

# Functional Outcomes of Open Reduction and Internal Fixation in Patients with Acetabular Fractures

Open Reduction and Internal Fixation in Patients with Acetabular Fractures

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## ABSTRACT

**Objective:** To determine the functional outcomes of open reduction and internal fixation in patients presented with acetabular fractures.

**Study Design:** Prospective/observational study.

**Place and Duration of Study:** This study was conducted at the Department of Orthopedics, QAMC/Bahawal Victoria Hospital/Civil Hospital, Bahawalpur, Pakistan from March 2017 to February 2020.

**Materials and Methods:** Forty five patients of both genders with age range 20 to 65 years who presented with acetabular fractures were enrolled in this study. Patients' detailed demographics including age, sex, body mass index and causes, and site of fractures were recorded after written consent. All patients underwent open reduction and internal fixation under general or spinal anesthesia. Radiological assessment was done. Patients followed for 1 year postoperatively. Functional outcomes were assessed by Harris Hip Scoring (HHS) system. Patient's satisfaction was also examined at final follow-up.

**Results:** There were 32 (71.11%) males while 13 (28.89%) were females with mean age was 38.69±12.84 years. Falling was the most common cause found in 26 (57.76%) patients. Posterior column was the commonest type found in 25 (55.56%). At 1 year, 32 (71.11%) patients had excellent, 10 (22.22%) had good, 2 (4.44%) had fair and 1 (2.22%) had poor functional outcomes by HHS. 39 (86.68%) patients were very satisfied, 4 (8.89%) patients were satisfied and 2 (4.44%) patients were not satisfied.

**Conclusion:** Open reduction and internal fixation surgical procedure is safe and effective for acetabular fractures with high patient satisfaction and excellent functional outcomes.

**Key Words:** Acetabular fractures, Open reduction and internal fixation, Functional outcomes, Patients satisfaction

**Citation of article:** Ahmed Z, Haider MI, Buzdar MI, Zafir MB, Qureshi MAM, Javed S. Functional Outcomes of Open Reduction and Internal Fixation in Patients with Acetabular Fractures. Med Forum 2020;31(6):26-29.

## INTRODUCTION

Acetabular fractures are among the most serious injuries treated by orthopedic surgeons. Unfortunately, patients with fractures of the pelvis and/or acetabulum, almost always also experience serious injury to surroundings of tissue (skin and muscles) and neurovascular structures (nerves, arteries and veins).<sup>1</sup> High-energy trauma is the main cause in younger patients and generally associated with other fractures. Over the age of 35, fractures occur with minimal trauma because of osteoporosis.<sup>2</sup>

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Received: March, 2020

Accepted: April, 2020

Printed: June, 2020

Majority of acetabular fractures are associated with lower limb fractures due to falls, particularly in older individuals.<sup>3</sup> Incident of posterior wall fractures are 24% of acetabular fractures. Acetabular fractures generally occur in conjunction with other fractures which influence management options, surgical approach and clinical outcomes.<sup>4</sup>

Standard radiographs (antero-posterior, pelvic inlet, pelvic outlet & Judet views) followed by CT scan with 3D reconstruction images help the surgeons to better view the fracture geometry & decide for best treatment for the acetabular fractures. Nonsurgical treatment may be recommended for undisplaced and stable fractures. In case of dislocation of the hip joint or wide displacement of the fracture fragments, open reduction with internal fixation (ORIF) is done with plate and screw fixation to reposition the bones into their normal alignment and place. This treatment may return the patient to their pre-injury functional level to the greatest extent possible.<sup>5</sup> Open reduction with internal fixation is considered the right treatment method for acetabular fractures. Patients who underwent this treatment had a good result. For the general orthopedic surgeons the treatment for displaced acetabular fractures is a

challenging task. Letournel and Judet described a system for classification of acetabular fractures.<sup>6</sup> They classified the fractures in terms of elementary fractures and associated fractures. Operative fixation is considered the effective method for the management of displaced acetabular fracture.

