

## Outcome of Only Posterior Approach in Acetabular Fractures Involving Both Columns

Piyush Mittal\*, Sandip Rathod\*\*, Amit Kumar\*\*\*, Parth Patel\*\*\*

### Abstract :

**Objective :** Clinical outcome in patients with acetabular fractures involving both columns was done in civil hospital, Ahmedabad, aiming to evaluate the efficacy of posterior approach and its radiological and functional outcome. Quality of reduction directly correlates with functional outcomes and increases rate of anatomical reduction when performed <2 weeks. ( $p < 0.05$ ) **Materials and methods :** 20 cases were included with both column fractures. T-fractures and severely displaced both column with spur sign were excluded. Preoperative radiographs and CT scan were done to evaluate the fracture. Timing of surgery was noted. Surgery was performed under fluoroscopic guidance. Follow-up radiographs and functional status was assessed using Harris hip score. **Result :** Majority of the patients i.e., 12 out of 20 patients had Harris Hip score >90 after 6 months of the post-op. 4 patients had satisfactory score of 70- 90. 4 patients had poor outcome with score <60. Follow-up radiographs showed good reduction maintenance and union in 15 patients (75%). **Conclusion :** Its suggested that acetabular fractures involving both columns (excluding severely displaced both column and T fractures) can be managed by a single posterior approach with good clinical outcome along with lesser soft tissue complications and lesser hospital stay.

**Key words :** Acetabular Fractures, Only Posterior approach

### Introduction :

There is an increase in rate of acetabular fractures due to an increase in road traffic accidents. Fractures of the acetabulum occur primarily in young adults as a result of high- velocity accidents. Displacement of the fracture fragments leads to articular incongruity of the hip joint and results in an abnormal pressure distribution on the articular cartilage surface.<sup>(1-6)</sup> This can lead to rapid breakdown of the cartilage surface, resulting in disabling of the hip joint. Anatomic reduction and stable fixation of the fracture, such that the femoral head is concentrically reduced under an adequate portion of the weight- bearing dome of the acetabulum, is the treatment goal in these difficult fractures.<sup>(3,7,8)</sup> With advances in imaging technologies, The Kocher-Langenbeck (K-L) approach is the most commonly used surgical exposure for the stabilization of acetabular fractures involving a displaced posterior component. However, controversy exists regarding the surgical approach for management of fractures

involving both the anterior and posterior columns of acetabulum. The conventional method of fixation of both columns separately through combined anterior and posterior approaches or extensile approaches have been reported to have significant intraoperative and postoperative complications.

Keeping in view the aggressive nature of combined anterior and posterior approaches and extensile approach, the concept of management of these fractures with a single posterior approach emerged. This study was designed to evaluate the effectiveness of a single approach for the management of fractures involving both columns with majority involving the combined transverse and posterior wall pattern. These fractures create a challenging situation for the surgeons in terms of understanding the dimensions of osseous injury and selection of surgical approach as malreduction can lead to post-traumatic arthritis.

### Material and methods :

20 adult patients (15 males and 5 females) presenting in emergency department of Civil hospital from July 2015 to March 2017 having acetabular fracture involving both the anterior and posterior column were included in the study. All patients were operated by a single operating team. Open reduction and internal fixation

