

Research Paper

Early Versus Delayed Surgery Outcomes of Intertrochanteric Fractures



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ABSTRACT

Background: This study aims to investigate early and delayed mortality rates and hospitalization duration among patients with delayed and early femoral intertrochanteric fractures.

Objectives: To compare short and long-term mortality rates and hospitalization duration between intertrochanteric fracture patients receiving early and delayed surgical treatment.

Methods: In this cross-sectional study demographic data, underlying disease history, pre-surgery hospitalization duration, surgery duration, and post-surgery hospitalization duration were extracted from patient files. Patients were divided into two groups with and without delay in surgery. Patients' mortality rates were divided according to the time elapsed after the operation. They were divided into short-term and long-term categories. Data were analyzed using SPSS software, version 26.

Results: No significant difference was observed between the two groups in terms of age and sex distribution, but the frequency of underlying disease was significantly higher in the delayed surgery group ($P < 0.001$). Also, mean hospital stay duration ($P < 0.001$), surgery duration ($P < 0.001$), short-term mortality ($P = 0.01$) and long-term death ($P < 0.001$) were significantly higher in the delayed surgery group.

Conclusion: Delayed surgery correlates with increased early and late mortality rates and prolonged hospital stay among patients with intertrochanteric femoral fractures.

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1. Introduction

Intertrochanteric fracture is common among the elderly, especially those with osteoporosis [1-5]. While the mortality rate related to intertrochanteric fracture has reduced due to medical care advancements in recent years [6], this kind of fracture still accompanies a considerable mortality rate among the elderly. Early mortality (within one month) among these patients has been reported to range between 10%-30% in various studies [7-12].

Several factors contribute to the mortality of patients with intertrochanteric fractures, including advancing age, delays in operative treatment, underlying diseases, duration of surgery, and anesthesia methods [13]. Additionally, studies have mentioned the influence of surgeons' experience, hospital patient load [14], and obesity [5] on mortality rates.

Due to the uncertainty of mortality causes and lack of comprehensive studies on this subject, this study was conducted to compare the short and long-term mortality rates and the hospitalization duration in intertrochanteric fracture patients receiving early and delayed surgical treatment.

2. Methods

The utilized data from patients with femoral intertrochanteric fractures who were referred to [Ayatollah Kashani Hospital](#), Isfahan City, Iran from 2018 to 2020.

The inclusion criteria included patients with intertrochanteric fractures who underwent surgery between 2018 and 2020 and had adequate information available in their medical records or accessible through family members.

We collected demographic data, underlying diseases, duration from admission to surgery, surgery duration, and length of hospital stay after surgery from the related documents. Patients were categorized into two groups based on surgical delay, those with delay (surgery initiated more than 48 hours after hospital admission), and those without delay.

Patients' mortality status, post-surgery complications, and the period after surgery to their death were obtained through phone calls. Patients' death was classified into short-term (within one month after surgery), and long-term (within one year after surgery).

Data were analyzed using SPSS software, version 26 with the chi-square test and t-test.

3. Results

A total of 308 patients with intertrochanteric fractures with a mean age of 62.35 ± 10.15 years were selected. Among them, 230 patients (74.7%) were men and 78 patients (25.3%) were women. Also, 8.4% of them had underlying diseases. The mean duration of surgery was 1.23 ± 0.57 hours, and the mean length of hospital stay was 13.99 ± 3.27 days. Delayed surgery was observed in 47 patients (15.3%), and 261 (84.7%) underwent surgery without delay. Furthermore, 7 patients (2.3%) died within one month post-surgery, and 13 patients (4.2%) died within one year after surgery.

The subjects in the two groups had no significant difference in their age and gender, but the existence of underlying disease was significantly higher in the group with delayed surgery ($P < 0.001$). Moreover, the mean length of hospital stay ($P < 0.001$), duration of surgery ($P < 0.001$), short-term mortality ($P = 0.01$), and long-term mortality ($P < 0.001$) were significantly higher in the delayed surgery group ([Table 1](#)).

4. Discussion

While delaying surgery for a femoral intertrochanteric fracture may allow for more comprehensive patient evaluation and medical optimization, it also introduces various complications, such as bed sore, thromboembolism, infection, delayed rehabilitation, prolonged hospital stay, and increased mortality rates.

