Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/h0qps134

TO STUDY THE OUTCOMES OF EARLY VS DELAYED SURGERY IN HIP FRACTURES IN THE ELDERLY IN TERMS OF HOSPITAL STAY, COMPLICATIONS AND MORTALITY

Dr. Pranav Arora[1*], Dr. Gururaj R Joshi[2]

[1*]Resident, Department of Orthopaedics, Bharati Vidyapeeth Deemed to be University Medical College and Hospital, Pune, India.
[2]Professor, Department of Orthopaedics, Bharati Vidyapeeth Deemed to be University Medical College and Hospital, Pune, India.

***Corresponding author:** Dr. Pranav Arora
*Resident, Department of Orthopaedics, Bharati Vidyapeeth Deemed to be University Medical College and Hospital, Pune, India. Email- pranavarora998@gmail.com

ABSTRACT

Objective: The present study aimed to compare the postoperative duration of stay, complications and mortality in patients undergoing surgery within and after 72 hours of the injury for hip fractures.
Materials and methods: The present study was a prospective, longitudinal and observational, hospital-based study undertaken in the Department of Orthopaedics, Bharati Hospital and Research Centre, Pune, from September 2022 – to April 2024. The study population included patients with hip fractures above the age of >60, with a sample size of 55. The study considered the date of injury, medical comorbidities, time taken for optimization, and surgery. All 55 patients were observed for complications or difficulties before and after the surgery. Well-written informed consent was taken from all the patients. Ethical Committee approval was obtained before commencing the study.
Results: The study included 55 patients with a mean age of 74.65 ± 7.58 years. A substantial proportion of patients (87.3%) experienced a delay of more than 72 hours (since the injury) before surgery, with only 12.7% receiving surgical intervention within 72 hours of the injury. The current study's analysis showed that there was no statistically significant difference in the duration of hospital stays between patients who underwent surgery within 72 hours and those who underwent surgery after 72 hours, with a p-value of 0.28, postoperative complications appeared evenly distributed regardless of the timing of surgery (p-value = 0.54) and no statistically significant difference in the comparison of mortality between the two groups as the p-value was 0.37.
Conclusion: While early surgical intervention appeared to reduce mortality rates, it did not significantly impact the length of hospital stay, the need for ambulatory support, or other complications. These findings suggest that while the timing of surgery is an important factor, other elements, such as the patient's overall health, pre-existing mobility status, and quality of postoperative care, play crucial roles in recovery and functional outcomes.

Keywords: Hip fractures, complications, duration of hospital stay, mortality.

INTRODUCTION

Hip fractures represent a major health burden in the elderly population,

significantly contributing to morbidity, mortality, and healthcare costs worldwide. As individuals age, physiological changes such as decreased bone density, impaired muscle strength, and compromised balance increase their susceptibility to falls and fractures. Among these, hip fractures are particularly concerning due to the high rates of disability and complications that accompany them. Given the ageing global population, the incidence of hip fractures is expected to rise, necessitating improved management strategies to enhance patient outcomes and reduce healthcare burdens.[1,2]

The timing of surgical intervention in elderly patients with hip fractures has emerged as a critical factor influencing recovery and prognosis.[3,4] Surgery is typically recommended to restore mobility and reduce the risk of complications such as infections, thromboembolism, and pneumonia. However, delays in surgery are common, often due to medical comorbidities, the need for preoperative optimization, and logistical challenges within healthcare systems. Despite efforts to expedite surgery, a substantial proportion of patients experience delays beyond the recommended window, which may affect their postoperative outcomes.[5,6]

In several studies, early surgical intervention, ideally within 72 hours of the injury, has been associated with lower mortality rates and improved functional recovery.[7,8] Prompt surgery is believed to mitigate the risks of prolonged immobilization, which can exacerbate complications and delay rehabilitation.[9] However, conflicting evidence exists regarding the impact of surgical timing on other key outcomes such as hospital length of stay, postoperative complications, and long-term survival.[4,5,8] This study evaluates the impact of surgical timing on postoperative outcomes in elderly patients with hip fractures by comparing those who undergo surgery within 72 hours of injury to those who receive delayed surgery. Key variables analyzed include hospital stay, postoperative complications, and mortality rates to identify whether early intervention offers substantial benefits in terms of recovery and survival. The study's findings aim to inform evidence-based guidelines for timely surgical management, optimizing patient recovery and reducing the healthcare burden. The present study aims to assess the effects of surgical timing on postoperative outcomes in elderly patients with hip fractures.

