

Original article:

Outcome of open reduction and internal fixation of fractures of posterior acetabulum

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ABSTRACT:

Introduction: The purpose of study was to present surgical management of posterior acetabular fracture in 30 patients treated primarily by reconstruction plates and cancellous screws over a period of two years from June 2009 to June 2011 with follow up period ranging from 2 months to 2 years.

Methodology: The ages range from 18 to 65 years. The average age of the patient is 34 years. The most common age group was 30 to 39 years, there were 27 (90%) were males and 3 (10%) were females. The most common mode of trauma was RTA in 28 (93%). Right sided fracture is common in 22 (73%). Posterior wall fractures were seen in 26 (87%) of patients and posterior column fractures were seen in 4 (13%) of cases with 4 cases of fractures to the extremities with 2 cases of hip dislocation, 2 head injuries, 1 abdominal and 1 chest injury. 63.34% cases were operated between 1 to 2 weeks. Average interval between trauma and surgery was 8.46 days. Average duration of surgery was 1 hrs and 55 min. 56.67% cases were finished within 2 hrs and 40% cases were finished within 2 to 3 hours.

Results : Partial weight bearing was started after 8 to 10 weeks depending on patient tolerance to pain (73.34%). 26 (86.67%) cases started full weight bearing in 12 weeks, and 4 (13.33%) cases started full weight bearing in 16 weeks due to superficial wound infection and associated injuries. The 3 patients had superficial wound, all infection, 2 patient has post traumatic arthritis with hip stiffness. 1 patient had a partial sciatic neuropraxia. 1 patient heterotrophic ossification in the postoperative X-rays. Good radiological results were seen in 73.33% and poor in 10%. Excellent to good clinical result were seen in 76.66% and poor in 16.66%.

Keywords: Fracture of posterior acetabulum, open reduction, Internal fixation.

INTRODUCTION:

Posterior wall fractures, with or without dislocations, are the most common type of acetabular fractures, accounting for a quarter to a third of all acetabular fractures. Acetabular fractures are caused by high-energy trauma, with traffic accidents, especially automobile accidents being their main causes. The increase in the number of vehicles circulating and their greater speed has increased the incidence of these fractures and decreased the age at which they occur. Displaced acetabular fracture is one of the more difficult fractures in orthopaedics

not only because of the complex nature of the fracture but also because it is often associated with severe trauma and the incidence of multiple injuries is high.

Acetabular fracture was an enormous orthopaedic problem in which the treatment was grossly inadequate and many patients were left with incapacitating pain. These fractures were often feared because of the poor outcome in many patients treated non-operatively. However many others continued to report good results with conservative treatment and problem of operative treatment

such as heterotrophic ossification and inadequate reduction were feared. Recently it has become obvious that accurate reduction of the fracture is an important factor in achieving satisfactory outcome and open reduction is better than closed reduction which resulted in incongruency of articular surface of hip joint and patients were left with enormous pain, long time to re-enable and end result stiff and painful suboptimal functioning hip joint. Rapid increase in the incidence of acetabular fractures and high expectations of the patients has compelled the orthopaedic surgeons across the world to do more research and study acetabular fractures. Surgery is the gold standard to treat unstable and incongruous acetabular fractures. Joint stability and early mobilization are the main goals of the surgery for acetabular fracture which can be achieved by anatomic reduction and rigid internal fixation.

Necessity is the mother of invention holds true in the surgery of trauma as various operative modalities of treatment has been evolved for treatment of these fractures and the techniques are being continuously refined. These include fixation with reconstruction plates, spring plates, cancellous cannulated screws alone, cable wire fixation, percutaneous fixation techniques or a combination of various implants including plates and screws. Reconstruction plates which can be contoured and bend along the contour of acetabulum are most commonly used with combination of cancellous cannulated screws. Screw penetration into the hip joint during operation is an unusual but potentially serious complication. Acetabular fractures in the posterior column, particularly involving the danger zone, are the most common form of

acetabular fracture, they remain technically challenging to the orthopaedic surgeons. The danger zone of the acetabulum, which was defined by Tile as that part of the posterior wall and column at the mid-acetabulum lying above the ischial spine, is frequently used in the fixation of posterior wall and posterior column. Screws directed perpendicular to posterior column in the danger zone would violate the hip joint. Proper screw placement can avoid the complication.

