

“Functional Outcome of the Surgical Management of Acetabular Fracture”

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Abstract

Introduction: Acetabular fractures usually produce hip pain, but may also cause diffuse pain in the groin and leg. Operative treatment is the treatment of choice in the management of acetabular fractures as precise anatomical reduction with adequate internal fixation can be attained. In 1960, Judet first suggested that open reduction and internal fixation be done in all cases of displaced acetabular fractures to achieve accurate reduction. This study aimed to observe the functional outcome of the surgical management of acetabular fracture.

Methodology: This observational study was conducted in the Department of Orthopaedic Surgery of National Institute of Traumatology and Orthopedic Rehabilitation (NITOR), Dhaka, Bangladesh during the period from April 2017 to March 2019. The sample size was 57. Statistical data was analysed by SPSS-20 and MS-Excel-2016. **Result:** In total 57 patients from both the groups completed the study. In our study, we found some complications to the patients. On them some had faced wound infections 5(8.77%) then followed sciatic nerve palsy 4(7.02%), avascular necrosis 3(5.26%) and urethral injury followed 1(1.75%) patients. Then from the study patients followed the outcome after treatment based on the clinical grading scale of Matta et al. so most of them found 26(45.61%), then 19(33.33%) was good, 8(14.04%) found fair and 4(7.02%) found poor.

Conclusion: Road traffic accidents as well as other accidents are the commonest mode of acetabular fracture injury with male predominance. Anterior column fractures are managed effectively by Ilioinguinal approach and the Posterior column fractures by the Kocher Langenbeck approach of surgery. In Bicolumnar fractures, one column fixed firstly and assessed for the reduction of the other column. If it is not reduced, then that column is also fixed with following the appropriate approach. Complications of acetabular fractures treated operatively are minimal. Good to excellent results were achieved in patients.

Keywords: acetabular fracture, surgical approach, functional outcome

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I. Introduction

Fractures in young individuals usually occur due to high energy injury. The majority of fractures are because of road traffic accidents¹. Acetabular fractures usually produce hip pain, but may also cause diffuse pain in the groin and leg. It may also lead to avascular necrosis in the femoral head and as well as the acetabulum². As the bone cells die, the bone gradually crumbles and collapses along with smooth cartilage protecting it. Without this smooth cartilage, bone rubs against bone which leads to increased pain, arthritis, and loss of motion and function³. Acetabular fractures are fractures that extend into the hip joint and pose a challenge for orthopedic trauma surgeons⁴. Fractures of the acetabulum are very difficult to treat because of the difficulty in understanding the fracture pattern, difficult surgical approach, and difficulty in achieving anatomical reduction⁵. Operative treatment is the treatment of choice in the management of acetabular fractures as precise anatomical reduction with adequate internal fixation can be attained⁶. In 1960, Judet first suggested that open reduction and internal fixation be done in all cases of displaced acetabular fractures to achieve accurate reduction. The accuracy of the reduction of an acetabular fracture is directly proportional to the number of surgeries performed by the surgeon. In short, the experience of the surgeon has a vast role in attaining anatomical reduction of the

fracture^{6,7}. The goal of open reduction and internal fixation of an acetabular fracture is a perfect reduction.

The study aimed to observe the functional outcome, assess the efficacy, and also complications of operative fixation after surgical management of acetabular fracture.

II. Objectives

a) General objective:

- To evaluate the functional outcome of operatively managed acetabular fractures,

b) Specific Objectives:

- To assess the efficacy of operative fixation of acetabular fractures.
- To assess the complications of operative fixation of acetabular fractures.

