ADDIS ABABA UNIVERSITY

COLL EGE OF HEALTH SCIENCES

SCHOOL OF MEDICINE

DEPARTMENT OF ORTHOPEDICS AND TRAUMATOLOGY

TWO YEARS MORTALITY PROFILE OF INTERTROCHANTERIC FRACTURE IN ELDERLY PATIENTS TREATED WITH SURGERY AT TIKUR ANBESSA SPECIALIZED HOSPITAL FROM SEPTEMBER 2020-OCTOBER 2023

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ADDIS ABABA, ETHIOPIA

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List of Abbreviation/Acronyms

ITF intertrochanteric fracture

TASH- Tikur Anbessa Specialized Hospital

WHO- World Health Organization

HMIS- Health information management and information system

SPSS: statistical package for the social sciences

ETB-Ethiopian birr

ASA American Society of Anesthesiologists

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Summary

Background: .Intertrochanteric fractures are extracapsular proximal femur fractures between the greater and lesser trochanters, commonly resulting from low-energy falls in elderly patients. Intertrochanteric fractures are associated with high mortality rates; however, data on mortality profile and predictors remain scarce in Africa. Therefore, this study will investigate profile of 2-year mortality in elderly patients with intertrochanteric fractures treated by surgery

Objective: To asses two years mortality ptofile of intertrochanteric fracture in elderly patients treated with surgery at Tikur Anbessa Specialized Hospital from September 2020-October 2023

Methods: This is a three year retrospective study to be conducted on elderly patients who presented with intertrochanteric fracture and treated by surgery at Tikur Anbessa Hospital from September 2020-October 2023. Data will be collected from major operation theatre Logbooks and HMIS records at outpatient and inpatient departments of orthopedics and trauma surgery . Data will be collected using kobo toolbox software and analyzed with SPSS version 27. P-value < 0.05 is going to be taken as statistically significant. Results will be described in texts, tables and charts.

Workplan and budget: The research will be executed between June 2025 to December 2025 and the rough estimated budget is 25,100ETB.

Key words: Intertrochanteric fracture , mortality rate , elderly patients , Tikur Anbessa hospital

1. Introduction

1.1. Background of the study

Intertrochanteric fractures are proximal femur extracapsular fractures between greater and lesser trochanter. It usually occurs from low energy falls in elderly people and the incidence rates are more common in females than males. The average age is around 80 years. They usually presented with pain of the affected hip and thigh with an inability to stand or walk and on physical examination, tenderness of the affected hip, shortened and externally rotated lower extremity. Intertrochanteric fractures are diagnosed with radiographs of the hip and classified as stable or unstable fracture based on status of posteriomedial cortex, which resists compressive loads once reduced. Early surgical fixation with in 24 to 48 hours is recommended for intertrochanteric fractures to allow early mobilization and reduce complications such as pneumonia, UTI, decubitus ulcers, and DVT which improves patient survival. In patients with stable intertrochanteric fractures, the use of either a sliding hip screw (DHS) or a cephalomedullary device (CMN) is recommended. Patients with unstable intertrochanteric fractures should be treated with a cephalomedullary device and in low resource settings 95 degree blade plate(ABP) and dynamic condylar screw (DCS) can be used (1–4)

The total annual direct medical costs associated with all hip fractures was $50,508 per patient, resulting in a yearly estimate of $5.96 billion to the U.S. health-care system. Intertrochanteric hip fractures accounted for an annual estimate of $52,512 per patient, corresponding to an overall annual economic burden of $2.63 billion to the U.S. health-care system and representing 44% of all hip fracture costs(5).

A review of recent literature on hip fracture–related mortality revealed notable regional variations. The mean one-year mortality rate in Europe was 23.3%, in Asia 17.9%, in United States 21%, and in Australia 24.9%. The highest rate was observed in South America, at 26.8% and there was no report from Africa(6).