No matter what the method, obtaining an excellent long term result in the treatment of acetabulum fractures is dependent on restoring a congruent and stable hip joint with an anatomically reduced articular surface. The achievement of these objectives minimises pain prevents posttraumatic osteoarthritis, and improve long term functional outcome. However fractures of the acetabulum continue to be a challenge for the orthopaedic surgeon. Successful treatment of an acetabular fracture is based on a thorough understanding of the complex three dimensional anatomy of the innominate bone.

There are few published studies with a prolonged follow up. Thus this study was to review the displaced posterior acetabular fractures treated operatively in our hospital during last 2 years with regards to clinical, radiological results, the rate of surgical complication and the rate of successful fracture reduction.

MATERIAL & METHODS

This study was conducted prospectively from June 2009 to June 2011 on 30 patients having fractures of posterior acetabulum which includes fracture posterior wall and fracture posterior column of acetabulum.

After Primary management of acetabular fractures, radiological assessment with three standard plain radiographs (one AP and two oblique Judet views), in addition two dimensional C.T. scan and a three dimensional C.T. scan if required. If posterior acetabular fracture was associated with hip dislocation then closed reduction under general anaesthesia was done on emergency basis and patient was put on skeletal traction and surgical treatment was performed as soon as the patient's general medical condition allowed with reconstruction plate 3.5mm and cancellous cannulated screws, patients were operated under spinal / general anaesthesia. For all patients Kocher Langenbeck Approach was used. Patient were followed up initially at 3 weeks interval for first 2 month and thereafter at 6 weekly intervals for next 6 months. Radiologic evaluation was carried out according to Matta's criteria 1996.

Males were affected more than females (9:1) The mean age was 34 years and most common age group was 30 to 39 years. Road traffic accident (93%) was the most common mode of trauma. Right sided (73%) acetabular fractures were more common than left sided (27%) fractures. Most of the cases were operated within 1 to 2 weeks of trauma (63.34%). Posterior wall acetabular fractures were more common seen in 87 % of cases and rest 13% cases were posterior column fractures according to the Letournel and Judet system of classification.

The average duration of surgery was 1 hour 55 minutes with most cases finished within 3 hours. All the cases were operated through the KOCHER LANGHENBECK approach. In 73.33 % of cases partial weight bearing was done after 8 weeks and in 87.67 % of cases full weight bearing was done after 12 weeks.

RESULT AND DISCUSSION

Partial weight bearing

Period in weeks	cases	percentage
< 8 weeks	0	0%
8 to 10 weeks	22	73.33%
10 to 12 weeks	6	20%
>12 weeks	2	6.66%

Full weight bearing

Period in months	cases	percentage
< 12 weeks	0	0%
12 to 16 weeks	26	86.67%
>16 weeks	4	13.33%%