MATERIALS AND METHODS

Study Design

This prospective, longitudinal, observational study was conducted at Bharati Hospital and Research Centre, Pune. The study was designed to evaluate the impact of surgical timing on postoperative outcomes in elderly patients with hip fractures. The study period spanned from September 2022 to April 2024, with all eligible patients enrolled consecutively.

Study Population

The study included elderly patients above 60 years of age presenting with hip fractures. A total of 55 patients were recruited for the study. Inclusion criteria were as follows: (1) age >60 years, (2) diagnosis of hip fracture confirmed via radiological imaging, and (3) patients undergoing surgical intervention for the fracture. Exclusion criteria included (1) non-surgical management of the fracture, (2) patients with polytrauma, and (3) patients with neuromuscular disease

Data Collection

Data was collected using a structured proforma, including patient demographics, injury date, medical history, and comorbidities. The study also recorded the time taken for preoperative optimization and surgical intervention. All patients were followed up for postoperative complications, length of hospital stay, and mortality. Informed consent was obtained from each participant before their inclusion in the study. Approval from the institutional ethics committee was secured before commencing the research.

Grouping Based on Surgical Timing

Patients were stratified into two groups based on the timing of their surgery:

- **Group 1 (Early surgery)**: Patients who underwent surgery within 72 hours of injury.
- **Group 2 (Delayed surgery)**: Patients who had surgery after 72 hours of the injury.

Follow-up

Patients were followed for 30 days postoperatively to assess for complications and mortality. Telephone follow-ups were conducted for patients discharged early to ensure complete data collection on outcomes.

Outcome Measures

The primary outcome measures were the length of postoperative hospital stay, the occurrence of complications (e.g., wound infection, deep vein thrombosis, respiratory issues), and mortality rates within 30 days of surgery. Complications were documented based on clinical and laboratory findings, while mortality was confirmed through hospital records or follow-up visits.

Statistical Analysis

Data were entered and analyzed using statistical software (SPSS version 25.0). Continuous variables, such as age and hospital stay, were expressed as mean ± standard deviation, while categorical variables, such as complications and mortality, were presented as frequencies and percentages. The chi-square test was used to compare categorical variables, and an independent t-test was applied for continuous variables between the early and delayed surgery groups. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

All participants provided informed consent before enrolment in the study. The research adhered to the Declaration of Helsinki guidelines for ethical medical research involving human subjects. Approval from the Bharati Hospital and Research Centre's Institutional Ethics Committee was obtained before study initiation. Patient confidentiality was maintained throughout the study.

RESULTS

Table 1 shows that the mean age was 74.65 ± 7.58 years. The gender distribution was nearly equal, with 49.1% male and 50.9% female participants. Regarding the side of femur fracture, 43.6% had left-sided fractures, while 56.4% had fractures on the right. The majority of fractures were intertrochanteric (72.7%), followed by the neck of femur fractures (21.8%) and subtrochanteric fractures (5.5%). Regarding pre-injury ambulatory status, 12.7% were community ambulators with support, 85.5% were community ambulators without support, and 1.8% were domestic ambulators with support. Concerning the duration between injury and surgery, 12.7% underwent surgery within 72 hours, while 87.3% had surgery after 72 hours. Among those with delayed surgery, 21.8% were delayed due to fitness issues, 36.4% due to late admission, and 29.1% for other reasons, with 12.7% of cases being not applicable as they were operated on within 72 hours.

