

# The Radiological and Functional Outcomes of Pelvic Fractures Treated by External Fixator

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## ABSTRACT

**Objective:** To determine the radiological and functional outcomes of pelvic fracture's patients treated by external fixator.

**Methods:** A case series was done at orthopaedics unit of Jinnah Postgraduate Medical Center in Karachi from January to July 2013. All patients with either gender age range from 20 to 50 years pelvic fracture of type A2 or B of less than 1 week duration were enrolled in this study. Patients were given spinal anaesthesia and the A.O external fixator was applied. Patients were followed for 3 months for final outcome. To assess the radiological outcome X-Rays pelvis AP view was done and for functional outcome was assessed in terms of severity of pain using Visual Analogue Score. The presence of acceptable radiological and functional outcome was taken as a satisfactory outcome as per operational definition.

**Results:** Mean age of the patients was  $36.39 \pm 7.89$  years, duration of symptoms  $3.58 \pm 1.01$  days, weight  $67.70 \pm 7.67$  Kg, Height  $1.56 \pm 0.058$ -meter, average BMI  $23.36 \pm 4.05$  Kg/m<sup>2</sup>. There were 65 (67%) males and 32(33%) females. Acceptable radiological outcome was found in 89 (91.80%) patients while acceptable functional outcome was found in 76 (78.40%) patients. A satisfactory outcome was found in 73(75.30%) patients.

**Conclusion:** Radiological and functional outcome in patients with pelvic fractures treated by external fixator was found to be acceptable in most of the patients.

**Keywords:** Pelvic Fracture, satisfactory outcome, radiological and functional outcomes, external fixator

## INTRODUCTION

High-energy trauma, such as road traffic accidents or falls from great heights, can cause significant damage to the pelvic ring.<sup>1</sup> These injuries are frequently part of a polytrauma, which can be fatal. When the pelvic ring is disrupted, it loses its stability, necessitating prompt and adequate therapy. In this patient sample, the overall reported incidence was 37 per 100,000 person-years. Males had a considerably higher prevalence than females among patients aged 15 to 25, with the majority of cases being related to severe trauma. In both genders, the incidence of pelvic fracture increased exponentially beyond age 55, with old age women having an estimated prevalence of the 446 fractures per 100,000 person-years.<sup>2</sup> There may be other injuries that require immediate attention (e.g. hemorrhage, urinary tract injuries), but the long-term functional consequences of the skeletal injury must be considered from the moment of admission. There are several management options are under practice: external fixation, percutaneous osteosynthesis and conservative treatment are all options for open reduction and internal fixation.<sup>3-5</sup> All of these procedures have benefits and drawbacks, and it is up to the surgeon and his intensive care team to determine the best strategy based not just on the type of injury, but also on his prior expertise. In a study, the outcome of external fixator in pelvic fractures was found to be satisfactory (anatomical and functional outcome) achieved in 16 of 20 cases (80%).<sup>6</sup> Although the type of fracture, the quality of the bone, the fixator design of the , the patient's habitus, the number and size of the pins, quality, maintenance of the technique, and other factors all influence external fixation stability.<sup>7</sup> The study has been conducted to assess the magnitude of outcome of external fixator in pelvic fracture as local data is not adequate on this topic, so this study will generate local data and if the outcomes found to be satisfactory then the same modality was used in such cases.

## MATERIAL AND METHODS

The case series study was performed in the department of orthopaedics, Jinnah postgraduate Medical Center after approval from the Ethical Review Committee of the Jinnah postgraduate Medical Centre, Karachi. Non probability consecutive sampling was used. A total of 97 patients with either gender between 20 and 50 years of age with Pelvic fracture of less than 1 week duration and Pelvic fracture of type A2 and type B as per Tile's classification were recruited from January 10, 2013 to July 9, 2013. Patients with pathological pelvic fractures, pelvic fractures of more

than a week old and Type 1 (as it is managed conservatively) and Type C as per Tile's classification were excluded from the study. Brief history was taken regarding the cause and duration of the fracture. Patients underwent surgery in spinal anesthesia and the A.O external fixator was applied. To assess the radiological outcome X-Rays pelvis AP view was done and for functional outcome was assessed in terms of severity of pain was assessed using VAS. The presence of acceptable radiological and functional outcome was taken as satisfactory outcome. Data were entered and analyzed on SPSS version 20. Mean and standard deviation were calculated for age, duration of fracture, weight and height and BMI of the patients. Frequency and percentages were calculated for gender, radiological, functional and satisfactory outcomes. Effect modifiers like age, gender, type of fracture and obesity (BMI>30kg/m<sup>2</sup>) were controlled through stratification, chi-square test was applied and p value  $\leq 0.05$  was taken as significant.

