PROFILE OF TROCHANTERIC FRACTURES AT MOI: TREATMENT AND SHORT-TERM OUTCOME 2012.

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PROFILE OF TROCHANTERIC FRACTURES AT MOI: TREATMENT AND SHORT-TERM OUTCOME 2012.

By

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A dissertation report submitted in partial fulfillment of the Requirement for the Degree of Masters of Medicine in Orthopaedic and Traumatology of the Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certifies that, he has read and hereby recommend for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation entitled **Profile of trochanteric fractures at MOI: Treatment and short-term outcome – 2012,** in (partial) fulfillment of the requirement for the degree of Master of Medicine in Orthopaedics and Traumatology of the Muhimbili University of Health and Allied Sciences.

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Dr. Anthony B. Assey MD, MMED, FCS

Supervisor

_____

Date

DECLARATION AND COPYRIGHT

I, **Karama Mankaga Kenyunko** declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

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Special thanks to almighty God for giving me protection and good health throughout my study period

DEDICATIONS

This dissertation is dedicated to my beloved husband Muhiddin Abdi Mahmoud and my children Jokha, Abdi and Mankaga for their love; courage, support and commitments to make sure our family are running smoothly.

ABSTRACT

Trochanteric fractures are one of the hip fractures, common in old age. However, they are not uncommon in younger age group. They commonly occurs in elderly following low energy trauma. In young people, these fractures result from high energy trauma. Despite different treatment modalities of these fractures, complications do occur.

Study Objective

This study aimed to determine the causes of injury, treatment modalities used and short-term outcome of trochanteric fractures at Muhimbili Orthopaedic Institutes (MOI) from January 2012- Decamber2012

Methods

A cohort study was done on adult patients with trochanteric fractures admitted and treated at Muhimbili Orthopaedic Institute (MOI). Ninety one patients met the study inclusion criteria, four were lost follow-up, hence 87 patients were reviewed and completed the 16 weeks of follow ups. The structured questionnaire was used to interview the participants.

These patients were treated either surgically or non surgical. Those who were surgically treated, immediate post-operative radiographs were taken, length of the lower limb and coxa vara deformity were assessed.

Patients who were treated non surgically were put on skin traction for four weeks, then control radiographs were taken, lower limb length and coxa vara deformity were again assessed.

There after each patient was followed up for a period of 16 weeks post treatment. In the follow-up visits, state of the wound, limb length discrepancy, coxa vara deformity and function of the hip joint were assessed. The obtained data were then analyzed by using **SPSS version 16.0**

Results

In this study 49% of cases occurred after simple fall, 43.7% of cases occurred after Road Traffic Crash (RTC). Average age of occurrence was 62.26 ± 19.19 years with male to female ratio of 2:1. Most cases were Evan's type II classification. 60 patients were surgically treated and 27 patients were treated conservatively. Of the participants, 37.9% had coxa vara, 40.2% had limb shortening, 85.1% had score of above 20 by Salvati - Wilson hip score

Conclusion

Trochanteric fractures occur due to simple fall and road traffic crash. Most of these fractures, have better outcome when surgically treated.

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ABBREVIATIONS

Profile of trochanteric fractures – causes, sex, age, classification of trochanteric fractures

AO	Arbeitsgemeinschaft für Osteosynthesefragen
AP	Anteroposterior
CBS	Condylar Blade Screw
DHS	Dynamic Hip Screw
DVT	Deep Venous Thrombosis
ECG	Electrocardiogram
MOI	Muhimbili Orthopedic Institute.
MUHAS	Muhimbili University of Health and Allied Sciences.
ORIF	Open Reduction and Internal Fixation.
RTC	Road Traffic Crush**.**
SD	Standard Deviation
SIGN	Surgical Implant Generation Network
SHC	Sign Hip Constract
SPSS	Statistical Package for Social Sciences

CHAPTER ONE

1.1 BACKGROUND

Trochanteric fractures are common in old age. However it is not uncommon in younger age group. In the elderly it is due to low energy trauma while also occurs in young people due to high energy trauma. The trochanteric area of the hip is defined as the region from the extracapsular femoral neck to the distal part of lesser trochanter. Therefore these fractures occur between the greater trochanter, where the gluteus medius and minimus muscles attach, and the lesser trochanter, where the iliopsoas muscle (hip flexor) attaches [1,2].