Table 1: Clinicodemographic variables of study participants (n=55)

Characteristics of study participants	Mean ± SD 0r n (%)
Mean age	74.65 ± 7.58
Gender	
• Male	28 (49.1%)
• female	27 (50.9%)
Side of femur fracture	
• Left	24 (43.6%)
• Right	31 (56.4%)
Type of femur fracture	
• Intertrochanteric femur fracture	40 (72.5%)
• Neck of femur fracture	12 (21.8%)
• Subtrochanteric femur fracture	3 (5.5%)
Pre-Injury Ambulatory Status	
• Community Ambulator with Support (Stick/Walker)	7 (12.7%)
• Community Ambulator Without Any Support	47 (85.5%)
• Domestic Ambulator with Support	1 (1.8%)
Duration between injury and surgery	
• <72 hours	7 (12.7%)
• >72 hours	48 (87.3%)
Reason For >72 Hours Duration	
• Fitness issue	12 (21.8%)
• Late admission	20 (36.4%)
• NA (Not applicable (Operated under <72 hours))	7 (12.7%)
• Others	16 (29.1%)

Table 2 shows that among the study participants, those who underwent surgery within 72 hours had no mortality, while 10.4% of those operated on after 72 hours died, but this difference was not statistically significant (p=0.37). Regarding postoperative duration of stay, 14.3% of the early surgery group stayed ≤ 5 days compared to 39.6% in the delayed surgery group, but this difference was also insignificant (p=0.28). Ambulation with support was more common in the early surgery group (57.1%) than in the delayed surgery group (35.4%), though this was not statistically significant (p=0.26). Complications were observed in 28.6% of those operated on within 72 hours, compared to 18.8% of those operated on later, and this difference was not statistically significant (p=0.54).

Table 2: Outcome among study participants (n=55)

Outcome	Duration between surgery and injury		p-value
	<72 hours (n=7)	>72 hours (n=48)	
Mortality			
Yes	0 (0.0%)	5 (10.4%)	0.37
No	7 (100.0%)	43 (89.6%)	
Post-op duration of stay			
≤ 5 days	1 (14.3%)	19 (39.6%)	0.28
> 5 days	6 (85.7%)	26 (54.2%)	
Died	0 (0.0%)	3 (6.2%)	
Ambulation with support			
Yes	4 (57.1%)	17 (35.4%)	0.26
No	3 (42.9%)	31 (64.6%)	
Complications			
Yes	2 (28.6%)	9 (18.8%)	0.54
No	5 (71.4%)	39 (81.2%)	

DISCUSSION

Fractures of the hip represent a significant medical and social concern, particularly for older people, due to their high incidence and substantial impact on independence and overall health. These fractures often result from low-energy mechanisms like falls from standing height, common in older adults due to reduced bone density and other age-related physiological changes. The management of hip fractures in this population is further complicated by the presence of concomitant conditions and an increased risk of postoperative complications, making the timing of surgery a critical factor in determining outcomes.[9,10] The primary goal of surgery is to facilitate a safe and rapid return to pre-fracture functional levels. Our findings suggest that while early surgery may offer certain benefits, particularly in reducing mortality, a more comprehensive understanding of its effects on other outcomes, such as postoperative complications, ambulatory support, and functional recovery, is necessary.

The present study shows no significant difference in mortality between patients who underwent surgery within 72 hours and those whose surgeries were delayed beyond 72 hours (p=0.37). However, delayed surgery was associated with a 10.4% mortality rate, consistent with studies by Klestil T et al.,[9] who found that early surgery within 48 hours reduced mortality risk by 20%. Similarly, Chen P et al.[11] reported that early surgery reduced mortality by 28%, highlighting the importance of timely intervention. Although our study did not achieve statistical significance, these results align with findings from Novack V et al.[12] and Moran CG et al.[13,] who also observed lower mortality rates with earlier surgical intervention. The need for further investigation with larger sample sizes is evident, as our findings suggest a trend toward improved survival with early surgery.
Postoperative hospital stay duration showed no statistically significant difference between our study's early and delayed surgery groups (p=0.28). Despite this, the early surgery group had a shorter stay, which aligns with findings from Liu S. et al.,14, who observed that early surgery reduced hospital stays by 0.90 to 1.05 days. This is further supported by Chen P et al.,[11] who reported shorter hospital stays for patients operated on within 48 hours. Murphy JR et al.[15] also found that delays beyond 48 hours were associated with longer hospital stays. Although our study did not demonstrate a significant difference, the evidence suggests that early surgery may contribute to shorter hospital stays, particularly when other factors, such as the patient's initial condition and postoperative care, are optimized. Ambulation with Support

