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Original Research Article

A Comparative Study on Short and Long-Term All-Cause Mortality and Morbidity in Hip Fracture Patients Aged above 50 Years on Antiplatelets vs Not on Antiplatelets

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Abstract

Background: Hip fractures in older adults are associated with considerable morbidity and mortality. Patients receiving antiplatelet therapy often experience delays in surgery because of concerns regarding perioperative bleeding, although the effect on overall outcomes remains uncertain.

Methods: This hospital-based prospective comparative study included 120 patients aged over 50 years undergoing surgical treatment for proximal femur fractures between October 2023 and October 2024. Patients were divided into two equal groups based on pre-injury antiplatelet use (60 each). Baseline characteristics, perioperative variables, postoperative complications, functional outcomes, and mortality at 30 days and one year were compared using appropriate statistical tests.

Results: Baseline demographic and clinical characteristics were comparable between the two groups. Patients receiving antiplatelet therapy had significantly greater delays to surgery (>48 hours) (68.3% vs. 26.7%, p=0.001) and longer hospital stay (12.37 ± 3.94 vs. 9.78 ± 4.11 days, p=0.001). Blood transfusion requirements, postoperative complications, Modified Harris Hip Scores, and 30-day readmission rates were similar in both groups. Intra-hospital mortality (5.0% vs. 1.7%), 30-day mortality (3.3% vs. 8.3%), and one-year mortality (21.7% in both groups) showed no statistically significant differences.

Conclusion: Pre-injury antiplatelet therapy was associated with delayed surgery and prolonged hospitalization but did not significantly affect perioperative morbidity, functional recovery, or short- and long-term mortality. These findings support individualized perioperative management and suggest that unnecessary delays in hip fracture surgery solely because of antiplatelet therapy should be avoided.

Keywords: Hip fracture; Antiplatelet therapy; Mortality; Morbidity; Modified Harris Hip Score; Blood transfusion; Surgical delay.

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Introduction

Hip fractures are among the most common fragility fractures in older adults and are associated with substantial morbidity, mortality, functional decline, and healthcare expenditure. The incidence of hip fractures increases markedly after the age of 50 years owing to osteoporosis, advancing age, and increased risk of falls. Despite advances in perioperative care, hip fractures continue to carry a high risk of short-term and long-term mortality, making timely and appropriate management essential. [1] Early surgical intervention has been shown to improve functional recovery and reduce postoperative complications. Several systematic reviews and meta-analyses have demonstrated that surgery performed within 24–48 hours of admission is associated with lower mortality, shorter hospital stay, and fewer medical complications compared with delayed surgery.

[2,3] However, the timing of surgery is often influenced by multiple patient-related factors, including pre-existing medical illnesses and the use of antithrombotic medications.

With increasing life expectancy, a growing proportion of elderly patients with hip fractures are receiving antiplatelet therapy for the prevention of cardiovascular and cerebrovascular diseases. Although continuation of antiplatelet agents may increase perioperative bleeding and transfusion requirements, delaying surgery to discontinue these medications may itself increase morbidity and mortality. Consequently, the optimal perioperative management of patients receiving antiplatelet therapy remains controversial. [4]

Mortality following hip fracture is influenced not only by surgical timing but also by age, associated comorbidities, postoperative complications, and overall physiological status. Previous studies have shown that medical complications such as pneumonia, myocardial infarction, stroke, venous thromboembolism, and surgical site infection significantly contribute to adverse outcomes following hip fracture surgery. [5]

Recent clinical studies have suggested that carefully selected patients receiving antiplatelet therapy may safely undergo early surgery without a significant increase in major bleeding complications, while avoiding the adverse consequences of delayed operative management. Nevertheless, evidence comparing short-term and long-term mortality and morbidity between patients on antiplatelet therapy and those not receiving antiplatelets remains limited, particularly in the Indian population. [6]

Therefore, the present prospective comparative study was undertaken to compare 30-day and one-year all-cause mortality, morbidity, treatment outcomes, and postoperative complications among hip fracture patients aged more than 50 years receiving antiplatelet therapy and those not receiving antiplatelet therapy.

Materials and Methodology

Study Design: This was a hospital-based prospective comparative study conducted after obtaining approval from the Institutional Research Ethics Committee.

Study Setting: The study was conducted in the Department of Orthopaedics, Government Medical College, Kozhikode, Kerala, at a tertiary care teaching hospital.