III. Methodology & Materials

This was an observational study and was conducted in the Department of Orthopaedic Surgery of National Institute of Traumatology and Orthopedic Rehabilitation (NITOR), Dhaka, Bangladesh during the period from April 2017 to March 2019. A Total of 57 (44 males and 13 female) patients with acetabular. Among the age of 20->60 patients included who have faced acetabular fracture. Sample population selected by following purposive method. This criterion consists of adult patients of both sex, with a closed, displaced fracture (Confirmed by CT scan and X-Ray). The list contained only acetabular fracture based on Letournel and Judet classification involving the anterior column, anterior wall, posterior column, and posterior wall After routine investigations and once the patients were fit for surgery, patients were taken up for surgery and for taken open reduction and internal fixation with recon plates or screws. From the four surgical approaches (Kocher-Langen back approach, the Ilio-inguinal approach, the extended ilio-femoral approach and the tri-radiate approach)one was used depending on the fracture pattern. For Anterior column fractures Ilioinguinal approach was used, the Posterior column fractures were fixed by the Kocher Langen beck approach. In Bicolunar fractures, one column was first fixed and assessed for the reduction of the other column which usually gets reduced. If it was not satisfactorily reduced, then that column was also fixed with following appropriate approach. Clinically patients were assessed for pain, ambulation. So the evaluation distributed based on clinical grading system by Matta et al Descriptive and inferential analysis. Collected data included by taking the permission of the patients following ethical rules. All data analysed by using SPSS-20 and MS-Excel-2016 version.

IV. Result

A Total of 57patients most of the patients found male 44(77, 19%) and 13(22.81%) female patients with acetabular fracture (Table I). Most of the patients found in 30-40 age group 18(31.58%), then 40-50 and that was 14 (24.56%) respectively 10(17.54%) found in 20-30, 8(14.04%) in 50-60 and 7(12.28%) in >60(Figure-I).Based to Judet- Letournel classification of acetabular fractures the study patients distributed in four. Most of the patients found in posterior column 26 (45.61%) then in bicolunar 23(40.35%), transverse 6(10.52%) and anterior column 2(3.51%)(Table-II).There used three types of surgical approach based on the acetabular fractures. Most followed approach was kocharLngen back 38(66.67%), then ilio inguinal 10(17.54%) and both approach followed together for 9(15.79%)patients (Table-III).There followed some complications to the patients but more than half patients 44(77.19%) have no complications. Some had faced wound infections 5(8.77%) then followed sciatic nerve palsy 4(7.02%), avascular necrosis 3(5.26%) and urethral injury followed 1(1.75%) patients (Figure-II). Then the study patients distributed according to the outcome after treatment based on the clinical grading scale of Matta et al. so most of them found 26(45.61%) was Excellent, then 19(33.33%) was good, 8(14.04%) found fair and 4(7.02%) found poor (Figure-III).

Sex	n	%
Male	13	22.81
Female	44	77.19

Table I Distribution of Sex (n=57)

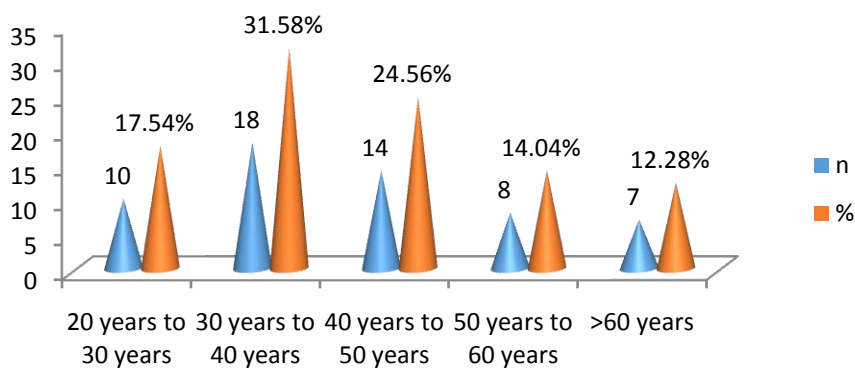


Figure-I: Distribute of age (n=57)

Type of fracture	n	%
Anterior Column	2	3.51
Bicolumnar	23	40.35
Posterior column	26	45.61
Transverse	6	10.53

