SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspublishers.com

OPEN ACCESS

Anesthesiology

Impact of Surgical Management Delay on Morbidity and Mortality of Proximal Femoral Fractures in Elderly Patients

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DOI: 10.36347/sasjm.2024.v10i06.010 | **Received:** 29.04.2024 | **Accepted:** 03.06.2024 | **Published:** 13.06.2024

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Abstract **Original Research Article**

Background: Fractures of the proximal femur (FPF) represent a significant public health concern, particularly among the elderly population. Despite advancements in surgical interventions, mortality rates remain high, necessitating an understanding of the impact of surgical management delay on patient outcomes. ***Material and Methods:*** This retrospective study, conducted at the Mohammed V Military Training Hospital, involved 125 patients aged over 50 years who underwent surgery for FPF between January 2018 and June 2021. Data collection utilized clinical records and statistical analysis was performed using Jamovi software. ***Results:*** The majority of patients (67.0%) presented with femoral neck fractures, with a male predominance (59%). Surgical management delay was categorized as less than 48 hours, between two days and one week, and more than one week. Comparison of management within 48 hours versus after 48 hours revealed significant associations with late complications (p=0.021) and one-year mortality (p=0.014). Multivariate analysis identified delayed care (>48 hours) as independently associated with postoperative morbidity and mortality (p=0.015, OR=3.122). ***Conclusion:*** Timely surgical intervention is paramount in mitigating the morbidity and mortality burden associated with proximal femoral fractures. Multidisciplinary collaboration and proactive risk factor identification are essential for optimizing patient care and outcomes. Healthcare policies should prioritize strategies to minimize surgical management delays, thereby improving patient outcomes and quality of life.

Keywords: Fractures proximal femur, Mortality and morbidity rates, risk factors.

Abbreviations: (FPF: Fractures of the proximal femur); (HMIMV: Mohammed V Military Training Hospital)

I. INTRODUCTION

Proximal femur fractures (FPF) pose a major public health challenge worldwide, affecting both functional and life expectancy. Global incidence stands at 4.5 million cases annually, with over 90% occurring in those over 50 years old. Despite surgical intervention, mortality remains high at 20% within the first-year post-intervention.

Efficient proximal femur fracture management requires a multidisciplinary approach with anesthesiologists, trauma-orthopedic surgeons, and physiotherapists. Considerations include patient profile, intervention timing, perioperative care, and anesthetic technique for improved outcomes in morbidity and mortality.

The patient's medical background, the promptness with which intervention is initiated plays a crucial role in recovery and complication prevention. Perioperative management, including pre-surgical preparation, intraoperative care, and postoperative support, is also a key area for optimizing outcomes. Finally, the choice of anesthetic technique should be carefully evaluated based on the patient's individual characteristics, medical history, and fracture specifics.

By considering these diverse elements in a coordinated and multidisciplinary manner, it is possible to improve the quality of care for patients with proximal

femur fractures, thereby reducing the associated risks. The aim of our study was to determine the impact of the delay on the management of the morbidity and mortality in elderly patients undergoing surgery for proximal femur fractures.

II. MATERIAL AND METHODS

This is a retrospective, descriptive, and analytical study that included all patients over 50 years of age who underwent surgery for fractures of the proximal femur (femoral neck fracture, pertrochanteric fracture, or subtrochanteric fracture) at the Mohammed V Military Training Hospital (HMIMV) between January 2018 and June 2021. We excluded patients under 50 years old, those with severe trauma whose FPF is associated with other fractures or injuries, and patients with incomplete or unusable medical records from the study.

Data were collected using specifically designed collection forms based on clinical records from the emergency, traumatology, and anesthesiology departments. Furthermore, information regarding complications, progression, and death was obtained by contacting patients and their families. All data processing and statistical analyses were performed using the Jamovi statistical software (version 2.3.18.0) and a p-value<0.05 was considered statistically significant.

III. RESULTS

We included 125 patients in the study. Among these, 84 (67.0%) had femoral neck fractures, 39 (31.0%) had pertrochanteric fractures, and 2 (2.0%) had subtrochanteric fractures. The majority of patients were male (74, 59%).

