa Approach: A Case Report

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Abstract

The fracture of the acetabulum are complex injury because of the close proximity to the neurovascular structures and internal organs [1]. The goals in the treatment of acetabular fractures are to achieve accurate anatomical reduction, stable fixation, and early rehabilitation [2]. The management of acetabular fractures is challenging due to the difficulties within the surgical approach [3]. The commonly used surgical approach for intrapelvic fractures is the ilioinguinal approach which was first described by Letournel in 1961 [4-6]. The disadvantage of this approach is the limitation in reduction and fixations space of fracture and complicated anatomy structure. The modified Stoppa approach serves as an alternative to this approach in the treatment of the acetabular fracture [7]. Case report: A 24-year-old male sustained a motor vehicle accident and complained of pain in his left hip post-trauma. The plain radiograph showed fractures over the anterior and posterior wall of the acetabulum, anterior column, and left iliac wing. Computed tomography (CT) scan showed a comminuted fracture of anterior and posterior walls of the left acetabulum involving the quadrilateral plate with a superior extension of fracture to the left iliac wing. The acetabular fractures were treated with open reduction and internal fixation via a modified Stoppa approach to access the pelvic ring injury. The patient was followed up and began partial weight-bearing at the sixth to eighth-week post-operation. Plain radiographs of anteroposterior and lateral were taken at follow-up for evaluation of bony union. Conclusion: The surgical approach in the treatment of fracture of the acetabulum depends on the fracture pattern. The quality of fixation and reduction is important to provide good functional outcomes for the hip by reducing the risk of arthritis of the joint.

Keywords: Fracture, Pelvic Fracture, Surgical Approach.

INTRODUCTION

Fracture of the acetabulum is an intra-articular fracture of the hip joint which is a crucial weight-bearing structure [2, 5]. The goal of the treatment for an acetabular fracture is to restore the pelvic structure stability and congruity of the hip joint by achieving an anatomical reduction of the fracture. Restoration of the articular surface anatomically and stable fixation is important for good long-term functional outcomes [5, 8]. The most common classification used for acetabular fractures is the Letournel and Judet classification which classifies all types of fractures into elementary and associated types according to anterior and posterior columns and walls [9]. Surgical intervention is the gold standard of treatment for unstable and displaced fractures of the acetabulum [5]. The pattern and type of fractures of the acetabulum determined which surgical approach is used [8]. Different surgical approaches have been described for acetabular fractures which are categorized into extensile, anterior, posterior, and combined approaches. The challenge in internal fixation and reduction of the acetabular fracture is due to its complicated anatomical structure and deep location [2]. The commonly used surgical approach for intrapelvic fractures is the ilioinguinal approach which was first described by Letournel in 1961 [4-6]. The disadvantage of this approach is the limitation in reduction and fixations space of fracture and complicated anatomy structure. The Stoppa approach serves as an alternative to this approach in the treatment of the acetabular fracture [7]. This ilioanterior approach consists of a combination of low Pfannestiel with an incision at the iliac crest was first described by Stoppa et al in the repair of hernia using Dacron. Hirvensalo et al reported the use of the Stoppa approach in fractures of the acetabulum in 1993 [10]. The modified Stoppa approach is employed by Cole and Bolhofner et al in the treatment of acetabular fractures [3, 4]. This approach provides wide visualization from the anterior aspect of the sacroiliac joint up to pubic symphysis [8]. In addition to that, this approach also allows direct visualization of the quadrilateral plate of the acetabulum and this enables accurate reduction and fixation of medially displaced fractures [4].

The informed consent was taken from the patient.

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CASE REPORT

A 24-year-old male with no known medical illness sustained a motor vehicle accident where he was skidded from a motorcycle. The patient fell on the left side of his body and complained of pain in the left hip post-trauma. Physical examination showed that patient had pain in the left hip with a reduced range of motion over the left hip. Distal pulses of the left lower limb are palpable comparable with the contralateral limb and the sensation is intact. The plain radiograph showed fractures over the anterior and posterior wall of the acetabulum, anterior column, and left iliac wing. (Figure 1) Computed tomography (CT) scan and the three-dimensional image showed a comminuted fracture of the anterior and posterior walls of the left acetabulum involving the quadrilateral plate. CT scan also noted superior extension of fracture to the left iliac wing. (Figure 2) The surgical procedure was done with a modified Stoppa approach to access the internal pelvic ring. The corona Mortis vessels were identified and ligated to prevent bleeding. The acetabular fractures were reduced and a reconstruction plate (Reconstruction Plate 3.5mm, Synthes) was placed to maintain the reduction of the anterior column and wall. The posterior column was fixed with a cannulated screw (Cannulated screw 7.3mm, Synthes). The left iliac wing fracture was reduced via the iliac fossa approach and a reconstruction plate (Reconstruction Plate 3.5mm, Synthes) was placed. The patient was followed up and began partial weight-bearing at the sixth to eighth-week post-operation. Full weight-bearing was allowed when radiographs showed the fracture healed and callus present. Plain radiographs of anteroposterior and lateral were taken at follow-up for evaluation of bony union. (Figure 3) Patient able to ambulate with full weight bear after 2 months.