Study Duration: The study was conducted over 12 months, from October 2023 to October 2024.

Study Population: A total of 120 patients aged more than 50 years admitted with proximal femur (hip) fractures were included. Patients were divided into two groups based on pre-injury antiplatelet use:

- **Group A:** Patients receiving antiplatelet therapy (n = 60)
- **Group B:** Patients not receiving antiplatelet therapy (n = 60)

Sampling Technique: A convenience sampling technique was used. Eligible patients attending the outpatient department or presenting to the emergency department who fulfilled the inclusion criteria and provided written informed consent were enrolled consecutively until the required sample size was achieved. Patients were grouped according to their pre-injury use of antiplatelet medication into the antiplatelet group and the non-antiplatelet group.

Sample Size Calculation: The sample size was calculated using the formula $N=((Z\alpha+Z\beta)^2\times Pq\times 2)/d^2$. Based on the assumptions ($Z\alpha=1.96$, $Z\beta=0.84$, P1=41.75%, P2=17.2%) and the study by Elete AR et al., [7] the calculated sample size was 54 patients per group, which was rounded up to 60 patients per group, giving a total sample size of 120.

Inclusion Criteria: Patients aged more than 50 years with traumatic proximal femur (hip) fractures who underwent surgical management and provided written informed consent were included in the study.

Exclusion Criteria: Patients with pathological fractures (primary or metastatic), those who were non-ambulatory before injury, patients with bleeding disorders, polytrauma patients or those with major fractures involving the same limb, and patients with a previous proximal femur fracture or prior hip surgery were excluded from the study.

Study Procedure: After obtaining Institutional Ethics Committee approval, eligible patients with proximal femur fractures were evaluated clinically and radiologically. A detailed history including comorbidities, pre-injury antiplatelet use, and pre-injury mobility status (Parker and Palmer score) was recorded.

Baseline laboratory investigations including haemoglobin, platelet count, prothrombin time, activated partial thromboplastin time, and INR were documented. Operative details including timing of surgery, duration of surgery, blood loss, type of procedure, and fixation method were recorded. Patients were followed up at 1 month, 6 months, and 1 year with clinical, radiological, and functional assessment using the Modified Harris Hip Score. Mortality, postoperative complications, blood transfusion requirement, time to ambulation, and return to work were also recorded.

Data Collection: Data were collected using a predesigned semi-structured proforma. Demographic details, comorbidities, ASA grading, Charlson Comorbidity Index, fracture characteristics, laboratory investigations, operative details, transfusion requirement, postoperative complications, hospital stay, mortality, radiological assessment, and Modified Harris Hip Score were recorded prospectively. Detailed information regarding antiplatelet therapy including drug type, dosage, duration, and indication was also documented.

Outcome Measures

Primary Outcomes

- All-cause mortality at 30 days.
- All-cause mortality at 1 year.

Secondary Outcomes

- Treatment outcomes.
- Delay to surgery.
- Blood transfusion requirement.
- Duration of hospital stay.
- Thirty-day postoperative complications (infection, myocardial infarction, stroke, thromboembolism, implant-related complications, and readmission).
- Functional outcome using the Modified Harris Hip Score.
- Time to ambulation and fracture healing.

Follow-up: Patients were followed clinically at 1 month, 6 months, and 1 year. Mortality, postoperative complications, radiological fracture healing, and functional outcomes were assessed during each follow-up visit. Hospital records and telephonic interviews were used to ascertain one-year survival status where necessary.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 29.0. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The Shapiro–Wilk test was used to assess normality. Independent sample t-test or Mann–Whitney U test was applied for continuous variables as appropriate, while Chi-square test or Fisher's exact test was used for categorical variables. A p-value <0.05 was considered statistically significant.

Ethical Considerations: The study protocol was approved by the Institutional Ethics Committee. Written informed consent was obtained from all participants before enrollment. Patient confidentiality was maintained throughout the study, and participation did not alter the standard treatment protocol.

Results

A total of 120 patients aged more than 50 years with proximal femur fractures requiring surgical management were included in this prospective comparative study.

Patients were divided equally into two groups based on pre-injury antiplatelet therapy: 60 patients receiving antiplatelet medication and 60 patients not receiving antiplatelet medication.

