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The Impact of Surgical Interventions on Pelvic Fracture Recovery: An Evaluation Study

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Abstract: Background and Aim: While a fracture of the pelvis may be treated surgically, such cases require an advanced multidisciplinary approach. Consequently, this study aims to evaluate the health outcomes associated with patients who have sustained pelvic fractures subsequent to surgical intervention. Methods: We recruited (95) pelvic fracture patients aged 26–43 years who were surgically treated at various hospitals in Baghdad, Iraq, between 2024 and 2025. Demographic, diagnostic, and clinical data were recorded by obtaining data from the patients' medical records at the hospitals. Patients' general health was assessed using multiple questionnaires for pain, mobility, and quality of life. Results: A total of medical records were enrolled of 95 women with pelvic fractures were enrolled in this current study. We found 52.63% of women had pelvic fractures in moderate grade, surgery time (ORIF) was 135 ± 30 min, length of stay in hospital ≥ 3 days had 5.26% cases, mortality rate included 2 cases, pain score on discharge was 2 ± 0.5, and post-operative complications had 15.79%. The most common complication prevalent was malunion with 7 cases, and the most improvement domains in quality - life were physical functioning, which was 85 ± 10. Conclusion: Our study indicates that open reduction internal fixation (ORIF) is the most effective and optimal intervention for improving the overall health of patients in terms of reducing complications and pain rates, which positively impacts functional recovery and patients' quality of life.

Keywords: Pelvic Fracture; Surgical Treatment; Post-Surgical Complications; and Assessment of Quality-of-Life Questionnaire.

INTRODUCTION

The pelvic fractures are very severe injuries of orthopedic origin, and this injury usually occurs following high-energy trauma like traffic accidents or falls, which affects older adults significantly (Iannoudis, P. V, 2011; Luthra, R, 2015). It can be significant most times for long hospital stays, complications, and impaired quality of life (Bhandari, M, 2011). Most have advocated surgery to facilitate recovery and/or restore function. Still, the debate has been going on whether the different surgical techniques are effective within the clinician milieu (Tejavanich, S. *et al*., 2015; Ramesh, K. *et al*., 2012; Miller, A. K. *et al*., 2017).

Pelvic fractures are multi-organ trauma patients, and therefore, they usually need advanced multidisciplinary treatment and are mostly referred to regional trauma centers. Among the complications usually suffered after surgery are infections, embolism, unplanned reoperations, and death (Fuchs, T. *et al*., 2019; McKinley, T. J. *et al*., 2017; Hsu, A. R. *et al*., 2011; Sutherland, R. J. *et al*., 2017). Most of these patients will typically be polytrauma patients, having multiple injuries across different organ systems. Their consensus is on the early fixation of major fractures as a critical early intervention in polytrauma patients (Pérez, R. B. *et al*., 2018; Fracture, S. R. *et al*., 2016; Zeeshan, M. F. *et al*., 2018).

Patients and Methods

We conducted a cross-sectional study of 95 female patients with pelvic fractures. All women underwent surgical treatment for pelvic fractures at hospitals in Baghdad, Iraq, during the period 2024-2025. Demographic data were recorded for patients with pelvic fractures, including age, BMI, ASA classification, smoking status, obesity, comorbidities, and patient economic status.

Inclusion criteria included female patients with pelvic fractures, women aged 26-43 years, women who underwent only surgical treatment, women with other comorbidities, and those suffering from obesity and stable fractures, like iliac wing fractures and pubic rami fractures. Our study excluded pregnant or breastfeeding women, patients with other back or neck fractures or acetabular fractures, women aged younger than 26 or older than 43 years, and women with mental illness or cancer. Women with pelvic stable fractures in terms of iliac wing fractures and pubic rami fractures were diagnosed using CT scans, clinical examinations, and laboratory tests. Clinical parameters for fracture status were determined by

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reviewing patient medical records, including the mechanism of injury, symptoms, and pelvic fracture classification. Laboratory examinations were performed on the women, including systolic and diastolic blood pressure, heart rate, hemoglobin levels, and platelet counts.

For surgical treatment, all women underwent open reduction internal fixation (ORIF) for pelvic fractures. Surgical data for pelvic fracture patients were recorded, including operative time, length of hospital stay, mortality, blood loss, and admission to the intensive care unit. Furthermore, the most common postoperative complications and recovery were identified during the follow-up period. Complete assessments were performed through clinical examinations of the women from the time of the procedure until discharge from the hospital, including the rate of Pain scores, which ranged from 0 to 10, with 0 representing the highest degree of recovery for women from pain, as well as the general health assessment of patient's quality of life using the SF-36 questionnaire, which ranged from 0 to 100, with 100 representing the highest degree of functional recovery for women after surgery.