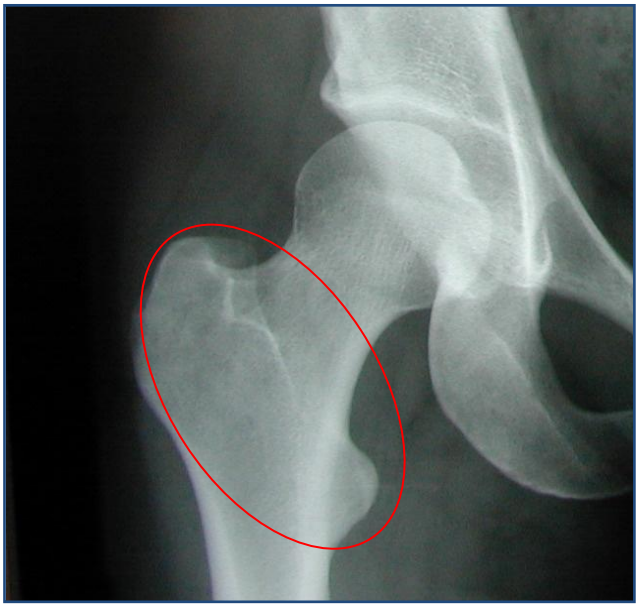


Figure 1 from [16]

The incidence of trochanteric fractures is reported to be increasing [3]. It is estimated that one third of all women, and one sixth of all men reaching the age of 90 years will have sustained at least one hip fracture[4] and approximately half of these fractures will be trochanteric.

Some of the risk factors associated with trochanteric, other than, except for femoral neck fracture include advancing age, increased number of comorbidities, increased dependency in activities of daily living, and a history of other osteoporosis related fractures [5**]**.

Aetiology

The aetiology of trochanteric fractures is reported to be increased bone fragility of the trochanteric region. This is associated with decreased agility and decreased muscle tone secondary to the aging process [6]. The increased bone fragility results from osteoporosis and osteomalacia. This is secondary to inadequate ambulation, decreased hormone levels, increased levels of demineralizing hormones, and other aging processes [7]. Benign and malignant tumors, along with metastases such as multiple myeloma and other malignancies, can also lead to weakened bony structure.

The combination of increased bone fragility and a traumatic event may lead to fracture at the trochanteric region. [6].

Causes of Injury

Trochanteric fractures in younger individuals usually result from high-energy injury, such as road traffic crashes or falls from a height [8].

Ninety percent of trochanteric fractures in the elderly result from a simple fall. [8] Falls in the elderly have many cause such as,decreased muscle power and labile blood pressure. [8] For the fall to cause a hip fracture, Cummings and Nevitt argue that four conditions must be met;

(a). the fall must be oriented so the person lands on or near the hip,

(b). protective reflexes must be inadequate to reduce the energy of the fall below a certain critical threshold,

(c). local shock absorbers (e.g., muscle and fat around the hip) must be inadequate; and

(d). bone strength at the hip must be insufficient [9].

Laboratory research indicates that the fall of an elderly from an erect position, generates at least 16 times the energy necessary to fracture the proximal femur [9]. The fact that the overwhelming majority of falls do not result infracture around the hip implies that the mechanics of the fall are important in determining whether a fracture will occur.

CLASSIFICATION OF TROCHANTERIC FRACTURES

These are of benefit in planning type of treatment, and have got some prognostic importance.

1. Boyd and Griffin's Classification [10] – **Figure 1**

Since 1949, it is the most widely used for planning treatment and estimating prognosis. They classified fractures extending from the extracapsular part of the neck to a point 5cm, distal to the lesser trochanter, into four types:

Type I: Fractures extending along the intertrochanteric line from greater to the lesser trochanter. This fracture is easily reducible and easy to maintain. Results are usually good.