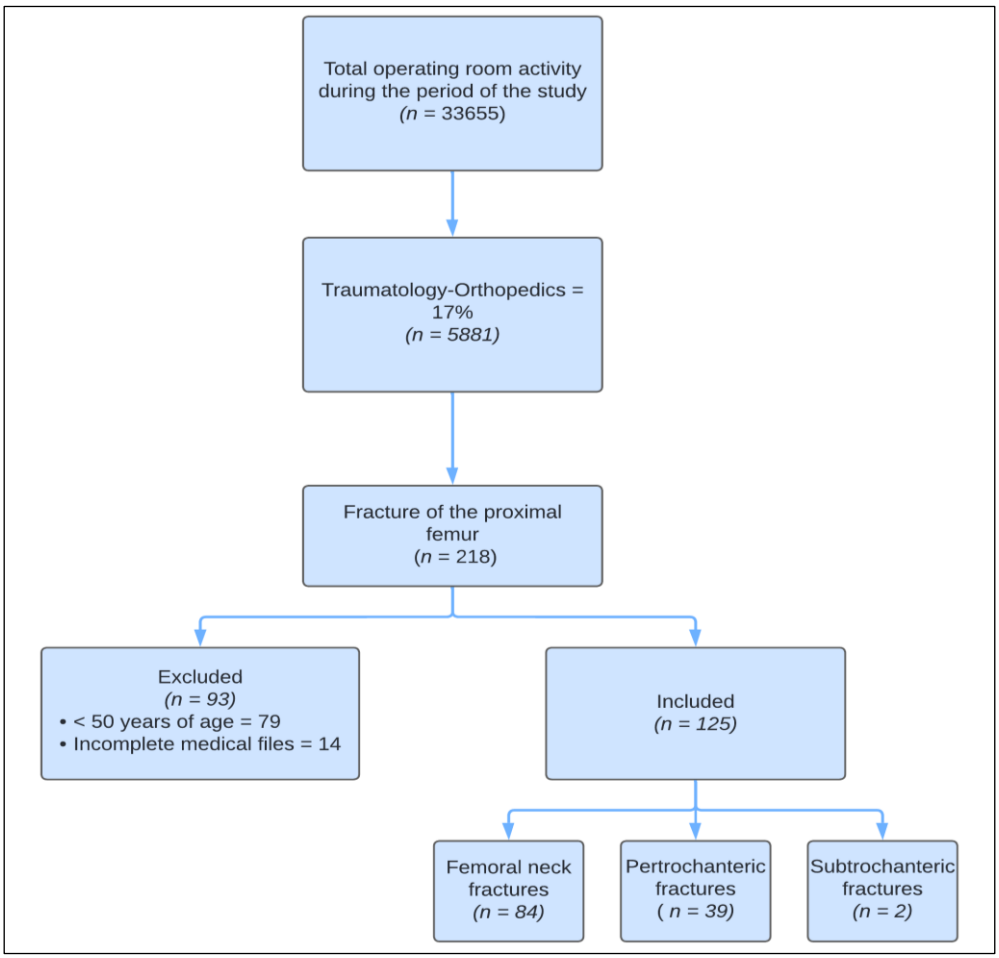

Fig 1: Study Flow Chart

The average age of the fractured individuals included in our study was 69.9 ± 10.5 years, with a minimum of 50 years and a maximum of 93 years. 48% of patients were over 70 years old, with a predominance in the age group between 60 and 69 years old.

The majority of FPF in our study population occurred as a result of domestic accidents (falls from height, stair falls, falls in the shower...) with 70.4%. Road traffic accidents accounted for 8% of fracture etiologies, fractures due to osteosynthesis devices accounted for 16%, and other etiologies (work accidents, sports accidents) accounted for 5.6%.

Surgical management delay:

The surgical management delay for FPF was less than two days (48 hours) for 51 patients (40.8%), between two days and one week for 36 patients (28.8%), and more than one week for 38 patients (30.4%).

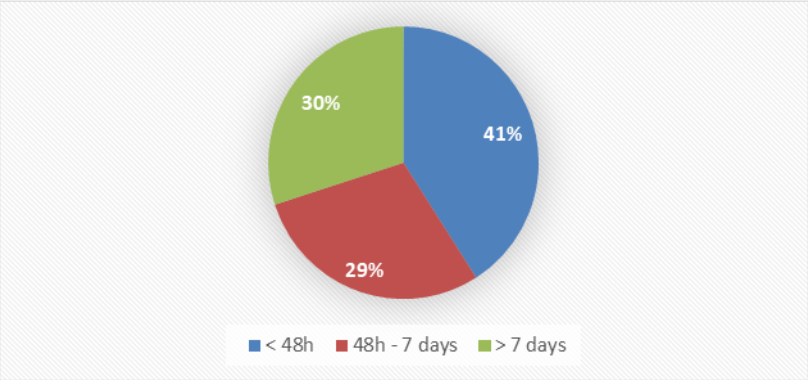

Fig 2: Percentage of Delay in Surgical Management

Impact of Time to Management

We examined the impact of time to management by comparing two groups: those managed within 48 hours versus those managed after 48 hours. This comparison encompassed various complications as well as intra-hospital mortality at 3 months and 1 year.