Intertrochanteric fractures are common cause of disability the elderly imposing a significant socioeconomic burden on society worldwide. Globally, mortality rates following intertrochanteric fractures remain high, ranging from 15% to 40% within one to two years. Mortality rates of intertrochanteric fracture are influenced by multiple factors, including advanced age, gender, blood albumin, haemoglobin, comorbid conditions, delayed surgery,

postoperative complications, and lack of postoperative rehabilitation and osteoporosis management.(7–12)

1.2. Statement of the problem and Rationale

With ongoing socioeconomic transformation and rise in an aging population, the incidence and prevalence of Intertrochanteric fractures are rapidly increasing and are associated with high mortality rates(5)

The mean age of patients sustaining hip fractures has steadily increased over the years. Advances in healthcare, including preventative planning, specialized orthogeriatric units, and surgical urgency, have contributed to the improvements in hip fracture incidence and mortality rates in developed countries while there was scarce data from Africa (13).

A study at Tikur Anbessa Specialized Hospital in Ethiopia found that osteoporotic hip fractures made up 59.9% of all osteoporotic fractures and 5.9% of all fractures. Of the hip fracture cases, 42.4% were intertrochanteric fractures. The findings showed that patients aged 50 years and older who sustained fractures from low-energy trauma were more likely to suffer from osteoporosis-related fractures. Overall, the study highlighted that nearly two-thirds (60%) of osteoporotic fractures were hip fractures. Despite this burden, no research has yet reported on mortality rates and predictors of mortality among elderly patients following intertrochanteric fracture treatment(14).

1.3. Significance of the study

The accelerated growth of older individuals worldwide has increased the number of patients presenting with fragility intertrochanteric fractures. Intertrochanteric fractures in elderly patients carry a high risk of mortality(15).

As of 2025, Ethiopia's population aged 60 and above are estimated at approximately 6.7 million, representing about 5% of the total population of 135.5 million. By 2050, this figure is projected to rise to around 20.5 million, accounting for approximately 9.1% of the total projected population of 225 million , making the country in ESA(in east and southern Africa) with the largest population of older people(UN World Population Prospects Data2025 and PopulationPyramid.net – Ethiopia 2050)

Mortality after intertrochanteric fracture surgery in older people increases with age and it is considered one of its main predicators, so the progressive aging of the population means that mortality following an intertrochanteric fracture is likely to increase in the future(7–9,15).

The purpose of this study was to analyze prospectively the profile of 2-year mortality after intertrochanteric fracture surgery in patients with age 60 years or above presented to our institution from September 2020 - October 2023.

To the best of our knowledge, our study is the first from Ethiopia to assess the mortality rate and predictors of mortality. This study will be helpful as a bench mark for further study and for patients and their families, it will provide a foundation for discussions about realistic expectations and prognosis after intertrochanteric fracture surgery and at the hospital and national level, the findings are important for improving the quality of care and guiding the effective allocation of healthcare resources.

2. Literature Review

Hip fracture places a major financial burden on the United States health care system, with annual costs estimated at 5.96 billion US dollars. Intertrochanteric fractures account for approximately 44% of these total expenditures. Hip fracture is a common orthopedic injury with a high incidence and a significant impact on human health. It imposes a considerable burden on patients and society through elevated treatment costs, decline in health-related quality of life and shortening survival. One-year mortality rate of after hip fracture is approximately 30 to 40 %. This alarming mortality rate emphasizes the need to identify determinants of death after intertrochanteric fracture surgery.

Multiple studies have investigated potential risk factors, including increasing age, sex, existing comorbid conditions, delay between fracture occurrence and surgical management, postoperative medical complications, and impaired mental status(5,16,17).

A prospective cohort study in China examining all-cause mortality in 363 elderly patients with intertrochanteric femoral fractures reported that, deceased patients were generally older, with a mean age of 83.4 years compared to 79.8 years among survivors. They also had a higher incidence of complications and had not received anti-osteoporosis treatment. No significant differences were observed between deceased and surviving patients in terms of gender, pre-

fracture medical history, hemoglobin levels, or 25(OH)D status. The study also indicated that early administration of zoledronic acid, within three days postoperatively, can improve outcomes in elderly patients with intertrochanteric fractures(7).