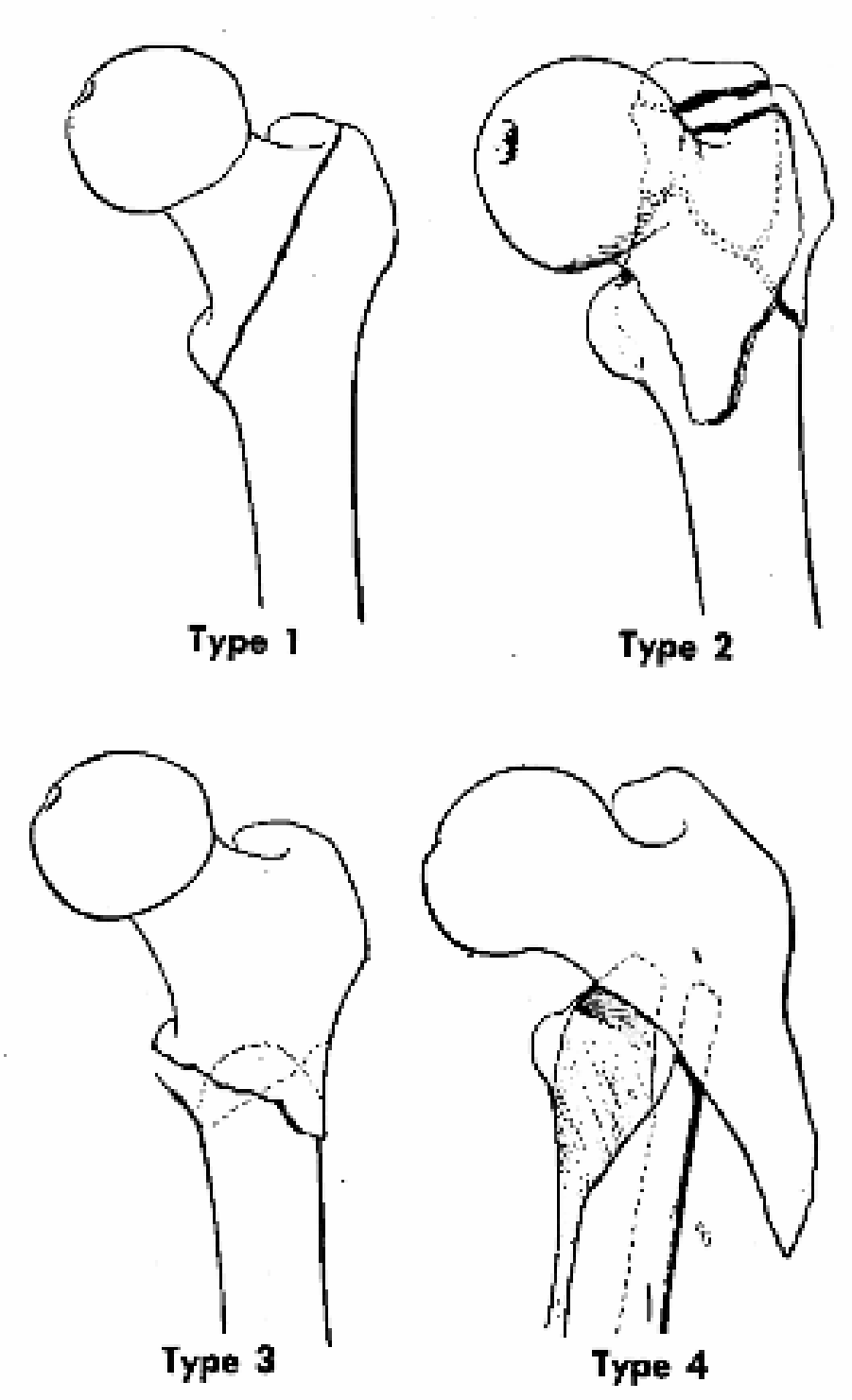
Type II: Comminuted intertrochanteric fractures, the main fracture line is along the intertrochanteric line with multiple fractures in the cortex along with an intertrochanteric fracture line in anteroposterior view, sometimes there might be an additional fracture in coronal plane also, seen only in lateral X-ray view. This fracture is difficult to reduce because of tendecy to extreme comminution.

Type III: Basically subtrochanteric fractures, with at least one frature line passing across the proximal end of the shaft just distal to or at the lesser trochanter with varying degrees of comminution. These fractures are difficult to reduce and result in more complications both at operation and during convalescence.

Type IV: Biplane fractures of the trochanteric region and proximal shaft. The fracture of the shaft is spiral, oblique or butterfly shaped, so, it should be reduced and internally fixed in two planes.

Type III and IV comprise of one-third of all trochanteric fractures which are difficult to manage. Subtrochanteric fractures include in type III and IV of this classification.