## RESULTS

Mean age of the patients was  $36.39 \pm 7.89$  years, duration of injury was  $3.58 \pm 1.01$  days, weight  $67.70 \pm 7.67$  kg, height  $1.56 \pm 0.06$  meter, BMI  $23.36 \pm 4.05$  kg/m<sup>2</sup>. Table 1

There were 65 (67%) male and 32 (33%) female patients. There were 56 (57.70%) patients with A2 type fracture and 41(42.30%) patients with a B type of fracture acceptable radiological outcome was found in 89(91.80%) patients while acceptable functional outcome was found in 76(78.40%) patients. A satisfactory outcome was found in 73(75.30%) patients. Stratification was done to see the effect of age, gender, type of fracture and obesity on the outcome. Chi-square test was applied and a significant difference was found for age, type of fracture and obesity. Table 2

Table 2. Baseline characteristics of the patients n=97

| Variables                   | Statistics       |            |
|-----------------------------|------------------|------------|
| Age (years)                 | $36.39 \pm 7.89$ |            |
| Duration of Symptoms (days) | $3.58 \pm 1.01$  |            |
| Weight (kg)                 | $67.70 \pm 7.67$ |            |
| Height (meter)              | $1.56 \pm 0.058$ |            |
| BMI (kg/m <sup>2</sup> )    | $23.36 \pm 4.05$ |            |
| Gender                      | Males            | 65 (67%)   |
|                             | Females          | 32 (33%)   |
| Types of fracture           | A2               | 56(57.70%) |
|                             | B                | 41(42.30%) |

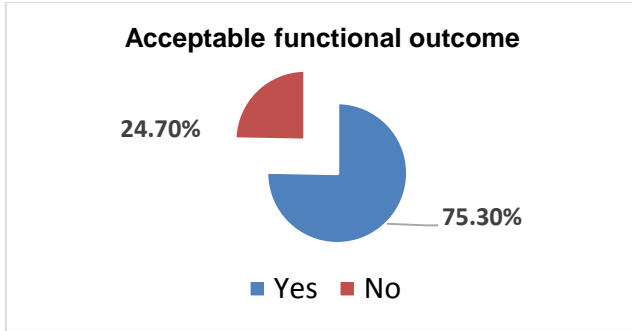


Fig:1. Frequency of acceptable functional outcome n=97

Table.2 Association of baseline characteristics with satisfactory outcome n=97

| Variables         | Satisfactory Outcome |           | P-value   |        |
|-------------------|----------------------|-----------|-----------|--------|
|                   | Yes                  | No        |           |        |
| Age group (Years) | ≤35                  | 54(93.1)  | 4 (6.9)   | 0.001* |
|                   | >35                  | 19 (48.7) | 20(51.3)  |        |
| Gender            | Male                 | 52 (80)   | 13 (20)   | 0.139  |
|                   | Female               | 21 (65.6) | 11(34.3)  |        |
| Type of fracture  | A2                   | 52 (92.9) | 4 (7.1)   | 0.001* |
|                   | B                    | 21 (51.2) | 20 (48.8) |        |
| BMI (Kg/m2)       | ≤30                  | 72 (82.8) | 15 (17.2) | 0.001* |
|                   | >30                  | 1 (10)    | 9 (90)    |        |

**DISCUSSION**

The pelvic ring fractures are thought to account for 2%–8% of all skeletal injuries, and are frequently connected with high-energy trauma, such as car falls from height and road traffic accident.<sup>5-7</sup> Due to airbags and safer car designs, the frequency of pelvic fracture appears to be increasing because of a rise in the rate of highly speeding motor vehicle accidents and the quantity of cases surviving these accidents. They're most common in young guys involved in traffic accidents, and they might range from little puncture wounds to total traumatic hemipelvectomy. Although in the current study the average age of the study subjects, was 36.39 ±7.89 years and males were in the majority 65 (67%). Similarly, in a study of Queipo-de-Llano A et al<sup>10</sup> reported that the out of 13 patients, 11 were males and only 2 were females and the overall mean age was 44.3 years. Alternatively, Wahab H et al<sup>11</sup> also found similar results regarding age and gender as menag of study subjects was 37.1±16.1 years and males were in majority 70.0%. Consistently Ghosh S et al<sup>12</sup> studied the 75 cases with pelvic fractures, 56 of them were males and 19 of whom were females, the average age of the participants in the study was 37.57 years and the most common cause of injury was automobile accidents. Male predominance in could be due to the fact that in our societies, males traditionally make up the majority of the workforce, whereas females have traditionally been homemakers, requiring the former to travel more for a living and thus being more likely to be involved in accidents.<sup>12</sup>

In this study acceptable radiological outcome was found in 89 (91.80%) patients while acceptable functional outcome was found in 76 (78.40%) patients and satisfactory outcome was found in 73 (75.30%) patients. Consistently Vécsei V et al<sup>6</sup> reported that there was a satisfactory functional and anatomical outcome achieved among 16(80.0%) patients out of 20, while the remaining four 4(20%) cases found with serious complications and form them mostly were caused by the initial injury type. In agreement of our findings, the Queipo-de-Llano A et al<sup>10</sup> demonstrated that among the three cases, radiological findings were excellent and among nine cases findings were good, while no any severe complication was seen. Based on a prior study that indicated Instable posterior pelvic fractures were more likely to have bleeding from the

posterior artery from the internal iliac artery or its posterior branches, this group classified these patients as either anterior or posterior fracture of the pelvic ring. Patients with anterior fractures received immediate external fixation, but those with posterior fractures received arterial angiography and embolization first. Many resuscitation methods include the use of external fixation for serious pelvic injuries, with the goal of stabilizing the pelvis to control hemorrhage, reduce the rate of blood transfusion, and survival rate improvement.<sup>12-14</sup> The treatment should be straightforward, quick, with a low risk of complications, and repeatable for surgeons who may only utilize it in regional settings on rare occasions. Furthermore, some pelvic fractures can be treated with an external fixator alone, without the need for additional internal fixation.<sup>14</sup>

**CONCLUSION**

As per study conclusion the radiological and functional outcome among patients with pelvic fractures treated by external fixator was observed to be acceptable in most of the patients. Further large sample size studies are suggested specially at local level.

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