\* Associate Professor,

\*\* Assistant Professor,

\*\*\* Resident, Department of Orthopaedics,

B J Medical College & Civil Hospital, Ahmedabad, Gujarat, India

Correspondence to : Dr. Sandip Rathod,

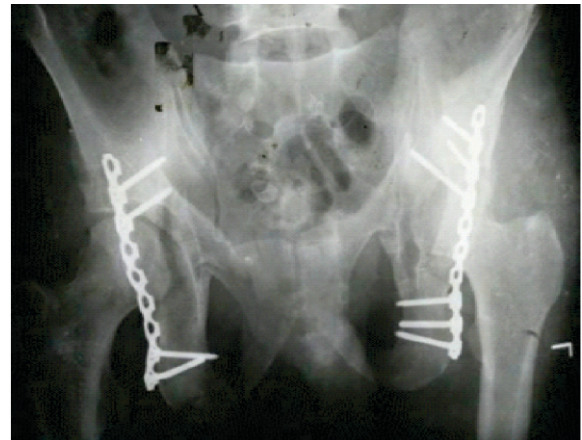
e-mail: drsandiprathod241@gmail.com

with reconstruction plate and cortical screws was done by exposing and reducing the posterior acetabular column through Kocher-Langenbeck approach. Additional lag screw was used to stabilize anterior column in some cases after indirect reduction, digital palpation through the greater sciatic notch and confirmed with C arm images. Maintenance of reduction was confirmed postoperatively by AP and Judet radiographic views. Third generation cephalosporin, as per hospital protocol, were administered postoperatively for five days. The median hospital stay was five days (ranging from four to nine days). Wound dressing was done two times and stitches were removed on the 12th day. Quadriceps exercises were advised as pain permitted. Patients were brought out of bed as early as possible (usually 1 month) and were kept non weight bearing. They were advised to use walker for locomotion with partial weight bearing gradually progressing to full weight bearing after evidence of radiological union (on average 12 weeks). Reduction quality of all acetabular fractures was assessed using three standard postoperative radiographs (AP and two 45° oblique Judet views) as well as intraoperative fluoroscopy. Displacement of >3 mm was considered as unsatisfactory. The quality of reduction was also analyzed with operative time and timing of surgery. Patients were followed up regularly up to 6 months postoperatively and clinical assessment done. The radiological and functional outcome was assessed. Harris hip score was evaluated after the end of 6 month follow up period and results were analyzed.

**Figure 1 : A 40 years male with transverse fracture (fair reduction).**



**Figure 2 : Bilateral acetabulum fracture in 35 years old male (good reduction).**



**Figure 3: Transverse fracture in 55 years old male (poor reduction).**



### Results :

There were no statistically significant differences between anatomic reductions and nonanatomic reductions in regards to gender, body mass index, mechanism of injury, use of skeletal traction, marginal impaction, wall comminution ( $P > 0.05$ ). The timing of surgery in good reductions was also significantly shorter than that of poor reductions ( $P = 0.02$ ). The postoperative functional results were graded as excellent in 7 hips (35%), very good in 4 (20%), good in 3 (15%), fair in 3 (15%), and poor in 3 hip (15%) according to the Harris hip score. The radiographic results according to the criteria developed by Matta at the final follow-up were excellent in 12 hips (60%), good in 6 hips (30%), fair in 1 hip (5%), and poor in one hip (5%). Functionally 70% fractures had a score labelled as excellent or good. Stage 1 and 2 of avascular

necrosis of the femoral head was seen in 3 hips at one year follow up. In two of our cases, superficial local wound infection that was diagnosed in the early postoperative period was treated with antibiotics without debridement. There was 1 iatrogenic sciatic nerve palsy and 2 patients showed heterotrophic ossification postoperatively. There were no cases of deep vein thrombosis or pulmonary embolism. Out of 20 patients, in 12 patients (60%), the Harris hip score was more than 90 at the end of six month follow up. The best score was 94 in a good anatomically reduced patient. On the other hand the least score in this study was 40 seen in the patient who had comminuted fracture dislocation of the hip joint.

### **Discussion :**

The outcome of displaced acetabular fractures are influenced by many factors including the type of fracture, associated femoral head dislocation, timing of the surgery, the quality of reduction achieved during the surgery and the associated complication of the surgical approach used. <sup>(6-9)</sup> A surgical approach which is less invasive, reduces the operative time, gives adequate working space on the fracture, minimizes the blood loss will help in achieving optimal functional outcome. <sup>(10, 11)</sup>

In complex acetabular fractures, combined or extensile approaches seem to be a valid option. However, the soft tissue complications associated with the extensile or combined approaches affect the functional outcome. <sup>(12,13)</sup> The idea of plating of the anterior and the posterior column via two different surgical approaches is considered to be very aggressive as remarkable complications have been reported, like massive hemorrhage, deep wound infection, and functional heterotopic ossification. <sup>(12,13)</sup> Keeping in view the hazards of combined approaches, such fractures may be reduced by a single posterior approach. Posterior approach is adopted because posterior column is the major weight bearing component of the acetabulum and hence no compromise is expected in its anatomical reduction. <sup>(4,9)</sup> In certain complex acetabular fractures like 'transverse posterior column fracture', the adequate posterior column reduction implies adequate anterior column fracture as well. However, intraoperative verification with fluoroscopic images is mandatory in this regard. Keeping this point in consideration this

study was conducted and the acetabular fractures with T pattern and two column displaced fractures with spur sign were not included in the study as it was not possible to achieve their adequate reduction through single posterior approach.