Figure 1: Boyd and Griffin Classification of Trochanteric fractures



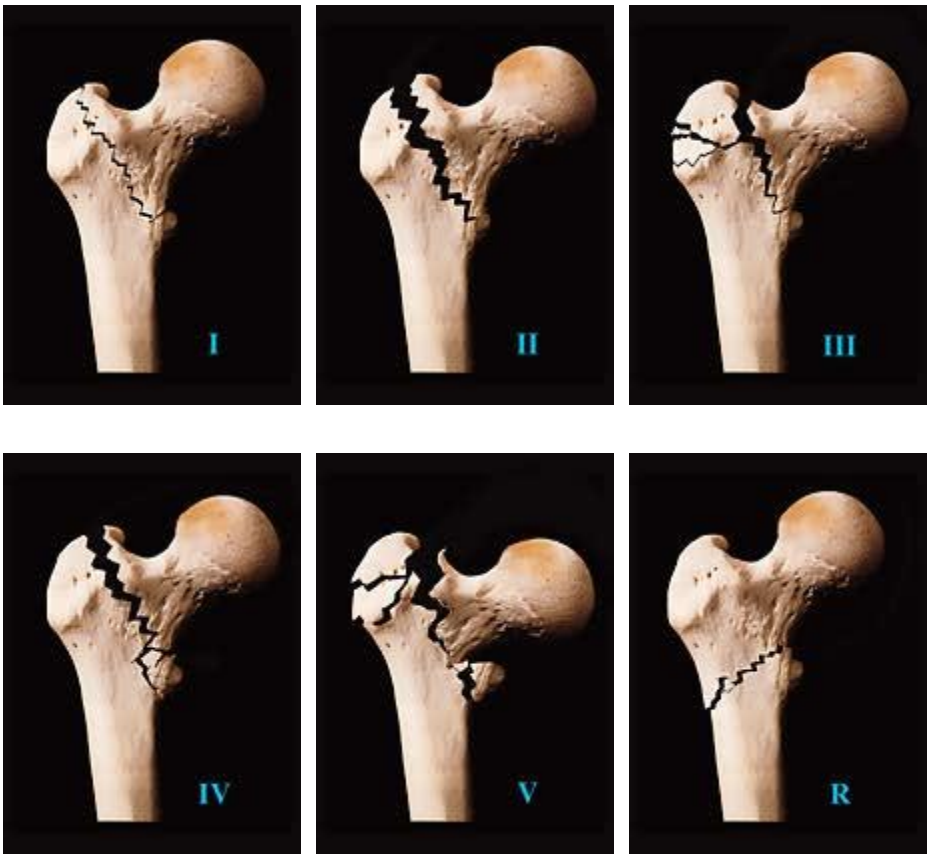
2. E. Merwyn Evan's Classification [11,12] – **Figure 2**

In 1949 E. Merwyn Evans of Birmingham, England has classified trochanteric fractures into two:

1. Stable fractures

2. Unstable fractures

Figure 2: Evan's Classification of trochanteric fractures



Type I: Undisplaced 2-fragment fracture, Type II: Displaced 2-fragment fracture, Type III: 3-fragment fracture without posterolateral support, owing to displacement of greater trochanter fragment, Type IV: 3-fragment fracture without medial support, owing to displaced lesser trochanter or femoral arch fragment, Type V: 4-fragment fracture without posterolateral and medial support (combination of Type III and Type IV). R: Reversed obliquity fracture

10. **AO Classification of intertrochanteric fractures** [13] – **Figure 3**

These are divided into the (1) easily stabilised fractures and into the (2) unstable problem fractures. Stable fractures (about 70% of all intertrochanteric fractures) have an intact medial buttress. In unstable trochanteric fractures there is in addition to the medial fragment a large posterior fragment. These are so called 4-part fractures in which at times may be even more comminuted than described.

I. Stable trochanteric fractures:

a). Fracture runs from greater trochanter obliquely downwards and medially to exit just above the lesser trochanter. A good portion of the calcar is attached to the proximal fragment antromedially. Quite commonly there is an avulsion fracture of lesser trochanter. As a rule the distal fragment is in external rotation. Rarely the infero-medial spike of the proximal fragment is impacted into the metaphysic of the distal fragment.

b). An avulsion fracture of lesser trochanter- this type os avulsion does not result in instability because it does not weaken the medial buttress.

II. Unstable trochanteric fractures:

a). The medial fragment varies in size and reaches distally to a varying degree. As a rule it contains the lesser trochanter. If the lateral wall remains intact then the distal fragment migrates proximally because of the muscle pull. Commonly there is in addition quite a large posterior fragment. Occasionally the proximal fragment contains a long medial spike made up of calcar and lesser trochanter. This makes it into a long oblique or spiral fracture.

