

ORIGINAL ARTICLE

Long-Term Outcome of Patients with Pelvic Fractures Managed by External Fixator: A Longitudinal Study

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ABSTRACT

Aim: To evaluate the long-term outcome of patients with pelvic fractures managed by an external fixator

Study design: A longitudinal study

Place and Duration: This study was conducted at Pakistan Institute of Medical Sciences (PIMS) Islamabad Pakistan from march 2020 to march 2021.

Methodology: The study included patients with unstable pelvic fractures who were treated with an external fixator. The study enlisted the participation of thirteen patients. The patients ranged in age from 23 to 55 years old, with eleven male and two female patients. Ten patients were injured in a car accident, and three were injured after falling from a height. Radiological evaluation X-rays, abdominal Ultrasound, and 3D – CT with anteroposterior, inlet, and outlet views were performed

Results: Although four patients required additional internal fixation and reconstruction plating, thirteen patients were stabilized with an external fixator in our study, and no one died. The fundamental advantage of this treatment is that it keeps the reduction in place, resulting in a tamponade effect that minimizes bleeding and makes patient transfer easier.

Conclusion: External fixators are proving to be effective in treating a variety of complicated pelvic fractures, and our findings suggest that it is operational in an emergency and can be sustained as an ultimate treatment for type B and C pelvic injuries.

Keywords: External fixator, Injuries, Fractures, Pelvic, Orthopaedics

INTRODUCTION

For orthopaedic trauma surgeons, pelvic injuries are very important. Though uncommon, these fractures result from high-energy trauma and are frequently accompanied by a variety of other ailments.(1) Road traffic accidents are the most common cause of these injuries, followed by falls from heights.(2)

The incidence of pelvic fractures is progressively increasing. (3)It affects not only the musculoskeletal system but also the pelvic soft tissues and viscera, increasing mortality and morbidity. (4)Even in the most advanced trauma facilities, managing such patients remains a problem for trauma surgeons. There have been numerous breakthroughs in the treatment of multi-trauma patients and trauma in general. Not only should the surgeon be knowledgeable about the biomechanics of these severe fractures, but also about shock, hemorrhage, electrolyte imbalance, and bowel and urogenital tract injuries. (5)

Several approaches to treating such severe injuries have been proposed. Tile divided pelvic ring disturbances into three categories based on the degree of instability: stable, moderately unstable, and entirely unstable. (6)Nonoperative methods could be used to treat stable pelvic injuries. On the other hand, surgical fixation is currently considered the treatment of choice for unstable pelvic disturbances. (7)Among the several surgical fixation procedures, external fixation demonstrated encouraging

outcomes in the treatment of the pelvic ring disruption and has a significant impact on the survival rate. (8)

External fixation and its temporary function are also used to treat pelvic fractures permanently since it decreases hemorrhage inside the pelvic ring.(9)Various studies have documented the use of external fixation as a temporary treatment in the management of pelvic fractures. Following external stabilisation, several people have reported positive functional outcomes.(10, 11)

The purpose of the study was to evaluate how external fixation works in the treatment of unstable pelvic fractures, both as a short-term fix and as a long-term fix (Type B & Type C).

METHODOLOGY

This longitudinal study included patients with unstable pelvic fractures who were treated with an external fixator. Patients with pelvic fractures who visited our hospital from march 2020 to march 2021 were included in the study. Permission was taken from the ethical review committee of the institute. The study enlisted the participation of thirteen patients. The patients ranged in age from 23 to 55 years old, with eleven male and two female patients. Ten patients were injured in a car accident, and three were injured after falling from a height. A complete medical history was obtained to determine the injury mechanism and the array of fractures. Additionally, radiological evaluation X-rays, abdominal Ultrasound, and 3D – CT with anteroposterior,

inlet, and outlet views were performed. Supportive therapy with enough intravenous fluids and blood transfusions was administered to restore hemodynamic status.

Five of the thirteen patients had open reduction and internal fixation with a reconstructive plate, while the other eight had an anterior external fixator. An emergency laparotomy with peritoneal lavage and omental plugging was performed on one patient who had a lacerated liver. A complete rupture of the patella tendon in the right leg demanded patella tendon surgery in one patient. A recon nail was used on one patient who had a similar fracture shaft and neck of the left femur. Patients with a healthy posterior complex and no other severe soft tissue injuries should sit for the first week before beginning to walk with partial weight-bearing after six weeks. Delay weight-bearing was provided to patients with complex posterior disruption for 10 to 12 weeks. As determined by clinical and radiographic evaluation, the fixators were removed 6-8 weeks after the fracture had healed. Hip exercises that were vigorous and dynamic were encouraged. For 6 months, clinical and radiological evaluations were performed on the cases regularly. Lindahl et al.(12) updated Majeed's scoring method (13) to assess the functional result. A numerical score method was employed for functional assessment, and six criteria were chosen, including pain, sitting, sexual intercourse, walking aids, unassisted gait, and walking distance. These clinical parameters were all given a score. A clinical grade of excellent (78-80), good (70-77), fair (60-69), or bad (<60) was assigned to the total score.

