

Functional Outcome of Displaced Acetabular Fractures Treated by Open Reduction and Internal Fixation

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ABSTRACT

Introduction: Management of displaced acetabular fractures need accurate knowledge of anatomy, approach and the potential complications. Often patients treated for acetabular fractures tend to do not that good due to multiple reasons.

Materials and methods: In this research article, we retrospectively assessed all the acetabular fracture patients treated with Open Reduction and internal fixation to look into the functional status and the reasons for poor functional outcome. The patients with all the relevant data were included in the study. Letournel and Judet classification was used to classify the fractures. Comparison was done with pre operative and post operative radiographs along with current one to assess the reduction obtained and the current status. Modified Merle D'Aubigne Score and Harris Hip Score was used for clinical assessment.

Results: Among the 20 patients we included in the study, 75 - 82.5% of patients had excellent scores, 5% poor scores.

Conclusion: We found statistically significant clinico- radiological mismatch in the functional status of these patients.

Keywords: Acetabulum, function, scoring, ORIF.

INTRODUCTION

Acetabular fractures are more common these days due to the high speed modern life style. The significance lies in the fact that these injuries are associated with other life threatening situations. Proper management includes prompt stabilization, control of the life threatening situations, proper timing and timely internal fixation with accurate reduction. Acetabular fractures are classified by the "Letournel" and "Judet" system.¹ There exists only few established acetabular surgeons due to difficult exposure, frequent complications, difficulty in obtaining anatomical reduction and joint congruency and ultimately poor functional outcome. The outcome depends on personal characteristics of the patient and circumstances of the accident², type of fracture, displacement and comminution as well as concomitant diseases have been said to affect clinical outcome.³ Varied factors are considered to influence the functional outcome of these patients; which include the fracture pattern, surgeon's expertise, patient's age, associated chondral damage and neurovascular injury and patient's co-morbidities and functional expectations. We assessed the functional status of our patients who underwent ORIF acetabulum in our Institution from 2012 onwards.

Aims and objectives of the study were to evaluate and determine the functional outcome of patients with displaced acetabular fractures surgically treated by Open Reduction and Internal Fixation at Department of Orthopaedics, Am-

rita Institute of Medical Sciences and Research Centre, Kochi.

MATERIALS AND METHODS

Study was done in the Department of Orthopaedics, Amrita Institute of Medical Sciences and Research Centre, Kochi. A cohort of 54 patients were identified meeting the inclusion criteriae. Of these, 20 patients were included in the study and follow up studies. The relevant clinical and radiological findings, mechanism of injury, fracture pattern and classification were noted at the time of admission. Fractures were classified based on Letournel and Judet Classification. Patients were grouped according to sex, age, fracture pattern and the associated complications. Operative indications included unstable or incongruence of the hip, posterior wall or anterior wall fractures with column displacement.

Inclusion Criteriae: Those patients with acetabular fractures and surgically treated by Open Reduction and Internal Fixation in our Institute between 2002 to 2012 who have given valid informed consent to take part in the study.

Exclusion Criteriae: Patients with open fracture, ipsilateral shaft of femur fracture, those lost to follow up and patients managed non operatively were excluded.

At the time of arrival, after initial management and stabilisation, all the patients were evaluated with three radiological views – AP Pelvis and 45° oblique views of Judet and CT scan. Those patients with instability of the hip, displacement of a fragment by > 2 mm, dislocation with a posterior wall fracture, and articular impaction or depression as seen on the pre-operative CT scan were considered candidates for surgery. All patients were operated using single approach (Kocher- Langenbeck, ilioinguinal, or extended ilioinguinal). Open Reduction and Internal Fixation was attempted to achieve anatomical reduction of the articular surface of the acetabulum. Suction drain was used routinely and was removed after 48 hours. Post operatively skin traction was applied and no prophylaxis for heterotopic ossification was used in any patient. DVT prophylaxis was started in obese

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patients with limited mobilization post operative. Immediate post operatively, ankle mobilization was started.

We retrieved the post operative radiographic images (AP Pelvis) of these patients and was evaluated for reduction and comparison with the latest radiographs. In all patients, immediate post operative complications were noted. Mobilisation was done as early as possible with the aid of physiotherapist. Toe touch weight bearing was allowed till around 6 weeks, partial weight bearing for next 6 weeks and full weight bearing from 3 months onwards. Clinical and radiological assessment and functional scoring was undertaken at six and 12 weeks, four, six and 12 months post-operatively and annually thereafter using (Modified Merle D'Aubigne Score and Harris Hip Score). Heterotopic ossification, Avascular Necrosis and Osteoarthritis were diagnosed based on clinical and X ray findings.

RESULTS

Of the 54 patients we obtained who underwent Acetabulum ORIF during the study period, one patient had bilateral acetabuli fracture, one sustained open fracture injuring the rectum, 24 were lost to follow up and 8 patients died due to age related poor health. Overall, we had total sample size of 20. 78% of them were males. Age of the patients ranged from 14 years to 70 years. Mean age was 42.6. The follow up period ranged from 13 years to 3 years and the mean follow up period was 7.53 years. Right hip was involved in 15 cases and left hip in 5 cases. The most common mechanism of injury is bike accident. (45%). Clinically the subjects were graded according to Modified Merle D'Aubigne Scoring and Harris hip Scoring as Excellent, Good, Fair, and Poor. The most common fracture noticed among our study group is posterior wall fracture (30%).