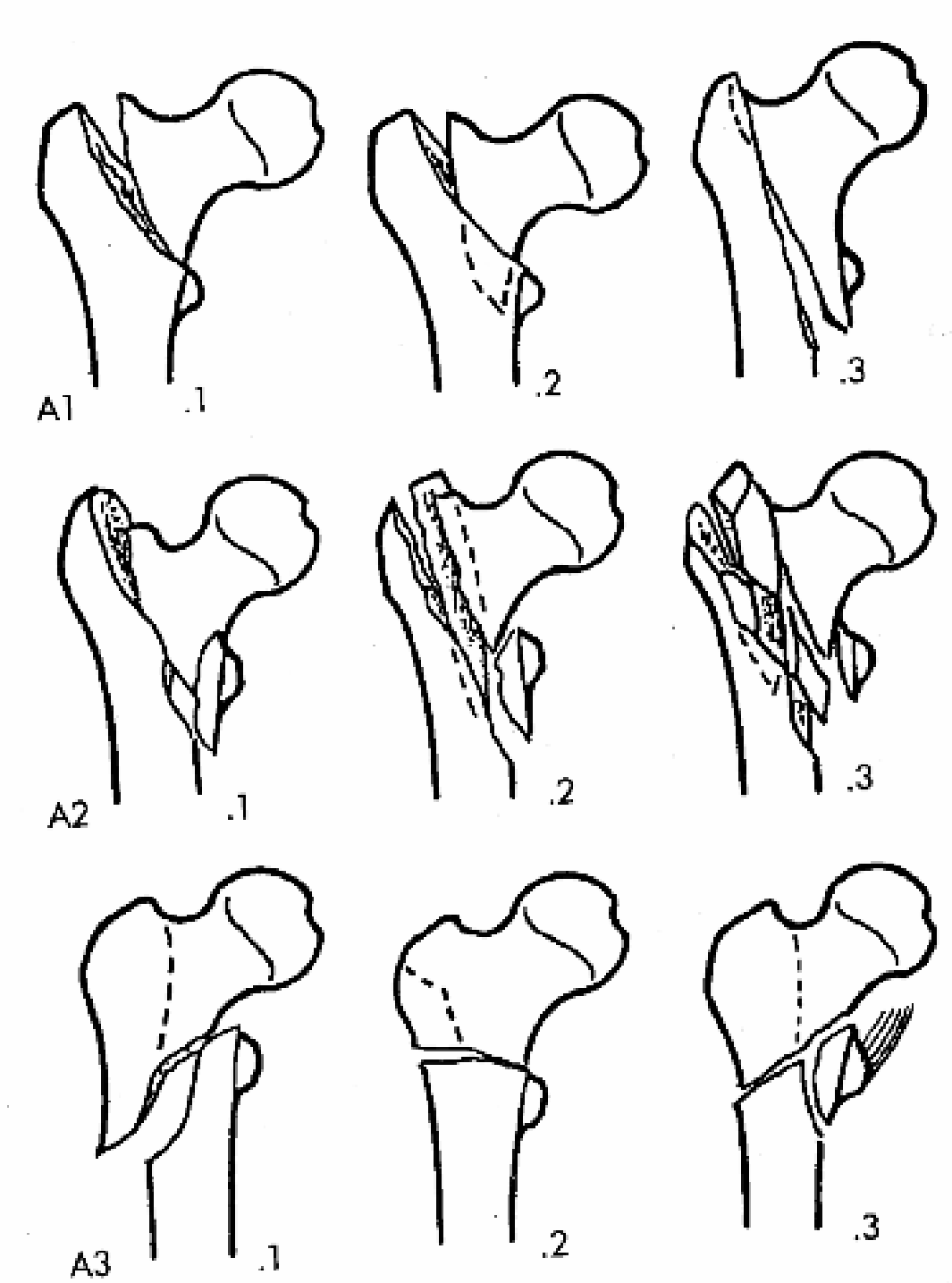
b). If the greater trochanter is fractured, then the distal fragment is not pulled upwards.

c). A badly comminuted trochanteric fracture has in addition to the fracture of lesser and greater trochanter further comminution posteriorly and medially.

d). The trochanteric fracture line is almost horizontal. Often, one finds this fracture associated laterally with a further anterior or posterior fragment, and occasionally both.

e). Occasionally the fracture has reverse course beginning laterally and distally and running upwards and medially. Medially it exits above the lesser trochanter. Commonly it is associated with a fracture of the greater trochanter. The problem with fractures (d) and (e) (about 5% of trochanteric fractures) is their reduction and stabilisation which, because of muscle pull and fracture pattern, are particularly difficult.