Table-II: Distribute Type of fractures (n=57)

Approach	n	%
Ilio inguinal	10	17.54
Ilio inguinal + Kocher langenbach	9	15.79
Kocher Langenback	38	66.67

Table-III: Distribute of Surgical Approach (n=57)

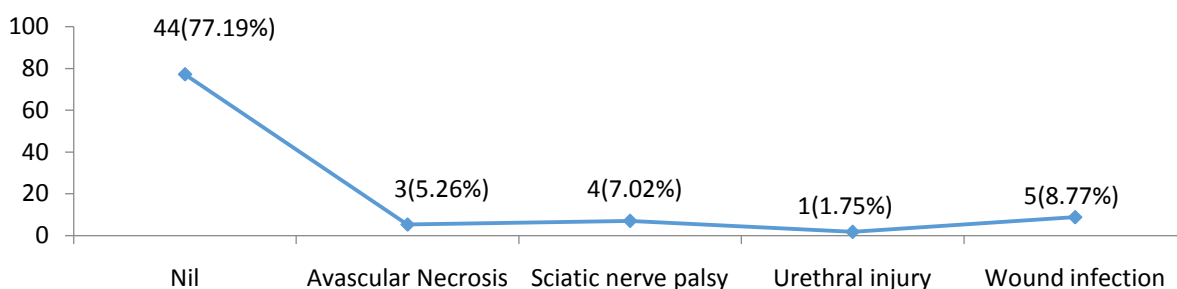


Figure-II: Distribute the study patients based on complication of after surgery (n=57)

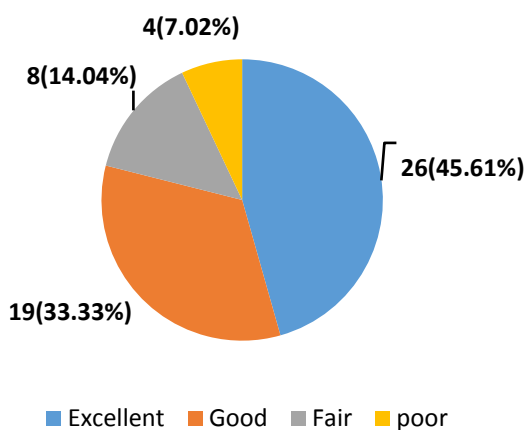


Figure-III: Distribution of Outcome of the Surgical Management of Acetabular Fracture