RESULTS

This study examined n=13 individuals who had pelvic fractures. Patients in this study range in age from 23 to 50 years old. The youngest patient was 23 years old, while the others were between 35 and 50. A total of n=8 patients presented within 2 hours after injury, n=3; 23% after 2 hours, and the longest time to present since injury was 6 hours, n=2 (15 %). The fractures were classified using the Tiles categorization system, with Type B being the most common (81.5%) and Type C being detected in 5 individuals (38 %). Eight patients experienced further injuries, including two patients who had other fractures, one patient who had a liver laceration, one patient who had a right patella tendon tear, and one patient who had urethral damage. (As shown in Table 1).

Table 1: Characteristics of study participants

Characteristics	No of Patients (n=13)	Percent
Age groups (years)		
20-30	2	15
30-40	7	53
40-50	3	23
50-60	1	7.6
Time since injury		
1-2 hrs	8	61.5
3 hrs	3	23
6 hrs	2	15.3
Total Duration of Fixator		
Type B	8	61.5
Type C	5	38.46

A total of 5 patients developed complications and 38% of them developed an infection of the external fixator. Deep infections were not found. Other issues included pulmonary embolism with foot drop in three (23%) patients, knee stiffness in two (15%) cases, and pin loosening in one case (7.6 %). (As shown in Table 2)

This study used Modified Majeed's scoring system to evaluate the functional outcome. Out of thirteen patients, n=3 showed excellent outcomes, followed by good n=8, fair n=2, and poor n=0. (As shown in Table 3)

Table 2: Complications in study participants

Complications	No. of Patients	Percent
Infection	5	38
Infection by dressings and antibiotics	2	15
Pulmonary Embolism	3	23
Knee Stiffness	2	15
Pin Loosening	1	7.6

Table 3: Functional Outcome

Functional outcome	Points	No. of Patients
Excellent	78-80	3
Good	70-77	8
Fair	60-69	2
Poor	<60	0

DISCUSSION

A pelvic fracture is a medical emergency that can be fatal and requires a thorough general examination and accurate radiological investigations to evaluate the degree of displacement and instability present and to plan treatment. (14) We believe that strong functional results are an essential measure of traumatised patients' successful therapy. The study intends to evaluate patients' quality of life, functional outcomes, and the role of external fixation in treating unstable pelvic fractures

Despite improvements in therapy, the death rate of large pelvic fractures remains around 10%. (15) In our analysis of thirteen patients, all of whom required external fixation, the mortality rate was nil, and three patients required extra internal fixation with reconstructive plating.

Despite clinical and radiographic characteristics that demonstrate vertical stability of the pelvis, vertical movements occur at the wounded symphysis pubis, as shown by Lange, (16) and Pennal, (17) One patient (10%) experienced a liver laceration in our thirteen-study population, which was treated with peritoneal lavage. Before the laparotomy, the patient was stabilised using external fixation. The principal benefit of this treatment is that it maintains the reduction, resulting in a tamponade effect that reduces haemorrhage and aids in patient transportation.(18)

According to the literature, open pelvic fractures are linked to infection, a high rate of morbidity, and a high rate of mortality. There were no such consequences in the current study, because all open injury patients had a stable fracture pattern- Jones class 1 damage. (19) Results of the present study are following the study conducted by Pakistani researchers that external fixation is a preferable alternative because it reduces blood loss, improves stability without removing soft tissue, and prevents wound infection and early mobility.(20) The disadvantages, which include

pin tract infection and pin loosening, were found to be minor. (18)As a result, external stabilisation with an external fixator for an unstable pelvic fracture is a well-established therapeutic option, which we corroborate in our study. This research has several limitations. First and foremost, this is a prospective single-centre study. Second, the study populations are small; additionally, only surgery-related problems were recorded. Our findings could be used as a starting point for future randomised controlled studies.

CONCLUSION

External stabilisation with an external fixator reduces both morbidity and mortality in patient's having pelvic fracture. It's a basic, minimally invasive technique that can even be done under local anaesthesia. This study affirms that an external fixator can be used as a long-term treatment option for type B and C pelvic injuries.

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