Figure 3: AO Classification of Trochanteric fractures



Treatment options of trochanteric fractures

The goal of treatment of patients with trochanteric are early mobilization of the patient, with prompt return to the prefracture level of functioning. This approach minimizes patient morbidity as well as the impact on health care resources. For displaced fractures, this goal is rarely, if ever, achieved without surgical intervention. [10]

Hence trochanteric fractures can be managed in two ways:

1. Conservative or Non operative method
2. Operative method

Types of conservative treatment [13,14,15]

The various conservative methods used in a patient who is unfit for surgery or unwilling for surgery are;

1. Derotation boot

A below knee plaster cast is applied from tibial tuberosity up to, the base of the toes with a wooden bar attached to the heel to prevent lateral rotation. After clinical and radiological union of fracture (10-12 weeks), it is removed and the physiotherapy is begun.[13]

2. Buck's extension skin traction

Adhesive plaster is applied to skin below knee of the affected limb with a spreader bar and light weight. The traction is placed for four weeks

3. Skeletal traction

If more controlled and powerful traction is desired skeletal traction is used. Skeletal traction is used through the proxima tibial skeletal (metaphyseal part) Steinmann's pin over a Bohler Brown splint. About 10% of the body weight is used for traction.[13]

Types of operative methods

The treatment of choice of trochanteric fractures should be operative, employing some form of internal fixation. The goals of operative treatment are;

1. Rigid stable fixation of the fracture fragments
2. Early mobilization of the patient
3. Restoration of the patient to his or her pre- injury status at the earliest [14,15,16].

SURGICAL TECHNIQUES

Rigid and stable fixation

The first successful implants in the treatment of trochanteric fractures were Fixed Angle Nail Plate devices(Jewett nail, Holt nail). [14]These consist of a triflanged nail fixed to a plate at an angle of 130 to 150 degrees. These devices provided stabilization of the femoral head and neck fragment to the femoral shaft, but they did not affect fracture impaction. The collapse of the fracture fragments led to inadvertent penetration of the tip of the nail into the hip joint. This was through the superior portion of the femoral head. Unstable fractures still had a tendency to heal in varus with broken or bent nails, broken side plates and screw fractures or pulling out of the screw from the femoral shaft.[20] This led to the introduction of the Sliding Nail Plate was introduced, aiming at controlling fracture impaction. Later there had been different modification of the sliding hip devices which includes DHS, Angled plate, Condylar blade plates. [17]

Intramedullary Nail

Intramedullary nails have a biomechanical and biological advantage over standard compression hip screws.[17] Intramedullary nails can be inserted with less exposure of the fracture and less blood loss. However they require more fluoroscopic exposure and have been associated with fracture comminution. Biomechanically, nails allow for stable anatomical fixation of more comminuted fractures without shortening the abductor moment arm or

changing the proximal femoral anatomy. These devices provide fracture stability by virtue of allowing the lateral aspect of the head and neck to come to rest against the nail in the medullary canal. [18] These devices include Gamma nails, short proximal nail, SIGN hip construct. These devices are associated with the risk of late femoral fractures at the tip of the device or the distal locking screw. For the unstable trochanteric fractures or in fractures with reverse obliquity in Intramedullary devices are recommended. [17].

1.3 PROBLEM STATEMENT

Trochanteric fractures are prevalent in old age group, although not uncommon in the younger age group. They pouse complication if poorly managed.

In the auther's setting, little is known regarding the profile of trochanteric fractures and their management outcome. The paucity of data regarding trochanteric fractures, and their management outcome in Tanzania is what prompted the auther in choosing this study.

1.4 RATIONALE

Normally, trochanteric fractures are common among elderly people. However, they also affect the younger ones. These fractures may pause serious complications when poorly managed. This justifies the compelling need in understanding the profile of trochanteric fractures at Muhimbili Orthopaedic Institute and their management outcome.

To the researcher's knowledge no study had been published in Tanzania on the profile of trochanteric fractures and their management outcome.

This study was conducted in the light of the paucity of information regarding trochanteric fractures and their management outcome. The findings of this study are expected to improve the knowledge and later improve the outcome of those patients sustaining trochanteric fractures in Tanzania as MOI is the tertiary hospital for orthopaedic and trauma.

This is an important requirement in the completion and fulfilment of Masters of Medicine degree in Orthopaedics and Traumatology.

1.5 RESEACH QUESTIONS

1. What are the causes of injury of trochanteric fractured patients admitted at MOI?
2. What is the treatment and short-term outcome of trochanteric fractures treated at MOI?