Figure 3: Plain radiograph of the pelvis

DISCUSSION

Fractures of the acetabulum commonly involve the anterior and posterior aspects of the acetabulum. It is crucial to achieve stable fixation of the pelvic ring to stabilize the pelvic ring [10]. The surgical treatment requires an operative approach that allows proper fracture exposure to achieve good reduction [11, 12]. Different approaches were described such as ilioinguinal, iliofemoral, Kocher-Langenbeck, extended iliofemoral, combined anterior and posterior, transtrochanteric and triradiate [4]. The ilioinguinal approach and modified Stoppa approach are widely used in the management of intrapelvic fractures involving anterior elements [3, 12-14]. The disadvantage of the ilioinguinal approach is fractures need to be exposed in three windows of tissue spaces including the spermatic cord or the fallopian arch, femoral nerve, and external iliac lymph and vessels causing this approach to be complex. Many authors had reported complications of this approach such as lateral femoral cutaneous nerve, higher rate of infection, and iliac vein injuries [2, 5, 15]. Modified Stoppa approach was able to avoid these complications as the subperiosteal dissection along the pelvic brim through symphyseal exposition prevent contact with major vessels and nerve [5, 10]. Modified Stoppa approach allows direct visualization of the quadrilateral plate, the Corona Mortis (anastomosis of obturator vessels and external iliac vessels), from the pubic symphysis to the anterior aspect of the sacroiliac joints and the lateral sacral ala by posterior dissection with the elevation of the external iliac vessels [1-4, 8, 14, 15]. Kim et al reported that exposure to the posterior column from the greater sciatic notch to the ischial spine can be achieved via the modified Stoppa approach [2]. Modified Stoppa approach direct exposure allows direct buttressing of the acetabular fractures with central protrusion of femoral head [3, 13]. This is also described by Shazar et al that reduction in posterior column fractures was able to be achieved [1]. Hence, the modified Stoppa approach is commonly used in the treatment of anterior column and wall fractures, transverse T shape, and anterior column combined with posterior half transverse fractures [1, 5, 11, 14, 16]. Modified Stoppa approach provides an extension of visualization of the surgical field of the pelvis for bilateral acetabular fractures [2]. Direct visualization of the fractures able achieved in our patient via a modified Stoppa approach. The fracture of the posterior column was treated with screw fixation using cannulated screw because the fracture was not displaced extensively. The iliac wing fracture was visualized via a small lateral window. The patient was able to ambulate with weight-bearing and no other complications were recorded. The combined modified Stoppa approach and iliac fossa were less invasive and has less surgical time and bleeding compared with the ilioinguinal and Kocher-Langenbeck approaches. Rocca et al reported the anterior combined endopelvic approach which consists of a modified Stoppa approach to the iliac crest) has a better advantage in terms of blood loss and clinical outcome compared to the ilioinguinal approach [12]. Modified Stoppa approach achieved 77.3% anatomical reduction in acetabular fractures while Letournel et al reported 73% in a patient treated with the ilioinguinal approach [2]. The



Figure 1: Plain radiograph of anteroposterior view of the pelvis



Figure 2: Three-dimensional (3D) image of pelvis

limitations of the modified Stoppa approach are in patients with obesity, a history of the pelvis and abdominal surgeries, and have fractures for more than 3 weeks [11].

CONCLUSION

The option of surgical approach in the treatment of fracture of acetabulum depends on fracture pattern, displacement direction, the timing of surgery, and skin condition at the surgical incision site. The quality of fixation and reduction is important to provide good functional outcomes for the hip by reducing the risk of arthritis of the joint post-operation.

Conflict of Interest

None declared.

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