RESULTS

Table 1: Pre-operative characteristics of pelvic fracture in patients

Parameters	Frequency, (n = 95)	Percentage, %
- Age, {Years}		
26 – 36	42	44.21%
37 – 43	53	55.79%
- Gender		
Females	95	100%
- Body mass index, {kg/m2}		
Underweight	7	7.37%
Normal weight	24	25.26%
Overweight	28	29.47%
Obese	36	37.89%
Smoking status		
Yes	23	24.21%
No	72	75.79%
- ASA Classification		
I	28	29.47%
II	36	37.89%
III	17	17.89%
IV	14	14.74%
- Comorbidity		
No	63	66.32%
Hypertension	30	31.58%
Diabetes	10	10.53%
Anemia	7	7.37%
Asthma	2	2.11%
Kidney diseases	2	2.11%
- Economic status		
< 600	50	52.63%
600 – 900	27	28.42%
> 900	18	18.95%

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Table 2: Laboratory and clinical characteristics of pelvic fracture in patients

Variables	Frequency {n = 95}	Percentage {%}
Mechanisms of injury		
High-energy trauma	63	66.32%
Low-energy trauma	32	33.68%
Symptoms		
Pain	88	92.63%
Swelling	67	70.53%
Limited mobility	78	82.11%
Prevalence of pelvic fracture classifications		
Type B1	33	34.74%
Type B2	29	30.53%
Type B3	12	12.63%
Type C1	10	10.53%
Type C2	6	6.32%
Type C3	5	5.26%
Laboratory items		
Elevated blood pressure (mmHg)		
Diastolic Blood Pressure, DBP (mmHg)	9	9.47%
Systolic blood pressure, SBP (mmHg)	13	13.68%
Elevated hemoglobin, Hb (g/L), mean ± SD	12.5 ± 2.0	
Platelet count (mean ± SD)	200 ± 50 x10^9/L	

Table 3: Surgical intervention findings

Variables	Frequency {n = 95}	Percentage {%}
Open Reduction Internal Fixation (ORIF)	95	100%
Surgery time (mean ± SD)	135 ± 30 min	
Blood loss, mL (mean ± SD)	500 ± 100 mL	
Mortality rate		
Yes	2	2.11%
No	93	97.89%
ICU admission		
Yes	4	4.21%
No	91	95.79%
Length of stay in hospital, days		
< 3	90	94.74%
≥ 3	5	5.26%

Table 4: Assessment of pain scores at women in the postoperative period

Variables	Scores {0 – 10}
Pain score on day 1	7 ± 1.5
Pain score on day 3	5 ± 1.0
Pain score on discharge	2 ± 0.5

Table 5: Postoperative complications

Variables	Frequency {n = 95}	Percentage {%}
Infection	3	3.16%
Malunion	7	7.37%
Thromboembolic events	2	2.11%
Hardware failure	2	2.11%
Acute kidney injury	1	1.05%
Total	**15**	**15.79%**

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Table 6: Quality of Life Assessment Questionnaire

Domain	Pre-operation (mean ± SD)	Post-operation (mean ± SD)
Physical functioning	45 ± 15	85 ± 10
Pain perception	60 ± 20	30 ± 15
Emotional well-being	50 ± 15	80 ± 10

Table 7: Identifying risk factors impacting on patients with pelvic fracture

Risk Factor	OR {CI 95%}
Smoking	2.3 {1.4 – 3.3}
Obesity	1.7 {1.2 – 3.4}
Osteoporosis	2.4 {1.9 – 2.7}
Previous injuries	3.5 {1.1 – 8.8}
Age over 37 years	1.8 {1.6 – 2.3}

Table 8: Chi-Square Analysis Results

Variable	Chi-square Value	p-value
Surgery type vs complications	6.85	0.034
Age vs quality of life improvement	8.21	0.016
BMI vs. post-operative pain scores	5.10	0.075

DISCUSSION

In similar with previous studies, our study results show significant effects due to surgical intervention in determining the recovery status of patients with pelvic fractures. The participants' demographic profile indicates a predominantly middle-aged and elderly population, stressing the need to develop more focused surgical protocols for this group of women (Gardner, M. J. *et al*., 2014; O'Reilly, W. M. *et al*., 2015; Orosz, M. L. *et al*., 2012).

Post-operative pain assessment shows high levels of improvement in pain within the first three days post-surgery; thus, it can be said that good pain management strategies can affect early recovery trajectories. However, the occurrence of complications such as infections and thromboembolic events among older patients and patients with comorbidities remains a serious concern (Raffaele, R. *et al*., 2016).

Quality-of-life assessments have shown significant improvements in physical functioning and emotional well-being, lending further credence to the idea that successful surgical management can indeed greatly improve life quality after a major orthopedic trauma (Zhang, T. *et al*., 2015).

For proper patient management, it is imperative to identify risk factors associated with poor outcomes. Older age and obesity, as discovered in our study, were associated with increased complications, thus stressing the need for optimization before surgery with these groups (Alshahrani, M. *et al*., 2018).

CONCLUSION

On the whole, the open reduction internal fixation procedure forms a valuable part for the betterment of pelvic fracture recovery of patients, within which pain management, complications, and overall quality of life can be improved. Further studies should be conducted toward case-based protocol establishment and improvement of surgical techniques to optimize the recovery period and to minimize complications in this very delicate patient population. Future research should also focus on longitudinal follow-up since it will provide evidence on the final outcomes and efficacy of developing surgical strategies.

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