1.6 RESEARCH OBJECTIVES

Broad Objective

To determine the profile of trochanteric fractures at MOI; treatment modalities used and short-term outcome. March 2012-February 2013

Specific Objectives

1. To determine causes of trochanteric fractures in patients admitted at MOI between March 2012 and February 2013 .
2. To determine the treatment modalities of the patients with trochanteric fractures treated at MOI between March 2012 and February 2013 .
3. To determine short term outcome (shortening, coxa vara deformity and hip function) of patients with trochanteric fractures treated at MOI between March 2012 and February 2013

1.7 DEFINITIONS OF TERMS

1. Profile: is the representation or description of something in outline. Causes, age, sex and fracture classification, treatment modalities and short term out come

2. Trochanter: is the region from the extracapsular femoral neck to the distal part of lesser trochanter.

3. Fracture: breaking of the continuity of the bone.

4. Short-term: limited duration of a year or less.

5. Outcome: conclusion reached through a process of logical thinking.

1.7 LITERATURE REVIEW

Hip fracture is the second most common cause of hospitalization for elderly patients. [19] Trochanteric fracture is common in elderly population.

Ninety percent of Trochanteric fractures in the elderly patients result from a simple fall. [20] There is considerable burden to the health care system, through their association with increased mortality and morbidity. [21,22] Trochanteric fractures have been estimated to occur in more than 200,000 patients annually in the United States, with reported mortality rate ranging from 15% to 30%. [23]

A prospective Study was done in South Africa involving 680 geriatric patients with hip fractures, aiming to determine whether the demographic profile of patients with femoral neck fractures was similar to that of patients with trochanteric fractures. Three hundred fifty-eight patients (52.6%) sustained a femoral neck fracture; 322 (47.4%), a trochanteric fracture. Patients with trochanteric fracture were significantly older, more likely to be limited to home ambulation, and were more dependent regarding basic and instrumental activities of daily living. This was significant in females. There were no differences in age, prefracture ambulatory ability, or dependence in activities of daily living in men with either type of fracture. [24]

A study done in Côte d'Ivoire which involved 65 patient with trochanteric fractures, 48(73.8%) males and 17(26.2%) were female. The age range was 16-88yrs (mean 44yrs). Fractures were the results of road traffic accidents in 42 cases (64.6%), fall from height in standing position 11(16.9%), fall from height in seven (10.8%), sports-related accidents in two (3.1%) an assault in one(1.5%) and an attack in two (3.1%). [25**]**

The current treatment of trochanteric fractures is surgical intervention. Despite an acceptable healing rate with nonsurgical methods, surgical intervention for trochanteric fractures has replaced previous nonsurgical methods of prolonged bed rest, prolonged traction in bed, or prolonged immobilization in a full-body (spica) cast.[26,27,28] Though healing rates for

previous nonsurgical methods may have been acceptable. These were accompanied by unacceptable morbidity and mortality rates, because of frequent nonorthopedic complications associated with prolonged immobilization or inactivity[9]. Complications included the following:

- Pulmonary complications of pneumonia resulting from inactivity.
- Pulmonary emboli from deep vein thrombosis (DVT) caused by immobilization of an extremity.
- Bedsores from prolonged bed rest.
- Loss of motion of the lower extremity joints and muscle atrophy due to prolonged immobilization.

Union of the fracture in an unacceptable position resulting in a deformity.

Anglen et al found that from 1999 to 2006, for fixation of intertrochanteric hip fractures, there was a dramatic increase in the preference for the use of intramedullary nails that interlock proximally into the femoral head, in comparison with use of a sliding compression screw. Intramedullary nail fixation rate increased from 3% in 1999 to 67% in 2006. Overall, patients managed with plate fixation had slightly less pain and deformity than those patients who were managed with intramedullary nailing. There were no significant differences identified regarding function or patient satisfaction. In addition, the authors found that patients managed with intramedullary nailing had more procedure-related complications, particularly bone fracture. The authors noted that this change in management of intertrochanteric hip fractures has occurred despite a lack of evidence supporting the change and despite the apparent potential for increased complications. [28]

Bhandari et al performed a meta-analysis to identify the risk of femoral shaft fractures associated with gamma nails following treatment of extracapsular hip fractures. They found that in earlier studies (1991-2000), gamma nails were found to increase the risk of femoral

shaft fracture by 4.5 times when compared with the use of compression screws. However, in more recent studies (2000-2005), gamma nails were not associated with significantly increased risk of femoral shaft fracture, and in a 2005 study, there was no difference in femoral fracture rates. According to the authors, more recent trials suggest that increased femoral shaft fracture risk associated with gamma nails have been resolved as the result of improved implant design and improved learning curves.[29]

Sidhu et al studied 53 patients (average age, 77 y) following total hip replacement for intertrochanteric hip fractures. In the study patients, the Harris hip score at 1 month was 66 ± 7; at 3 months, 72 ± 6; at 1 year, 74 ± 5; at 3 years, 76 ± 6; and 76 ± 8 in the 27 patients who completed 5-year follow-up. The average time to return to normal daily activities was 28 days (range, 24-33 days), and there was no loosening or infection observed. The authors concluded that in mentally healthy elderly patients with intertrochanteric hip fractures, total hip arthroplasty may be a valid treatment option because it offers the potential for quick recovery with little risk of mechanical failure, it avoids the risks often associated with internal fixation, and it can enable patients to maintain a good level of function immediately after surgery. [30]

CHAPTER TWO

2.0 METHODOLOGY

2.1 Study Design

This was a hospital based cohort study.

