ORIGINAL ARTICLE

Functional and radiological outcomes of open reduction and internal fixation of acetabular fractures

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Abstract

Introduction: Acetabular trauma is a common and severe injury faced in trauma patients which are increasing in incidence. What were once managed with bed rest and traction are now better managed operatively. This study explores the outcome of fixation in these fractures.

Materials & methods: This study included 30 patients, between 2014-2017. Pre-operatively the patients were classified by Judet and Leuternal classification. Post-operatively, functional outcome was measured at 6 months with Harris Hip Score along with radiological outcome by Matta grade.

Results: 30 cases were included in our study with mean age of 40.9 years with 25 male and 5 female. Road traffic accident (80%) was the most common cause of injury. Right acetabulum was involved in 21 patients while left in 9. 20 cases were elementary fractures while 10 cases were associated type. At 6 months, the mean Harris Hip score was 88.07+5.34. Radiologically, 21 patients had an anatomical grade, 8 patients had a congruent x-ray while 1 patient had incongruency

Conclusion: The fracture type and the quality of reduction determines the functional outcome. The functional outcome may be indicated by the Harris Hip score. Good intraoperative and post-operative care should lead to better results in acetabular fractures.

Keywords: Acetabular fractures, Harris Hip score, radiological outcome by Matta Grade, Judet and Leuternal classification

Introduction:

Acetabulum fractures are one of the most severe injuries that come across and are treated by orthopedic surgeons. People of all ages are susceptible and are at risk to these injuries. In young individuals fractures usually take place due to high energy injury like vehicular mishaps such as fall from the height or car collision. Whereas individuals of old age who are having osteoporotic bones fracture may happen due to trivial fall or fall from standing. Commonly fractures are due to road traffic accidents.[1]

Earlier these fractures were treated conventionally using bed rest and skeletal traction. The management has been changed from conservative towards surgical management because of the work of Judet and Leuternal. Treatment for displaced acetabular fracture has always been a challenging task for the general orthopedic surgeon,[2,3] and now the recent trend of treatment for acetabular fracture is open reduction and internal fixation.[4,5] This caused a decrease in the overall incidence of AVN, post-traumatic osteoarthritis and better clinical outcome.[4-6]

Interruption in treatment,[7] age of patient,[8] fracture pattern,[9] dislocation or dis-lodgment at the time of injury,[10] osteo-chondral harm to femoral head and acetabulam,[11] associated neuro-vascular injury and the surgeon practice are the factors that affect the final functional outcome. Internal fixation should be done within first 10 days of trauma, provided the patient is surgically fit.[12] It

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may be delayed if patient is not feeling good, but it is recommended to execute the surgery within three weeks as there are complexities in precise reduction after this period.[13,14]

The aim of this study is to evaluate functional and radiological outcomes of open reduction and internal fixation of acetabular fractures.

Materials and Methods:
This retrospective study was conducted in Department of Orthopedics and Traumatology Khyber Teaching Hospital Peshawar from January 2014 to December 2017. 30 patients were included in study and those who were followed up to six months. Judet and letournal classification was used for fractures classification. Inclusion criteria's, patients with acetabular fractures treated surgically, no history of past injury to the hip or acetabulum and no pre-existing hip osteo-arthritis. All patients undergone surgery had definite indications with more than 2mm displaced fractures, medial impaction, non-concentric reduction and Matta roof arc angle of less than 450 Patients who had defaulted follow up, and those with past history of hip injuries and co-existing hip osteoarthritis were excluded.

All patients were thoroughly evaluated including history, examination (skin and NV) and x rays (AP pelvis and Judet obturator oblique and iliac oblique views) and 3D CT scan to know geometry of fractures and to plan for surgical fixation accordingly. Surgical approaches used were kocker-langenbach, ilioinguinal, extended iliofemoral and trochanteric osteotomy in some cases of posterior approach. Fixation done with 3.5mm reconstruction plates and screws. Double plating in cases of posterior wall and column fractures while in selected cases indirect fixation of anterior column with 4.5mm screw done along with plating of posterior column.