Baseline demographic characteristics, clinical variables, perioperative outcomes, postoperative complications, functional outcomes, and mortality were compared between the two groups.

Table 1: Baseline Demographic and Clinical Characteristics of the Study Population

Variable	No Antiplatelet (n=60)	Antiplatelet (n=60)	p-value
Age (years), Mean ± SD	74.12 ± 13.44	72.42 ± 13.35	0.488
Male, n (%)	31 (51.67)	36 (60.00)	0.358
≥2 Comorbidities, n (%)	34 (56.67)	32 (53.33)	0.626
ASA Grade III–IV, n (%)	27 (45.00)	35 (58.33)	0.399
Pre-injury Mobility Score	4.45 ± 2.90	4.68 ± 2.95	0.663
INR	1.15 ± 0.21	1.09 ± 0.21	0.159
PT (seconds)	12.91 ± 1.79	12.61 ± 1.86	0.364

There were no statistically significant differences in age, gender distribution, comorbidities, ASA grade, pre-injury mobility, INR, or prothrombin time between the two groups (p>0.05), indicating that both groups were comparable at baseline.

Table 2: Comparison of Perioperative Outcomes

Variable	No Antiplatelet (n=60)	Antiplatelet (n=60)	p-value
Delay to surgery >48 hours, n (%)	16 (26.67)	41 (68.33)	**0.001**
Blood transfusion required, n (%)	22 (36.67)	25 (41.67)	0.575
Hospital stay (days), Mean ± SD	9.78 ± 4.11	12.37 ± 3.94	**0.001**

Patients receiving antiplatelet therapy experienced a significantly greater delay to surgery (>48 hours) and significantly longer hospital stay compared with patients not receiving antiplatelet therapy (p=0.001 for both). However, blood transfusion requirements were similar in both groups (p=0.575).

Table 3: Comparison of Postoperative Outcomes and Functional Results

Variable	No Antiplatelet (n=60)	Antiplatelet (n=60)	p-value
Any postoperative complication, n (%)	29 (48.33)	29 (48.33)	0.231
Modified Harris Hip Score	69.58 ± 16.36	68.75 ± 18.55	0.795
30-day readmission, n (%)	5 (8.33)	5 (8.33)	1.000

The incidence of postoperative complications, functional outcome assessed by the Modified Harris Hip Score, and 30-day readmission rates were comparable between the two groups, with no statistically significant differences observed (p>0.05).

Table 4: Comparison of Mortality between the Study Groups

Outcome	No Antiplatelet (n=60)	Antiplatelet (n=60)	p-value
In-hospital mortality, n (%)	1 (1.67)	3 (5.00)	0.309
30-day mortality, n (%)	5 (8.33)	2 (3.33)	0.243
One-year mortality, n (%)	13 (21.67)	13 (21.67)	1.000

Although in-hospital mortality was numerically higher in patients receiving antiplatelet therapy, the difference was not statistically significant. Similarly, 30-day mortality and one-year all-cause mortality did not differ significantly between the two groups (p>0.05).

Discussion

Hip fractures in older adults are associated with substantial morbidity, mortality, prolonged disability, and increased healthcare utilization. The increasing use of antiplatelet therapy for cardiovascular and cerebrovascular diseases has raised concerns regarding surgical timing, perioperative bleeding, and postoperative outcomes in this patient population. The present prospective comparative study evaluated the effect of pre-injury antiplatelet therapy on perioperative outcomes, postoperative complications, and short- and long-term mortality among patients aged over 50 years undergoing surgery for proximal femur fractures.

Current clinical guidelines emphasize that hip fracture surgery should be performed as early as possible without unnecessary delays. The National Institute for Health and Care Excellence (NICE) recommends early surgical fixation because delayed intervention is associated with increased complications and poorer functional recovery. [8] In the present study, patients receiving antiplatelet therapy experienced a significantly greater delay to surgery (>48 hours) compared with patients not receiving antiplatelets (68.3% vs. 26.7%; p=0.001). This finding likely reflects the cautious perioperative approach adopted for patients receiving antiplatelet medications because of concerns regarding bleeding risk and anesthesia.