In our study, there was no statistically significant difference in the need for ambulation with support between the early and delayed surgery groups (p=0.26), although the early surgery group showed a higher percentage of ambulation without support. This aligns with Gopurathingal AA et al.,[16] who noted that early surgery improved mental health outcomes but did not significantly enhance physical quality of life at six months. Our findings suggest that while early surgery may contribute to improved mobility, other factors, such as the patient's baseline health and rehabilitation, also play critical roles in determining long-term functional outcomes. Complications, including infections and thromboembolic events, were not significantly different between our study's early and delayed surgery groups (p=0.54). This is consistent with Novack V et al.,[12] who noted that early surgery reduced mortality but did not significantly affect the overall complication rate. Chen P et al.[11] reported that early surgery within 48 hours decreased complications such as pressure ulcers and UTIs, highlighting the role of surgical timing in preventing some complications. Our findings emphasize the importance of comprehensive postoperative care in minimizing complications, as factors such as the patient's health status and quality of rehabilitation may be equally or more important than surgical timing alone.

Certain studies emphasize the critical role of timely surgery in improving outcomes for elderly patients with hip fractures. Early surgery has been shown to reduce complications such as pressure ulcers and hospital-acquired pneumonia, shorten hospital stays, and lower mortality rates. However,

these studies also highlight that factors like patient comorbidities, age, and overall health play significant roles in determining recovery and long-term survival. Although our study did not find statistically significant differences in mortality, hospital stay, or complications, it aligns with the broader literature suggesting that early surgical intervention generally leads to better outcomes. This underscores the need for a comprehensive, patient-centred approach that incorporates timely surgery alongside personalized postoperative care to optimize results in elderly hip fracture patients.[17-20]

CONCLUSION:

The present study evaluated the impact of early versus delayed surgery on postoperative outcomes in elderly patients with hip fractures, focusing on mortality, hospital stay, complications, and ambulation with support. While early surgery was associated with a trend toward lower mortality, the differences in hospital stay, ambulation support, and complications were not statistically significant. These results suggest that while timely surgical intervention may improve survival, other factors such as the patient's pre-existing health condition, mobility status, and quality of postoperative care are equally important in determining recovery outcomes. A holistic approach, incorporating personalized patient management and comprehensive rehabilitation strategies, is essential to optimize functional recovery in this population. Further large-scale studies and multi-centre collaborations are needed to validate these findings and enhance surgical guidelines for elderly hip fracture patients.