The current treatment trend for acetabular fractures is open reduction and internal fixation. This treatment has reduced hospital stay. For achieving good results in acetabular fractures the prime factors are early surgical intervention and experienced management. For posterior wall and column fractures Kocher-Langenbeck approach is considered the best.<sup>7</sup> Whereas for anterior wall and/or column fractures anterior ilioinguinal approach can be used for stable fixation of fractures. According to the statistics 74.6% of the cases achieved excellent results using ilioinguinal approach for surgical fixation of anterior wall and/or column fractures.<sup>8</sup> We conducted present study with aim to examine the functional outcomes of open reduction and internal fixation in patients with displaced and unstable acetabular fractures.

## MATERIALS AND METHODS

This prospective/observational study was conducted at Department of Orthopaedics QAMC/Bahawal Victoria Hospital/ Civil Hospital, Bahawalpur during the 1<sup>st</sup> March 2017 to 29<sup>th</sup> February 2020. A total of 45 patients of both genders with age range 20 to 65 years with acetabular fractures were enrolled. Patients' detailed demographics including age, sex, body mass index, causes, type and site of fractures were recorded. All the fractures were classified as per Letournel and Judet classification system. Patients with previous hip surgeries, patients with no consent and those unfit for anesthesia were excluded.

Pre and postoperatively X-rays and CT-scan examination were done (Figs. 1-3). All patients received open reduction and internal fixation (Kocher-Langenbeck approach and/or Ilio-inguinal approach, as indicated) under general or spinal anesthesia. Functional outcomes were assessed by using Harris Hip Scoring (HHS) system. Postoperative complications such as wound infection, nerve injury, and loss of reduction were examined. Patients were followed for 1 years postoperatively. Functional outcomes such as excellent (HHS score 90-100), good (80-89), fair (70-79) and poor (0-69) were examined. We also examined patients' satisfaction towards surgical procedure at final follow-up. All the data was analyzed by SPSS 24.

## RESULTS

Out of 45 patients 32 (71.11%) were males while 13 (28.89%) were females with mean age  $38.69 \pm 12.84$  years. Mean BMI was  $24.4 \pm 2.27$  kg/m<sup>2</sup>. Fall was the most common cause of fractures found in 26 (57.76%) patients followed by RTA in 19 (42.22%) patients.

Posterior column was the commonest type found in 25 (55.56%) patients followed by posterior wall in 12 (26.67%), transverse type in 4 (8.89%) and both columns (anterior and posterior column) in 4 (8.89%) patients. 29 (64.44%) patients had right side fracture while 16 (35.56%) had left side (Table 1).

Regarding postoperative complications we found that 4 (8.89%) patients had wound infection, 1 (2.22%) patient had nerve injury and 1 (2.22%) patient with loss of reduction (Table 2). At 1 year, 32 (71.11%) patients had excellent, 10 (22.22%) had good, 2 (4.44%) had fair and 1 (2.22%) had poor functional outcomes by HHS. Overall 42 (93.33%) patients had good to excellent functional outcomes (Fig. 4). According to the patients satisfaction, 39 (86.68%) patients were very satisfied, 4 (8.89%) patients were satisfied and 2 (4.44%) patients were not satisfied (Table 3).

**Table No.1: Demographical details of all the patients**

Variable	No.	%
Age (years)	38.69±12.84	
BMI (kg/m)	24.4±2.27	
<b>Gender</b>		
Male	32	71.11
Female	13	28.89
<b>Causes</b>		
Falling	26	57.76
RTA	19	42.22
<b>Type of fracture</b>		
Posterior Colum	25	55.56
Posterior Wall	12	26.67
Transverse	4	8.89
Anterior+Posterior wall	4	8.89
<b>Side</b>		
Left	29	64.44
Right	16	35.56

**Table No.2: Postoperative complications**

Complication	No.	%
Wound Infection	4	8.89
Nerve Injury	1	2.22
Loss of Reduction	1	2.22

**Table No.3: Patients satisfaction at final follow-up**

Patients satisfaction	No.	%
Very Satisfied	39	86.68
Satisfied	4	8.89
Not Satisfied	2	4.44