Surgical management within forty-eight hours following the fracture was statistically significantly associated with the occurrence of late complications (p=0.021) and one-year mortality (p=0.014).

Table 1: Occurrence of complications according to handling time

	Handling time		p-value
	< 48 hours	>48 hours	
Late complications	**21.6%**	**41.9%**	**0.021**
Chronic pain	**15.7%**	**21.6%**	**0.492**
Hardware failure in osteosynthesis	**0.0%**	**6.8%**	**0.079**
Surgical site infection	**2.0%**	**2.7%**	**1.000**
Intra-hospital mortality	**0.0%**	**8.1%**	**0.080**
Death within 3 months following the intervention	**2.0%**	**5.4%**	**0.648**
One year mortality	**9.8%**	**28.4%**	**0.014**

Multivariate analysis using logistic regression revealed that a delay in care of more than 48 hours was the only factor independently associated with postoperative morbidity and mortality, with a p-value of 0.015 and an odds ratio (OR) of 3.122.

IV. DISCUSSION

Despite advancements in medical care, the mortality rate associated with proximal femur fractures remains high. Our study observed intra-hospital mortality rates of 4%, 4.8% at one month, 8.8% at three months, and 20.8% at one year, consistent with literature findings [1-4]. Factors independently associated with postoperative mortality included delayed care (>48 hours) and ASA score >2, underscoring the critical importance of early intervention for patients with proximal femur fractures.

Table 2: Comparison of one-year mortality rates from our study with literature findings

Study	One year mortality rate
Taylor *et al*., (2012) [5] ***n=160***	**30%**
Lo JC *et al*., (2015) [1] ***n=13550***	**22,8%**
Ireland AW *et al*., (2015) [6] ***n=2552***	**34%**
Az-Eddine Djebara *et al*., (2018) [3] ***n=170***	**25,3%**
Our Study Jeddab *et al*., (2021) ***n= 125***	**20.8%**

Early surgical intervention (<48 hours) is associated with a significant reduction in postoperative mortality rates, emphasizing the importance of timely management in improving patient outcomes.

The question of the optimal timing for surgically treating FPF has been extensively debated. Currently, there seems to be a general consensus on the importance of early intervention in managing these fractures. The need for maximal responsiveness is now widely recognized.

In a meta-analysis of 35 studies involving 191,873 patients, research conducted by Moja and colleagues revealed a significant reduction in mortality rates associated with early surgical intervention (within 48 hours) with an odds ratio of 0.74. These results highlight the positive impact of prompt management on patient survival. Moja concluded that surgical delay is associated with a significant increase in the risk of death and pressure sores. Conservative delay strategies should be avoided. Orthopedic surgery services should ensure that the majority of patients undergo surgery within one or two days [7].

Similarly, Jacques Boddaert concluded in his 2014 study that early surgical intervention is a determining factor that can improve morbidity and mortality [8].

Additionally, Colais *et al*., [9], in their retrospective study involving over 400,000 Italian patients, aimed to evaluate the correlation between the timing of surgery and one-year mortality for all elderly Italian patients hospitalized for a hip fracture. The results of this study confirm the previously reported conclusions regarding the link between delayed surgical intervention and increased mortality and complications rates among elderly patients admitted for a hip fracture, with a Hazard Ratio of 0.83.

Furthermore, Rajiv Gandhi [10], in his literature review on morbi-mortality factors, found only two factors that could decrease the mortality rate: surgeon experience and operative delay (OR = 1.36; p = 0.06).

In our study, multivariate analysis identified the timing of surgical intervention as the only statistically significant factor (p = 0.015) in the occurrence of postoperative morbidity and mortality.

V. CONCLUSION

In summary, our investigation into the impact of surgical management delay on the morbidity and mortality of patients with proximal femoral fractures (FPF) highlights the critical importance of timely intervention in optimizing patient outcomes. Through a retrospective analysis conducted at the Mohammed V Military Training Hospital, we have elucidated the significant association between delayed surgical management (>48 hours) and adverse postoperative complications and mortality rates.

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