In our study, we observed higher short and long-term mortality rates among patients with delayed surgery. There is controversy in recent studies concerning the correlation between delayed surgery and mortality rates. Leung et al. reviewed 42 studies and found that early surgery was associated with lower side effects, mortality rates, bed sores, and hospitalization duration. However, evidence of short and long-term mortality was diverse [15]. This is probably due to the small sample size, diverse definitions of delayed surgery, and failure to evaluate the cause of the surgery [16]. Daugaard et al. investigated 38,020 patients from 2003 to 2010 and reported that delayed surgery after acute pelvic fracture accompanies with a considerable increase in short-term mortality (odds ratio (OR)=1.3 in 24-hour delay) [16]. Similarly, Poór et al. found that increased comorbidity significantly increased mortality in patients with hip fractures, highlighting the critical nature of timely surgery [17]. Rosso

Table 1. Comparison of patient characteristics and outcomes between early and delayed surgery groups for intertrochanteric fractures

Variables	No. (%)		P	
	Delay in Surgery			
	No (n=261)	Yes (n=47)		
Gender	Male	200(76.6)	30(63.8)	0.06
	Female	61(23.4)	17(36.2)	
Mean age (y)	62.36±14.92	62.27±16.21		0.97
Underlying disease	11(4.2)	15(31.9)		0<0.001
Mean of the length of hospital stay (d)	13.11±1.83	18.82±4.94		0<0.001
Mean of the length of surgery (h)	2.01±0.13	3.46±0.52		0<0.001
Short-term death (within one month)	3(1.1)	4(8.5)		0.01
Long-term death (within one year)	2 (0.8%)	11 (23.4%)		0<0.001

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et al. concluded that surgical treatment for pelvic fractures should be performed within 48 hours [18].

In our study, gender and age were not related to delayed surgery, but patients with underlying diseases were more likely to experience delayed surgeries, with longer surgical durations and hospitalizations observed in this group.

A study by Cha et al., similar to ours, found a correlation between delay in surgery and mortality rate in patients with intertrochanteric fracture [19]. While investigating factors contributing to surgical delays, they did not explore the impact of surgery duration on delays or the effect of delay in surgery on the length of postoperative hospitalization. By investigating the cause of the delayed surgery, they found that age (P=0.312) and gender (P=0.7102) were not determining factors for the kind of surgery (early or delayed). In addition, they found that factors like medications and comorbidities, such as pneumonia or heart disease (OR=2.780, 95% confidence interval [CI], 1.012%, 7.640%, P=0.047), have a significant relationship with the mortality rate related to pelvic fracture. Charlson's comorbidity index has shown increased marginal mortality (OR=1.431, 95% CI, 0.958%, 2.137%, P=0.080) in these patients compared to delay in surgery due to hospitalization factors, such as hospitalization on weekends or holidays, or delay due to the surgery schedule or consultation with other specialties. Therefore, the trigger of the higher rate of mortality in patients with delayed surgery may be in part due to the inappropriateness of the patient's health status, such as drugs or medical status.

5. Conclusion

Most patients with underlying disease who undergo delayed intertrochanteric fracture surgeries experience more length of hospitalization and surgery duration. This delay brings about more short and long-term mortality rates among patients. Timely surgical intervention is crucial to improve outcomes in these patients.

Ethical Considerations

Compliance with ethical guidelines

This retrospective cross-sectional study, approved by the Ethics Committee of [Isfahan University of Medical Sciences](#) (Code: IR.MUI.MED.REC.1398.439).

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Authors' contributions

Conceptualization, and supervision: Mohammad Ali Tahririan and Hossein Akbari Aghdam; Formal analysis: Mohammad Ali Tahririan and Mohammad Shahsavan; Methodology, and the original draft preparation: Hossein Akbari Aghdam and Mohammad Shahsavan; Project administration: Farnaz Jokar and Ashkan Jalili; Review and editing: Mohammad Ali Tahririan, Hossein Akbari Aghdam, and Mohammad Shahsavan; Final approval: All authors.

Conflict of interest

The authors declared no conflict of interest.

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