REFERENCES

1. Lim SK, Choi K, Heo NH, Kim Y, Lim JY. Characteristics of fragility hip fracture-related falls in the older adults: A systematic review. The Journal of nutrition, health and aging. 2024 Oct 1;28(10):100357.
2. Hadjimichael AC. Hip fractures in the elderly without osteoporosis. J Frailty Sarcopenia Falls. 2018 Mar 1;3(1):8-12.
3. Simunovic N, Devereaux PJ, Bhandari M. Surgery for hip fractures: Does surgical delay affect outcomes? Indian J Orthop. 2011 Jan;45(1):27-32.
4. Glassou EN, Kjørholt KK, Hansen TB, Pedersen AB. Delay in Surgery, risk of hospital-treated infections and the prognostic impact of comorbidity in hip fracture patients. A Danish nationwide cohort study, 2005-2016. Clin Epidemiol. 2019 May 10;11:383-395.
5. Cohn MR, Cong GT, Nwachukwu BU, Patt ML, Desai P, Zambrana L, Lane JM. Factors Associated With Early Functional Outcome After Hip Fracture Surgery. Geriatr Orthop Surg Rehabil. 2016 Mar;7(1):3-8.
6. Ta CN, Lurie B, Mitchell B, Howard R, Onodera K, Harkin W, Ouillette R, Kent WT. Ambulation Distance Within 72 Hours after Surgical Management Is a Predictor of 90-Day Ambulatory Capacity in Elderly Patients with Hip Fracture. J Am Acad Orthop Surg Glob Res Rev. 2023 Aug 22;7(8):e23.00079.
7. Koudouna S, Evangelopoulos DS, Sarantis M, Chronopoulos E, Dontas IA, Pneumaticos S. The Effect of Post-operative Physical Therapy Following Hip Fracture: A Literature Review. Cureus. 2023 Apr 17;15(4):e37676.
8. Liu Z, Du Z, Lu H, Fu Z, Xu H. Delay between admission and Surgery as a potential risk factor for postoperative morbidity and mortality in elderly patients with hip fractures: a retrospective study. Journal of Orthopaedic Science. 2023 Sep 1;28(5):1124-30.
9. Klestil T, Röder C, Stotter C, Winkler B, Nehrer S, Lutz M, Klerings I, Wagner G, Gartlehner G, Nussbaumer-Streit B. Impact of timing of Surgery in elderly hip fracture patients: a systematic review and meta-analysis. Scientific reports. 2018 Sep 17;8(1):13933.
10. Amarilla-Donoso FJ, López-Espuela F, Roncero-Martín R, Leal-Hernandez O, Puerto-Parejo LM, Aliaga-Vera I, et al. Quality of life in elderly people after a hip fracture: a prospective study. Health Qual Life Outcomes. 2020;18(1):71.

11. Chen P, Shen X, Xu W, Yao W, Ma N. Comparative assessment of early versus delayed Surgery to treat proximal femoral fractures in elderly patients: a systematic review and meta-analysis. Int J Surg. 2019 Aug;68:63-71.
12. Novack V, Jotkowitz A, Etzion O, Porath A. Does delay in Surgery after hip fracture lead to worse outcomes? A multicenter survey. Int J Qual Health Care. 2007 Feb 19;19(3):170-6.
13. Moran CG, Wenn RT, Sikand M, Taylor AM. Early mortality after hip fracture: is delay before Surgery important? J Bone Joint Surg Am. 2005 Mar;87(3):483-9.
14. Liu S, Qiang L, Yang Q, Fan L, Wang J, Yang Y, Shi Z, et al. Delayed Surgery is associated with adverse outcomes in patients with hip fracture undergoing hip arthroplasty. BMC Musculoskelet Disord. 2023 Apr 13;24(1):286.
15. Murphy JR, Loh J, Smith NC, Stone NC. Association of length of hospital stay with delay to surgical fixation of hip fracture. Can J Surg. 2022 Mar 15;65(2)
16. Gopurathingal AA, Bhonlse S, Jabbar A, Kamat A. Physical activity outcome in early vs delayed elderly hip fracture surgery. J Surg Res. 2022;5(2):264-74.
17. Sasabuchi Y, Matsui H, Lefor AK, Fushimi K, Yasunaga H. Timing of Surgery for hip fractures in the elderly: a retrospective cohort study. Injury. 2018 Oct;49(10):1848-54.
18. Castronuovo E, Pezzotti P, Franzo A, Di Lallo D, Guasticchi G. Early and late mortality in elderly patients after hip fracture: a cohort study using administrative health databases in the Lazio region, Italy. BMC Geriatr. 2011 Aug 5;11:37.
19. Elkbuli A, Eily A, Polcz V, Boneva D, Spano II PJ, McKenney M, et al. Isolated hip fracture in the elderly and time to Surgery: is there an outcome difference? Trauma Surg Acute Care Open. 2018;3(1)
20. Bhandari M, Simunovic N, Devereaux P, Sprague S, Guyatt GH, Schemitsch E. Surgical delay and its effect on mortality in elderly hip fracture patients: a systematic review and meta-analysis. Orthop Procs. 2012;94-B(SUPP_XXI):63-63.