The functional outcome of the operative procedures was done by evaluation of Harris Hip Score after 6 months of surgery. This is a time tested scoring system for the evaluation of hip function which is based on best response from the patient regarding different aspects of life. Operative management through single posterior approach yielded good Harris hip score in 60% of the patients. Good Harris Hip Score was also observed in 3 (15%) cases in which reduction of the anterior column was not accurate as revealed in the immediate postoperative radiographs. However, by the end of follow up period in the study, not only the functional hip score was found to be good but the radiographs also showed union of anterior column. Patients between the age group of 20 years and 40 years had better outcome compared to patients above 50 years. This could be due to fact that complex fracture patterns were more common after 50 years of age and reconstruction is difficult in osteoporotic and comminuted bone. The interval from injury to operative fixation of acetabular fractures also affects quality of reduction. Earlier intervention improves the probability of achieving an anatomic reduction. Acetabular fixation should be performed within 5 days of injury when possible.

### **Conclusion:**

It is suggested that acetabular fractures involving both the columns (excluding severely displaced both column and T fractures) can be managed by a single posterior approach. It is associated with good clinical outcome and lesser soft tissue complications, lesser hospital stay.

### **References :**

1. Gias PV, Grotz MRW, Papakostidis C, Dinopoulounoudios H. Operative treatment of displaced fractures of the acetabulum. Ameta- analysis. *J Bone Joint Surg Br* 2005; 87:2-9.
2. Kakar R, Sharma H, Al Lcock P, Sharma P. Occult acetabular fractures in elderly patients: a report of three cases. *Journal of Orthopedic Surgery* 2007;5(2):242-44.
3. Ferguson TA, Patel R, Bhandari M, Matta JM. Fractures of the acetabulum in elderly patients aged 60 years and older: An Epidemiological and Radiological Study. *Bone Joint Surgery Br* 2010 Feb;92(2):250-57.

4. Kaempffe FA, Bone LB, Border JR. Open reduction and internal fixation of acetabular fractures: heterotopic ossification and other complications of treatment. *J Orthop Trauma* 1991; 5:439-45.
5. Letournel E. Acetabular fractures: Classification and Management. *ClinOrthopRelat Res* 1980; 151:81-106.
6. Matta JM. Operative treatment of acetabular fractures through the ilioinguinal approach: a 10 year perspective. Vol. 26 (3) Nov., 2014 23 year perspective. *J Orthop Trauma*. 2006; 20:S20-S29.
7. Giordano V, Amaral NP, Franklin CE, Pallottino A, Albuquerque RP, Giordano M. Functional outcome after operative treatment of displaced fractures of the acetabulum: a 12-month to 5-year follow-up investigation. *Eur J Trauma Emerg Surg*. 2007;33:520-
8. Judet R, Judet J, Letournel E. Fractures of the acetabulum: classification and surgical approaches for open reduction: preliminary report. *J Bone Joint Surg [Am]* 1964; 46:1615-46.
9. Ponsen KJ, Joosse P, Schigt A, Goslings JC, Luitse JS. Internal fracture fixation using the Stoppa approach in pelvic ring and acetabular fractures: technical aspects and operative results. *J Trauma* 2006;61:662-67.
10. Kaempffe FA, Bone LB, Border JR. Open reduction and internal fixation of acetabular fractures: Heterotopic ossification and other complications of treatment. *J Orthop Trauma* 1991;3:439-45.
11. Oh C-W, Kim P-T, Park B-C, Kim S-Y, Kyung H-S, Jeon I-H, Cheon S-H, Min W-K. Results after operative treatment of transverse acetabular fractures. *J Orthop Sci*. 2006; 11:478-84.
12. Griffin DB, Beale PE, Matta JM. Safety and efficacy of the extended iliofemoral approach in the treatment of complex fractures of the acetabulum. *J Bone Joint SurgBr* 2005 Oct;87(10):1391-6.
13. Harris WH. Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty. An end- result study using a new method of result evaluation. *J Bone Joint Surg Am*. 1969 Jun;51(4):737-55.