Outcome of Two Column Acetabular Fractures Treated Operatively Through Single Posterior Approach

Rana Muhammad Arshad, Raza Elahi Rana, Muhammad Hanif, Kazi Muhammad Saeed

ABSTRACT

Objective: A prospective evaluation of clinical outcome of patients with acetabular fractures involving both columns was done in King Edward Medical University/ Mayo Hospital. All patients were operated by a single posterior approach, directly reducing the posterior wall and column and indirectly reducing the anterior column. The aim was to evaluate the efficacy of this single approach.

Material and Method: 19 adult patients (15 male and 4 female) presenting in the accident and emergency department of Mayo Hospital from December 2011 to June 2013 having acetabular fracture involving both the anterior and posterior column falling in E and G group of Judet classification, were included in the study. All patients were operated within 7 days of injury by a single operating team. Open reduction and internal fixation with reconstruction plate and cortical screws was done by exposing and reducing the posterior acetabular column through Kocker Lengenbeck approach. Additional lag screw was used to stabilze anterior column after indirect reduction, digital palpation through the greater sciatic notch and confirmed with C arm images.

Patients were followed up 6 months and functional outcome was evaluated after the end of the follow up period using Harris Hip Score and the results were analyzed.

Result: Majority of the patients 14 out of 19 had Harris Hip score more than 90 after 6 months of the operative management.

Conclusion: It issuggestedthat acetabular fractures involving both the acetabular columns, in Letournel and Judet type E and G, can be managed by a single posterior approach. It is associated with good clinical outcome and lesser soft tissue complications.

INTRODUCTON

Acetabular fractures usually result from high energy trauma such as road traffic accident or fall from height.[1]Open reduction and internal fixation remains the gold standard treatment as anatomical reduction and stable fixation is the primary goal.[2,3]

Involvement of both columns in acetabular fractures is a common presentation. Combined transverse-posterior wall type (Letournel and Judet type G) account for 24% to 32% of acetabular fractures[1,4,5]

These fractures create a challenging situation for the surgeons in terms of understanding the dimensions of osseous injury and selection of surgical approach. Malreduction can lead to post-traumatic arthritis and currently no authors denies the benefitsof anatomical reduction of the displaced articular fragments.[6]

Department of Orthopedic Surgery, King Edward Medical College, Lahore
Correspondence: Muhammad Hanif,
Email: hanifspine@gmail.com

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.[7,8]

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.[4]This study was designed to evaluate the effectiveness of a single approach for the management of fractures involving both columns particularly the combined transverse and posterior wall pattern.

MATERIAL AND METHODS

A prospective study was carried out in the department of Orthopaedic Surgery Unit II, King Edward Medical University/ Mayo Hospital, Lahore. Patients presenting in Accident and Emergency department with

acetabular fractures involving both columns falling in Letournel and Judet type E and G, from December 2011 to June 2013 were included in the study. Skeletally immature patients, patients with delayed presentation more than three weeks or patients having associated abdominal or head injury which required intervention were excluded from the study.

All patients were operated within 7 days of injury by a single operating team. Open reduction and internal fixation with reconstruction plate and cortical screws was done by exposing and reducing the posterior acetabular column through Kocker Lengenbeck approach. Additional lag screw was used to stabilize anterior column after indirect reduction, confirmed clinically with digital palpation through greater sciatic notch and C- arm imaging.

Out of 19 adult patients (n=19),15 were male and 4 were female. The mean age was 39.7 ranging from 26 to ears 57 years. Open reduction and internal fixation with reconstruction plate and cortical screws was done by exposing and reducing the posterior acetabular column through Kocker Lengenbeck approach. Anatomical reduction of posterior wall and column was achieved in all the patients as first step of the surgery. It was followed by definitive fixation with plate and screws.Additional lag screw was used in some cases to stabilze anterior column after indirect reduction.

Maintenance of reduction was confirmed postoperatively by AP and Judet radiographic views. 3rd generation cephalosporin, as per hospital protocol, were administered postoperatively for five days.The median hospital stay was three days (ranging from two to five days). Wound dressing done on alternate days till the healing of wound and stitches removed on the 10th day. Quadriceps exercises were advised as pain permited. Patients were brought out of bed as early as possible and were kept non weight bearing. They were advised to use walker for locomotion until full weight bearing was permitted after evidence of radiological union (on average 12 weeks). No pharmacological prophylaxis against deep-vein thrombosis (DVT) was used, however, mechanical prophylaxis was done beginning on 1st postoperative day.

Patients were followed up regularly up to 6 Months post operatively and clinical assessment done. Harris hip score was evaluated after the end of 6 month follow period and results were analyzed. Patients who were unable to come regularly because of poor economic conditions were contacted telephonically and Harris hip score evaluated and documented for analysis.

RESULTS

Out of 19 patients 14 (73.7%) the Harris hip score was more than 90 at the end of six month follow up. The best score was 95 in which case the only limiting factors to patient's pre injury status were that the patients walking ability was limited to six blocks and slightly limited flexion at hip joint. 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 and proximal femur as well.

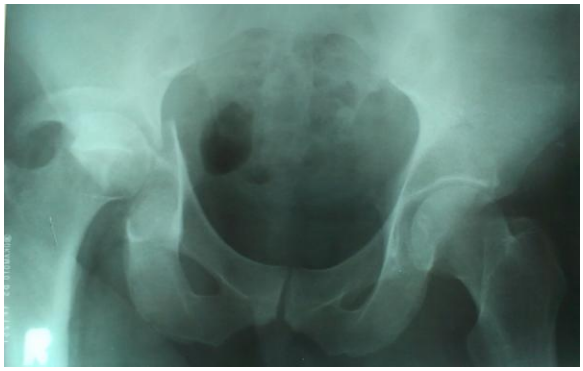

Fig.1: AP View of acetabular fracture involving both anterior

Fig. 2: Open reduction and internal fixation through single posterior approach

DISCUSSION

Acetabulular fractures are high energy trauma fractures in which involvement of both of the columns is usually seen. This happens because in a dash board injury for instance, force applied along the long axis of the femur is transmitted to the hip joint and head of the femur acts as a hammer and disrupts the cavity in which it is contained.[1] The displaced fragments if not

reduced back to their anatomical position can alter the forces acting uniformly in the acetabular cavity and this can therefore lead to cartilage degeneration and post traumatic arthritis.

In the management of actetabular fractures there are two basic questions which need answer. Firstly, what is the classification of the acetabular fracture and secondly which surgical approach is needed for accurate reduction of the fracture fragments. 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 approached affect the functional outcome. 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[7,8]

The study by Griffin et al. reported the outcome of extended iliofemoral approach for the management of one hundred and six patients with fracture acetabulum with associated fracture pattern. Most of the patients had a both column fracture. Moderate to severe heterotopic ossification developed in thirty-two patients (30%), with 8.5% of the patients requiring an operation for excision. [9]

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. In certain complex acetabular fractures like 'transverse posterior column fracture', the adequate posterior column reduction implies adequate anterior column fracture as well.[1,5] 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.[10] Operative management through single posterior approach yield good Harris Hip Score in 73% of the patients.

Good Harris Hip Score was also observed in 3 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.

March 2013 Immediate post operative radiograph

Post Operative X-ray after one month.

The authors therefore feel that in acetabular fractures falling in E and G group af Judet classification, if there is adequate indirect reduction of anterior column, it is not necessary to fix the anterior column.

CONCLUSION

Acetabular fractures involving both the acetabular columns, in selected patients, can be managed by a single posterior approach as it is associated with good clinical outcome and involves lesser soft tissue complications.

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