Lu et al. (2022) studied predictors of long-term mortality following intertrochanteric fracture surgery and found a mortality rates of 9.6% at 1- year, 16.7% at 2- years, and 24.4% at 3- years among 156 patients. They identified age, hemoglobin and malnutrition as factors associated with three-year mortality. Han et al. (2024) documented a one-year postoperative mortality rate of 15.3% and advanced age, male sex, and having three or more comorbidities were independent risk factors for mortality. Surgery performed within two days of injury was associated with improved survival, while patients older than 80 years demonstrated a higher risk of postoperative mortality. They suggested preoperative health status is a key determinant of postoperative outcomes in elderly patients with fragility intertrochanteric fractures. Priority should be given to older patients, males, and those with multiple comorbidities and surgery should be performed as early as possible in patients with fewer comorbidities (8,9).

Hao et al. (2024) conducted a retrospective review of 563 with femoral intertrochanteric fractures and found a 1-year mortality rate of 8.7% after surgery. Age over 80 years, hemoglobin below 100 g/L, ASA score ≥ 3, Charlson Comorbidity Index (CCI) ≥ 3, and time to surgery greater than 14 days as independent risk factors for mortality. The study recommends prioritizing surgical care for patients over 80 years with low hemoglobin, high ASA score and multiple comorbidities and surgical delay greater than 14 days should be avoided(15).

Jianda et al. (2021) retrospectively analyzed the relationship between the Charlson Comorbidity Index, early recovery, and two-year mortality in elderly patients who underwent surgical treatment for intertrochanteric fractures in 60 patients. The study reported an overall two-year mortality rate of 10% and identified postoperative complications and the timing of first mobilization out of bed as significant factors influencing survival, while the Charlson Comorbidity Index may not reliably predict two-year mortality in older patients. The authors recommend that improving prognosis should focus on minimizing postoperative complications and promoting earlier postoperative mobilization(18).

M et al (2018) did a prospective observational study on 122 elderly patients with intertrochanteric fractures in India and found a 1-year mortality rate of 30% and age above 80 years, multiple co-morbidities, high ASA score and presence of postoperative complications

were factors that affected mortality. Cengiz et al (2018) retrospectively examined 86 patients and 1-year mortality rate was 20.9% and mortality was significantly higher in patients over 80 years (19,20).

Kalafong et al (2010) retrospectively reviewed 57 elderly patients with intertrochanteric fractures in South Africa and the mortality rate were 32% in the first year and 39% in the second year. Baidoo et al(2021) did a prospective cohort study on 67 elderly patients with hip fracture and 1 -year mortality rate were 19.7% and found mortality rates were significantly higher among males than females(21,22).

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Moran et al. (2005) evaluated the association between time to surgery and mortality after hip fracture and reported that delaying surgery for up to four days did not increase mortality among patients who were medically fit for operative management. However, surgical delay beyond four days was associated with increased mortality. Wang et al (2025) studied the role of perioperative transfusion in mortality in geriatric patients with intertrochanteric fracture and found the 2-year mortality were 13.4% and not risk factors in long follow up. While Zhang et al (2023) did a prospective cohort study on 2589 patients and found a hematocrit level of <28% was associated with mortality (23–25).

Bayram et al (2024) conducted a retrospective review of 1510 patients to assess the roll of vitamin D on mortality after hip fracture and found a 30.7% mortality rate on 405 (IQR 249 to 610) days follow up and Vitamin D deficiency was independently associated with increased mortality in hip fracture patients. Nurmi-Luthje et al (2009) prospectively reviewed 221 hip fracture patients in Finland found reduced mortality after post-fracture use of prescribed calcium plus vitamin D supplementation(26,27)

3. Objectives of the Study

3.1. General Objective

To assess two years mortality profile of intertrochanteric fracture in elderly patients treated with surgery at TASH from September 2020 -October 2023

3.2. Specific objectives

To determine two year mortality rate of intertrochanteric fracture in elderly patients treated with surgery at TASH

To identify predictors of mortality of intertrochanteric fracture in elderly patients treated with surgery

4) Methodology

4.1 Study area

The study will be conducted at the Department of Orthopedics and Trauma surgery in Tikur Anbessa Specialized Hospital, the largest referral hospital in the country, in Addis Ababa, Ethiopia.