**Figure No.1: Pre-operative X-ray**



Figure No.2: Pre-operative CT scan



Figure No.3: Post-operative X-ray

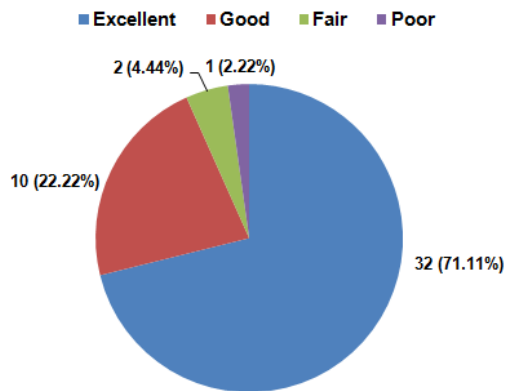


Figure No. 4: Functional Outcomes at 1 year postoperatively

**DISCUSSION**

Acetabular fractures are commonly found injuries in orthopedic settings. Many treatment modalities have been used for the management of these fractures but surgical fixation is considered treatment of choice for acetabular fractures.<sup>9,10</sup> We conducted present study with aim to examine the functional outcomes of open reduction and internal fixation in patients with acetabular fractures. In this regard 45 patients were included. Majority of patients (71.11%) were male and falling was the most frequent cause of acetabular fracture found in 57.76% followed by road traffic accident in 42.22%. The mean age of patients was 38.69±12.84 years. Mean BMI was 24.4±2.27 kg/m<sup>2</sup>. These results showed similarity to many of previous studies regarding surgical treatment of acetabular fractures, in which male patients population was high 55% to 70% as compared to females and majority of patients were in the age group 30 to 50 years (45%).<sup>11,12</sup>

Some of studies reported that road traffic accident was the commonest cause of acetabular fractures followed by falling from height and some of previous studies reported that falling was the most frequent cause of acetabular fractures followed by RTA.<sup>13,14</sup>

In present study we found that posterior column was the commonest type found in 25 (55.56%) patients followed by posterior wall in 12 (26.67%), transverse in 4 (8.89%) and both anterior and posterior column in 4 (8.89%) patients. 29 (64.44%) patients had right side fracture while 16 (35.56%) had left side. A study conducted by Kandasamy et al<sup>15</sup> reported that posterior column was the commonest variety in 43.75% patients followed by anterior and posterior column in 31.25% patients. Anizar-Faizi et al<sup>16</sup> reported that posterior wall was the commonest type in 46.7% patients followed by bicolunar.

In our study, regarding postoperative complications we found that 4 (8.89%) patients had wound infection, 1 (2.22%) patient had nerve injury and 1 (2.22%) patient with loss of reduction. These results were comparable to some previous studies.<sup>14,17</sup>

In present study at final follow-up we found that 32 (71.11%) patients had excellent, 10 (22.22%) had good, 2 (4.44%) had fair and 1 (2.22%) had poor functional outcomes by HHS. Overall 42 (93.33%) patients had good to excellent functional outcomes. Praveen et al<sup>18</sup> reported that 42.1% patients had excellent, 15.8% had good, 21.05% had fair and 21.05% had poor radiological outcomes at final follow-up. Ramji Lal Sahu<sup>19</sup> reported that open reduction and internal fixation had good functional outcomes, his study showed 60.86% patients had excellent, 21.73% had good, 8.69% had fair and 8.69% had poor functional outcomes. A study conducted by Sagar et al<sup>20</sup> reported in their study regarding surgical outcomes of acetabular fractures, 49.1% patients had excellent, 27.3% had good, 16.4% had fair and 7.3% had poor functional outcomes.

In this study we also examined patients satisfaction regarding surgical procedure and found that 39 (86.68%) patients were very satisfied, 4 (8.89%) patients were satisfied and 2 (4.44%) patients were not satisfied. These results showed similarity to many of previous studies in which majority of patients 90% were satisfied towards surgical fixation for acetabular fracture.<sup>21,22</sup>

**CONCLUSION**

Open reduction and internal fixation surgical procedure is safe and effective for acetabular fractures with higher patient satisfaction and excellent functional outcomes and fewer rate of complications. We found that overall 42 (93.33%) patients had good to excellent functional outcomes.

**Author's Contribution:**

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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