Despite the increased delay to surgery, the present study found no significant difference in perioperative blood transfusion requirements between the two groups. Similar findings were reported by Mattesi et al., who concluded that continuation of antiplatelet therapy does not substantially increase perioperative bleeding in most hip fracture patients and that unnecessary surgical delay should be avoided. [9]

Likewise, Soo et al., in their systematic review and meta-analysis, demonstrated that early surgery in patients receiving clopidogrel was not associated with clinically significant increases in bleeding complications or transfusion requirements, supporting early operative management whenever feasible. [10]

Chechik et al. also reported that although patients receiving aspirin or clopidogrel may exhibit slightly increased intraoperative blood loss, this rarely translates into clinically significant morbidity or mortality requiring major intervention. [11] Similarly, Purushothaman et al. concluded that early hip fracture surgery can be safely performed in carefully selected patients receiving clopidogrel without increasing postoperative complications or mortality. [12] These observations are consistent with the present findings, where blood transfusion requirements and postoperative complications were comparable between the two study groups.

An important finding of the present study was the significantly longer hospital stay among patients receiving antiplatelet therapy. This prolonged hospitalization is most likely attributable to delayed surgery rather than the antiplatelet medication itself. Elete et al. similarly demonstrated that patients receiving antiplatelet or anticoagulant therapy experienced longer preoperative waiting times and prolonged hospital stay, while overall postoperative outcomes remained comparable with those of patients not receiving these medications. [7]

Functional recovery following hip fracture depends on multiple factors including age, comorbidities, pre-injury mobility, timing of surgery, and postoperative rehabilitation. In the present study, the Modified Harris Hip Score at follow-up did not differ significantly between the two groups, suggesting that pre-injury antiplatelet therapy had no adverse effect on long-term functional outcome. This finding is supported by the mobility

assessment described by Parker and Palmer, who demonstrated that baseline functional status remains a major predictor of postoperative recovery following hip fracture rather than medication use alone. [13]

Comorbidity burden is another important determinant of mortality after hip fracture. The Charlson Comorbidity Index has been widely validated for predicting long-term survival among elderly patients with multiple chronic illnesses. [14] In the present study, baseline comorbidities and ASA grades were comparable between the two groups, minimizing confounding effects and allowing a more reliable comparison of treatment outcomes attributable to antiplatelet therapy.

The most clinically relevant observation of the present study was that neither 30-day mortality nor one-year all-cause mortality differed significantly between patients receiving antiplatelet therapy and those not receiving antiplatelets. Although intra-hospital mortality was numerically higher in the antiplatelet group, the difference was not statistically significant.

These findings are comparable with those reported by Kristensen et al., who showed that postoperative survival is influenced predominantly by patient frailty, mobility status, and medical comorbidities rather than isolated perioperative factors. [15] Similarly, Leer-Salvesen et al. concluded that when appropriate multidisciplinary perioperative care is provided, delayed surgery related to antiplatelet therapy does not necessarily translate into increased one-year mortality. [16]

Overall, the findings of the present study suggest that although pre-injury antiplatelet therapy may contribute to delayed operative intervention and prolonged hospitalization, it does not significantly influence perioperative bleeding, postoperative complications, functional recovery, or short- and long-term mortality. These observations support current recommendations favoring individualized perioperative assessment and avoidance of unnecessary delays in surgical management of hip fracture patients receiving antiplatelet therapy.

The findings of the present study support individualized perioperative decision-making rather than delaying surgery solely because of pre-injury antiplatelet therapy. Careful patient assessment and multidisciplinary management may help minimize surgical delays while maintaining favourable clinical outcomes.

Limitations

This study has certain limitations. It was conducted at a single tertiary care centre, which may limit the generalizability of the findings. The relatively modest sample size limited subgroup analyses. Furthermore, different antiplatelet agents were analysed together without subclassification, which may have masked differences between individual drugs.

Future Recommendation: Further multicentre prospective studies with larger sample sizes are recommended to validate the present findings and strengthen the evidence regarding perioperative management of patients receiving antiplatelet therapy who sustain proximal femur fractures.

Conclusion

The present prospective comparative study showed that patients aged >50 years receiving antiplatelet therapy experienced significantly longer delays to surgery and prolonged hospital stay compared with those not receiving antiplatelet therapy. However, perioperative blood transfusion, postoperative complications, functional recovery, readmission, and short- and long-term mortality were comparable between the groups. These findings suggest that preoperative antiplatelet therapy should not be considered a reason to delay timely surgical intervention when appropriate perioperative management is ensured.

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