V. Discussion

A Total of 57 patients most of the patients found male 44(77.19%) and 13(22.81%) female patients with acetabular fracture. Most of the patients found in 30-40 age group 18(31.58%), then 40-50 and that was 14(24.56%) respectively 10(17.54%) found in 20-30, 8(14.04%) in 50-60 and 7(12.28%) in >60. In another study most of the patients were in the 21–40 age group⁵ also found in another study there found majority of the patients were in the age group of between 31–40 years with a mean age of 36.2 years but opposite type of result in gender that the male: female ratio was 0.8:1 was found⁸. S. D. Deo et al⁹ found 16 – 81 and mean age was 36. A. Kumar et al¹⁰ 15 -76 and found the mean age was 39.5 year. Based to Judet- Letournel classification of acetabular fractures the study patients distributed in four. Most of the patients found in posterior column 26 (45.61%) then in bicolunar 23(40.35%), transverse 6(10.52%) and anterior column 2(3.51%). In another study majority of the fractures found in Bicolunar 24 patients (43.6%), followed by posterior column fractures in 15 patients (27.3%), posterior wall fractures in 10 patients (18.1%), transverse fractures in 5 patients (9.1%) and anterior column fracture in one patient (1.8%)⁸. Kumar A et al.¹⁰ showed in his study anterior column 8.11%, posterior column was 5.41%, bicolunar 72.97% and transverse 13.51% also showed by Deo SD et al.⁹ anterior 12.5%, posterior 5%, bicolunar 50%, transverse 32.5%. There used three types of surgical approach based on the acetabular fractures. Most followed approach was Kocher-Langenbeck 38(66.67%), then ilio inguinal 10(17.54%) and both approach followed together for 9(15.79%) patients. Another study showed Kocher-Langenbeck approach was used in 40 cases (72.7%). Ilioinguinal approach was used in 9 cases (16.4%). Both approaches were used to fix 6 patients with Bicolunar fracture. Since posterior column and bicolunar fractures constituted a majority of cases, the Kocher-Langenbeck approach was predominantly used⁸. Kumar et al¹⁰ ilio inguinal 36.11%, Kocher-Langenbeck 56.94%, and both approach followed for 1.39% patients. Joel M. Matta¹¹ ilio inguinal 33%, Kocher-Langenbeck 43%, both approach followed for 2% patients. S. D. Deo et al⁹ ilio inguinal 24%, Kocher-Langenbeck 38%, both approach followed for 15% patients. There followed some complications to the patients but more than half patients 44(77.19%) have no complications. Some had faced wound infections 5(8.77%) then followed sciatic nerve palsy 4(7.02%), avascular necrosis 3(5.26%) and urethral injury followed 1(1.75%) patients⁸. In another study there found two complications-Osteonecrosis of the femoral head with secondary Osteoarthritis in two patients (3.6%). Sciatic Nerve palsy, which existed pre-operatively, was seen in three patients (5.5%). Urethral injury was observed in one patient (1.8%). Wound infection occurred in four cases (7.3%)⁸. Vincenzo Giordano et al¹² avascular necrosis found 4.8%, Sciatic Nerve palsy 12.2%, heterotopic ossification 1.2%, wound infections found in 1.2% patients.

Then the study patients distributed according to the outcome after treatment based on the clinical grading scale of Matta et al. so most of them found 26(45.61%), then 19(33.33%) was good, 8(14.04%) found fair and 4(7.02%) found poor. As per Matta et al. scoring system, another study had found the excellent outcome in 27 patients (49.1%), Good in 15 patients (27.3%), Fair in 9 patients (16.4%) and Poor in 4 patients (7.3%)⁸. Letournel¹³ reported perfect reduction in 62% of bicolunar fractures with a single approach. Matta and Merritt¹⁴ reported 81% good reduction by extended iliofemoral or ilioinguinal approaches occasionally by two separate approaches. Keith Mayo et al¹⁵ excellent 14%, good 61%, fair 16%, and poor 9% found in their results. A. Moroni et al¹⁶ reported that good reduction was achieved by staged Combined Ilioinguinal and Kocher-Langenbeck approaches during the same Operation.

VI. Limitations Of The Study

Our study wasn't a blind study so patient bias was present along with observer bias in subjective recording and the study and follow-up period was short in comparison to other studies, small sample size, limited resources and facilities; computer simulation facility was not available properly. So, to make more conclusive results, the following recommendations are proposed for further studies.

VII. Conclusion And Recommendations

Road traffic accidents as well as other accidents are the commonest mode of acetabular fracture injury with male predominance. In earlier days due to the lack of the knowledge of understanding the anatomy and the pattern of fracture, and lack of advanced imaging techniques and surgical expertise, the acetabular fractures were managed conservatively with a poor outcome as well as high morbidity. But now-a-days with the advent of radiology, CT scan with 3D reconstruction, the fracture pattern is well understood and coupled with improvements in the surgical techniques and instrumentation and now the management of these fractures has become standardized with good results. Anterior column fractures are managed effectively by Ilioinguinal approach and the Posterior column fractures by the Kocher-Langenbeck approach of surgery. In Bicolunar fractures, one column fixed firstly and assessed for the reduction of the other column. If it is not reduced, then that column is also fixed with following the appropriate approach. Complications of acetabular fractures treated operatively are minimal. Good to excellent results were achieved in patients.

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