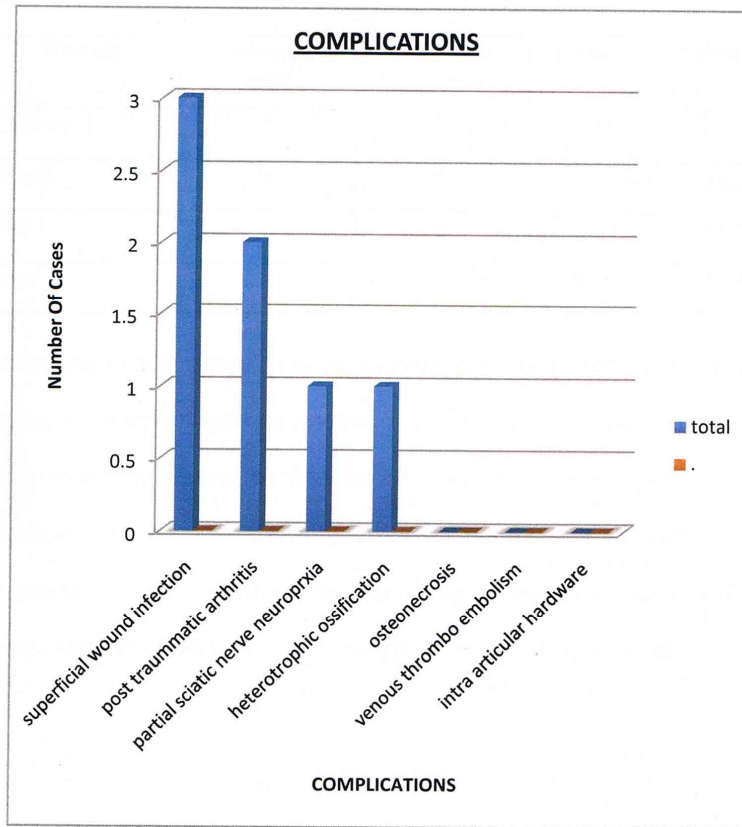
Union Time in Weeks :

Weeks	No of cases
12 to 14	22
14 to 16	3
16 to 18	4
18	1

Complications

Complications	cases	percentage
Superficial wound infection	3	10%
Post traumatic arthritis	2	6.67%
Partial sciatic nerve neuropraxia	1	3.33%
heterotrophic ossifacation	1	3.33%
osteonecrosis	0	0
venous thrombo embolism	0	0
Intra articular hardware	0	0

- Average union time was 13 weeks.
- For majority of cases period of hospitalization varied from 10 to 25 days average being 20.9 days.
- Complications encountered in this series are
 - a. Supemcial wound infectio (10%)
 - b. post traummatic arthritis (6.67 %)
 - c. partial sciatic nerve neuropraxia (3.33 %)
 - d. heterotrophic ossification (3.33%).



COMPLICATION OF FRACTURE ACETABULUM AND ITS TREATMENT

According to Radiographic grading system, modified by Matta 1996¹, 7 (23.33%) of cases showed excellent results, 15 (50.00%) of cases showed good results, 5(16.66%) of cases showed fair results and 3 (10.00%) of cases showed poor result. According to the clinical grading system developed by Merled'Aubigne and Postel as modified by Matta², 8(26.66%) cases showed excellent results, 15(50%) cases showed good results, 5(16.66%) cases showed fair results, and 2(6.66%) cases showed poor results .

Posterior acetabular fractures are difficult fractures to treat due to complex fracture configuration, difficult surgical approaches and precarious blood supply of acetabulum. These are intra-articular fractures involving the hip joint which need to be appropriately managed to restore near normal anatomy and mobility otherwise morbidity and disability will be the outcome. Kocher Langhenbeck approach is appropriate for posterior acetabular fractures as it gives adequate exposure for reduction of all

posterior wall and posterior column fractures. It is possible to achieve early mobilization of the patient which helps in healing of the fracture and prevents joint stiffness. Early weight bearing and rehabilitation is possible with good postoperative mobilization protocol and physiotherapy. Individualized approach and adoption of minimally invasive surgery gives better results. The accuracy of reduction is an important predictor of functional outcome. The approximation to normal anatomy will depend on the complexity of the fracture and the expertise of the surgeon.

Thus reconstruction of the posterior acetabular fracture with open reduction and internal fixation produces good to excellent results in majority of patients with acceptable rate of complication. They provide a stable fixation with good joint congruency of the hip joint amenable to early range of motion and weight bearing. Therefore we recommend that open reduction and internal fixation of posterior acetabular fractures as the treatment of choice in displaced fractures.

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