40% of patients in our study group developed osteoarthritis and 15% each had avascular necrosis and heterotopic ossification. Most of these patients had a follow up period more than 6 years. The incidence may rise with further follow up. No specific fracture pattern was found to be associated with osteoarthritis and avascular necrosis. At the time of presentation, 25% patients had dislocated their hip and of them 15% had sciatic nerve palsy. 60% of these patients developed AVN on follow up of atleast 4 years. 2 patients developed post-operative infection in which extensile approach was used for fixation. The incidence of infection in our study is comparable to similar studies.^{4,5} Three patients (15%) underwent THR 2,5 and 7 years after the acetabular surgery. The conversion rate to THR also is comparable with similiar studies.^{6,7}

85% and 75% of patients made it into the Excellent – Good group according to the MMDA score and Harris Hip Score respectively. Fair - Poor function was obtained in 1 patient (MMDA) and 2 patients (HHS).

DISCUSSION

Fractures of acetabulum and pelvis are relatively rare; about 2% of all fractures.^{8,9} The associated injuries which can hap-

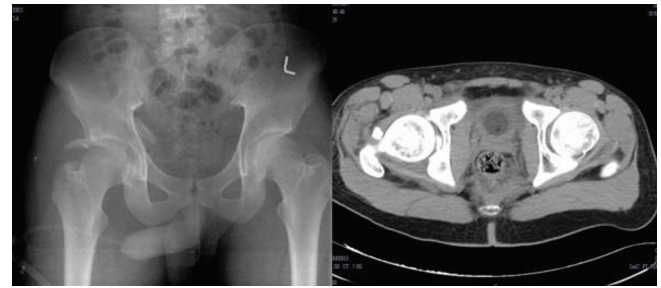


Figure-1: X ray showing a posterior wall + posterior column fracture – AP view and the corresponding CT image showing displaced intra articular fragment.



Figure-2: Immediate post op X ray image – AP view and Obturator oblique view

Clinical grade	MMDA Score	Harris Hip Score
Poor	1	2
Fair	2	3
Good	14	13
Excellent	3	2

Table-1: Showing the clinical grades obtained with the two scoring systems.

pen alongwith causes significant morbidity and mortality¹⁰ making it a dreaded one. Several studies demonstrates that accurate reduction and rigid internal fixation can decrease the incidence of post-traumatic arthritis and improve functional outcome.¹¹⁻¹³ Clinical outcome after acetabular fracture surgery is difficult to predict and earlier it used to be poor. Poor bone stock in older patients, comminuted articular surface fractures and poly-trauma patients with multiple co-morbidities are adverse factors influencing outcome.¹⁴ Current trends in the treatment of these fractures include open reduction and internal fixation¹⁵ according to the principles that apply to all intra-articular injuries.

Displaced fractures of the acetabulum are a diverse group of serious injuries which are difficult to treat and the functional results were poor in the earlier days. The success of the surgery and prognosis after high-energy trauma is, based on the articular cartilage viability and anatomical reduction. The goal of the open reduction and internal fixation of acetabular fractures is to return the patient to pre-fracture level of activities. However, despite the appearance of an anatomical reduction on radiographs, there may still be imperfections on areas of the articular surface that are invisible on standard plain radiographs or are hidden by plates and screws, which can be picked up with CT. In some of our patients with anatomical reduction, functional scoring does not correlate.

It must therefore be concluded that clinical results depend mostly on the severity of articular cartilage injury happened at the time of insult and the capability of the acetabulum in an adult to tolerate changes in the distribution of pressure and perhaps to reshape itself over time. A post operative CT evaluation may be warranted in indicated cases to assess the reduction obtained so that post operative physiotherapy and the treatment may be modified to obtain a better functional result. Complications can occur from the injury per se or can be the result of surgical treatment. Early complications include thrombo embolism (30% to 50%), neurologic injury (16 % to 30%), infection (3% to 9%), malreduction, loss of reduction, intra-articular hardware and vascular injury. Late complications include avascular necrosis (2% to 25%) heterotrophic ossification (1% to 60%), post traumatic arthritis (12% to 57%).

Our study results with regard to the incidence of fracture types were comparable with that of Magu NK et al.¹ and Letournel et al.² Among the Fair- Poor function group, one patient had post-operative infection requiring surgical debridement 3 times after the surgery. In the same group, two patients had perfect anatomical reduction in the follow up radiograph. Clinico-radiological mismatch observed can be due to multiple reasons of which the most possible would be the severity of the cartilage, labral or other soft tissue injury happened at the time of insult or intra-operative. Despite perfect reduction, osteoarthritic changes are expected to develop in the long term for which most common procedures done are hip arthrodesis or total hip replacement.

CONCLUSION

The uncomplicated radiographic appearance and relatively simple operative approach for fractures of the posterior acetabular wall may mask the risk of poor results. A post operative CT may be used to assess the same. Fractures in elderly patients and those with extensive comminution are more likely to have a poor clinical result. However, a high likelihood of a long-term good-to-excellent result can be expected following anatomic reduction and internal fixation of these fractures. An increase in the rate of anatomical reduction and decrease in the rate of operative complications should be the goal of surgeons who treat these fractures, even though setbacks do occur due to associated injuries and inappropriate rehabilitation.

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