4.2 Study design and period

This is a retrospective cohort study which evaluates two years mortality profile of intertrochanteric fracture in elderly patients treated with surgery at TASH from September 2020 -October 2023.

4.3 Study population

All elderly patients with intertrochanteric fracture that were treated by surgery at Tikur Anbessa Specialized hospital from September 2020 -October 2023.

4.4 Inclusion and Exclusion criteria

4.4.1 Inclusion criteria

Patients with intertrochanteric fractures

Age ≥60 years,

patients who underwent internal fixation

postoperative followup ≥2 years

4.4.2 Exclusion criteria

Patients with pathological fractures or open fractures;

Patients with multiple fractures;

patients with incomplete clinical data before and/or after surgery

4.5 Sample size determination

All patients who full fill the inclusion criteria in the study period will be included by census sampling technique.

4.6 Sampling procedure

Elderly Patients(age ≥ 60years) with intertrochantric fracture treated by surgery will be identified from major operation room registries in departments of Orthopedics and Trauma surgery. Those patients that presented in the study period and fulfill the inclusion criteria will be included in the study.

4.7. Data collection and quality control

Data will be collected by the principal investigator and Orthopedic residenst using structured self-administered questionnaires. The study questionnaire has four parts: Part I is about demographics characteristics of patients, Part II is about clinical features , Part III is on surgical and postoperative data , and Part IV is on outcome of patients after surgery .

After selecting eligible study participants, the Kobo Toolbox software along its server will be used to collect and store data. The principal investigator will train data collectors on the relevance of the study and closely follow the data collection procedures.

4.8. Operational definitions and Variables

4.8.1 Operational definitions

1. Elderly Patient

   A patient aged ≥ 60 years at the time of presentation

2. Two-Year Mortality

   Death occurring within 24 months from the date of surgery

3. Mortality

Death occurring at any time within two years after the index surgery, confirmed by: Chart review, Phone call to patient or family,Hospital death registry

4. Duration of Surgery

The total operative time from skin incision to skin closure, measured in hours.

5. Intraoperative Blood Loss

The approximate volume of blood lost during surgery, recorded in milliliters (mL) from anesthesia and operative notes

6. Initiation osteoporosis Treatment

Whether the patient began osteoporosis medication post-fracture/not including(bisphosphonates,Denosumab,hormone therapy,)

3.9.2 Dependent variables (two year mortality)

3.9.2 Independent variables (Sex, age, duration from fracture to surgery, Hgb at admission, history of blood transmission, comorbidities, ASA score, duration of surgery, intraoperative blood loss, postoperative complications, type of fixation, initiation of osteoporosis treatment)

4.9. Data Processing and analysis

Data stored at Kobo Toolbox server would be extracted to excel and exported to SPSS version 27 for analysis. Descriptive statistics will be used for frequencies, means and proportions. Logistic regression will be used to assess correlation between dependent and independent variables. P-value < 0.05 is considered to be statistically significant.

5) Ethical considerations

Ethical clearance will be obtained from Institutional Review Board (IRB) of Addis Ababa university, college of health science and permission for chart review and access to patient medical electronic recordings will be obtained from department of Orthopedics and Trauma surgery . Patients confidentiality are maintained using unique study codes and no personal identifiers will be used.