Patients were followed for a minimum 6 months. Clinically patients were assessed using Harris Hip Score (HHS)15 at each visit of follow up and Radiologically Matta16 grading. Patients were grouped into excellent (HHS, 90-100), good (HHS, 80-90), fair (HHS, 70-80), and poor (HHS, <70) in order to evaluate functional outcome. Patients were further sub grouped into acceptable (excellent and good) and non acceptable (fair and poor). Patient were placed into three categories based on Matta radiological grading such as anatomical, congruent or incongruent, using plain radiograph AP pelvis and Judet (obturator and iliac oblique views). Anatomical when all steps had been eliminated Intra-operatively and post-operative films shows restoration of all five anatomical lines (iliopectineal, ilioinguinal, anterior wall, posterior wall and dome) with the head centered and parallel beneath the acetabular roof. A congruent reduction was best judged on AP radiograph, comparing the hip with reference to contra lateral normal hip joint. Incongruent, fails to restore five anatomical lines with inward subluxation of hip.

Results:
30 cases of acetabular fractures were included in our study with mean age of 40.9 years (range 20-70 years), 25 male (83.3%) and 5 female(16.6%). Road traffic accident (80%) was the most common cause followed by fall from height (20%). Right acetabulum was involved in 21(70%) patients while left in 9(30%). Twenty cases (66.6%) were elementary fractures while ten cases (33.3%) were associated type fractures. Most common pattern of acetabular fracture was posterior wall fracture in thirteen patients followed by transverse fracture in seven patients. All fractures were operated within 2 weeks of injury.

At 6 months of follow-up, the mean Harris Hip score was 88.07 with a standard deviation of 5.34. Only 2 patients had a fair Harris Hip Score. 29 patients had an acceptable score which comprised of 12 excellent and 17 good scores. The mean Harris Hip scores foreach class of fractures is summarized in table 1.

At 6 months follow-up, 70 percent (21 patients) had an anatomical grade on x-rays. 26.7% (8 patients) had a congruent x-ray while only 1 patient had incongruency.

4 patients (13 %) developed superficial surgical

Table-1: Showing fracture of acetabulum using judet and letournal classification

Judet and Letournal Class	Number	Mean	Std Deviation
Posterior Wall	13	91.0	3.44
Transverse	7	91.14	3.76
T-type	3	82.33	3.22
Posterior Wall and Column	4	80.75	2.06
Transverse and posterior column	1	81.0	-
Two column	2	85.0	2.83

site infections, for which they were readmitted and treated with IV antibiotics based on cultures. None of this patients required hardware removal and all subsequently recovered. 2 patients (6%) had trauma- induced sciatic nerve injury pre-operatively. 1 patient showed early osteoarthritic changes and was booked for arthroplasty.

Discussion:

Acetabular fractures may not be the most common fractures commonly encountered in the orthopedic unit, but are significant due to the role of acetabulum in weight bearing and disastrous effect of poor treatment on the quality of life of the patient. Conservative management of these fractures brings with it a multitude ofcomplications in addition of prolonged hospital stays, which include venous thromboembolus, stiffness of the hip, osteoarthritis of the hip joint and a-vascular necrosis. Acetabular fractures also tend to be associated with other injuries, thereby necessitating a more careful approach to their treatment.

Literature shows that the Harris Hip score is a good indicator of functional outcome in thesepatient. Our mean HHS score of 88.07+5.34 compared favorably with national and international studies of the same nature. Iqbal et al reported a mean HHS of 82.3617 while Shrestha et al and Gupta et al reported mean scored of 78 and 74 respectively.[18,19]

Other studies showed that fracture type had an effect of Matta radiological score but not the functional outcome. Kredaret al reported worse outcome in posterior wall and column fracrutes.[20] Our study concurred with a mean HHS in posterior wall and posterior column fractures of 80.75+2.06

Our study had no iatrogenic sciatic nerve injury and injury included nerve injury of 6%. Other studies have reported comparable injury rates of 4% in the case of Lehman et al[21] and 12% in a study done by Iqbal et al.[17]

The infection rate of our study was 13%. This was more than the infection rates reported in literature. Suzuki et al reported and infection rate of 5.2%.[22]

Conclusion:

Our study indicates that the fracture type, influenced by the mechanism of injury along with the quality of reduction determines the functional outcome. The functional outcome may be indicated by the Harris Hip score. Good intraoperative and post-operative care should lead to better results in acetabular fractures.

Conflict of interest: None

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Role and contribution of authors:

Dr Awal Hakeem, collected the data and references and did the initial write up.

Dr Qaisar Azim, collected the data and referecnes, went through the article, and made some changes

Dr Ahmad Jawad Mufti, critically review the article and made the final changes

Dr Zahid Askar, helped in collecting the data and references and helped in discussion writing.

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