6) Work plan and Budget breakdown

Work Plan

Activities	Responsible Person	Months								
		May 2025	June 2025	July 2025	August 2025	September 2025	October 2025	November 2025	December 2025	January 2026
Topic selection	PI									
Proposal development and defense	PI and advisors									
Ethical clearance and data collection	PI, Orthopedic residents									
Data management: cleaning and entry	PI, Orthopedic residents									
Data analysis and interpretation	PI									
Draft thesis	PI									
Final thesis and defense	PI									
Final writeup	PI									
Result dissemination	PI									
PI= principal investigator										

Budget Breakdown

Title	Qualification	Numbers	Unit Cost per case	Cost (40 cases)	Tota in birr (ETB)
Data Collector	Orthopedics resident 2	1	200	1*200*40	8,000
Data collector	Orthopedics resident 2	1	100	1*100*40	8,000
Taking out card from store			25	80*25	2000
Subtotal					18,000ETB
Materials and Equipments					
Type	Quality	Quantity	Unit Cost	Total	
Printing proposal and binding		3*200	3	1,800	
Printing Final thesis		3*200	3	1,800	
Subtotal				3,600	
Communication					
	Unit Cost (ETB)	Quantity	Total		
Mobile Card	100	5	500		
Contingency					3000ETB
Grand Total= 18,000+ 3,600 + 500 + 3,000					25,100TB

7. Result dissemination Plan

The findings of this study will be presented to the Department of Orthopedics and Trauma surgery at Tikur Anbessa Specialized Hospital (TASH). The completed thesis will be submitted to the Department of Orthopedics and Trauma Surgery and the College of Health Sciences, Addis Ababa University, as part of the requirements for partial fulfillment of the postgraduate program.

Finally, the results will be prepared and submitted for publication in peer-reviewed scientific journals, with the aim of contributing to the national and international body of evidence on mortality outcomes among elderly patients with intertrochanteric fractures treated with surgery.

8. Strength and weakness

Strengths of the Study

To the best of m knowledge this is the first study in the country to assess the two-year mortality profile of elderly patients with intertrochanteric fractures treated by surgery. It will provide baseline data that has not been documented previously in Ethiopia.

There is also a limited local evidence on the long-term outcomes and mortality patterns of elderly intertrochanteric fracture patienttreated by surgery . This study fills that critical gap and highlights the burden of the problem in our setting.

The findings will also serve a baseline for future multicenter studies, including prospective cohort studies. It will guide researchers, hospitals, and policymakers in improving clinical care pathways and resource allocation. By identifying factors associated with mortality, the study will help physicians to design better strategies for early intervention, optimization of comorbidities, postoperative care, and rehabilitation—ultimately contributing to improved patient survival.

Weakness: retrospective and single - centered study

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10. Appendices

10.1. Annex 1: Data collection Questionnaire

Part I: Respondent detail

1. Age of patient in years(select one)

A) 60-70

B) 70-80

C) 80-90

D) more than90

2. Sex(select one)

A) Male

B) Female

Part II: clinical features

3. Side of fracture

A) Right

B) Left

4. Duration from fracture to surgery in days

A) With in 48 hrs (2 days)

B) 2-7 days

C) 7-14 days

D) 14-21 days E) more than 21 days

5. Hgb at admission in (g/l)

…….

6. History of blood transfusion

A)yes

B) No

7. If Yes , how many unit of blood

…….

8. any comorbidities

A) DM D) Cardiovascular disease(IHD/CHF)

B) HTN E) Any malignancy

C) B.Asthma F) Other

9..IF any other comorbidities , specify

…….

Part III: Surgical and postoperative data

10. ASA score

A) I

B) II

C) III

D) IV

11. Type of Ansthesia

A) SA

B) GA

12. Duration of surgery in hours

…….

13 .Intraoperative blood loss in ML

…….

14 .Postoperative complications

A) SSI D) Bed sore

B) DVT E) Other

C) Pnemmonia

15 . IF any other ccomplications , specify

…….

16 . Type of fixation

A) CMN

B)DHS

C) DCS

D) ABP

17 . Initiation of osteoporosis treatment after surgery

A)yes

B) No

18 . Was supplementation given(calcium and vitamin D)

A)yes

B) No

Part III: Outcome

19 . Status at 2 years follow up

A)Alive

B) Deceased

20 . If deceased , when?

A) In Hospital

B) With in 6 months

C) 6 months -1 year.

D) 1 year -2 year