2.2 Study Setting

This study was conducted at Muhimbili Orthopaedic Institute (MOI). This is a tertiary hospital providing specialised services in Orthopaedics, Trauma and Neurosurgical care. It is located in Dar-es-salaam Tanzania. It serves patients in the city as well as those referred from upcountry. It is also used as teaching centre for Muhimbili University of Healthy and Allied Sciences and International Medical and Technology University.

2.3 Study Duration

The study was conducted from March 2012 to February 2013.

Study Population

Patients aged 18 years and above admitted at MOI with trochanteric fractures.

2.4 Study Criteria

Inclusion Criteria

Patient aged 18 years and above with trochanteric fracture admitted at MOI, and consented to participate in the study.

Exclusion Criteria

- Old malunited fractures
- Trochanter fractures associated with fracture of the neck of femur / head of the femur
- Trochanter fractures associated with fracture of the femoral shaft
- Trochanteric fractures associated with dislocations of hip and knee joint
- Patients with fractures limited to trochanter avulsion
- Patients with bilateral trochanteric fractures
- Patient with deformity of at least one lower limb i.e polio, mojor joint contractures and amputees

2.5 Sample size estimation and sampling technique

The minimum sample size of this study will be calculated using Kish and Lisle formula (1965)

$$n = \frac{Z^2 p(1-p)}{e^2}$$

- n = Minimum sample size
- Z = Standard normal deviate corresponding to two sided specified significant level. This is 1.96 (at 95%c confidence interval)
- e = Margin of tolerable error 0.05

- p = a proportion of trochanteric fractures at MOI for past three (3) months (December 2011, January and February - 2012) which was as calculated as:

$$p = \frac{n^t}{N}$$

Where

p = proportion of trochanteric fractures at MOI for the past 3 months

n^t = number of trochanteric fractures at MOI for the past 3 months

N = number of hip fracture at MOI for the past 3 months

$$p = \frac{5}{83}$$

$$p = 0.06$$

Note: Data were obtained from MOI patient registry after obtaining permission from the Medical Director of MOI

Therefore

$$n = \frac{1.96^2 \, x \, 0.06 \, (1 - 0.06)}{0.05^2}$$

$$n = \frac{0.21667}{0.0025}$$

$$n = 86.667$$

Therefore, the minimal sample size required is 87 patients. 10% increment in sample size due to loss to follow up, minimum sample size was 94. But in this study 91 patients were consecutively enrolled.

2.6 Data Collection Process

Pre- test for data collection tool was conducted by a researcher for the purpose of finding out if it provides the required information. Necessary changes were made so as to obtain the required information.

One research assistant with knowledge and experience in research was recruited. He was trained on the study objectives and being oriented to data collection tools.

The researcher and research assistant provided information about the study to prospective study participants and obtained consent from those willing to participate. Study participants were interviewed using a pretested structured questionnaire. Patents were evaluated on the day of admission and day of discharge. These patients were followed up at 8^{th},12^{th} and 16^{th} for those treated conservatively. For operated ones were followed up on the 2^{nd}, 6^{th}, 12^{th} and 16^{th} post surgery, where of the wound, limb length, range of motion of hip joint and fracture line were assessed.

Other tools involved in data collection were tape measure to measure true limb length, goniometer to measure neck shaft angle and range hip joint movement.

2.7 Patient Enrolment and Follow up

Adult Patients with trochanteric fracture treated at MOI were included in the study after consent to participate.

- Pre-treatment x-rays AP and Lateral view of patient's affected hip was assessed and classified by a researcher and confirmed by a radiologist. The type of trochanteric fracture was classified by using Evans classification. Patients over 50 years of age, blood urea, creatinine, blood pressure and blood sugar were examined. Also chest x-rays and ECG were examined. Opinions of physician and anaesthesiologist were taken as to the fitness of surgery, the unfit patients were treated conservatively.

- **Treatment procedure**

- **Non surgical treatment;**

- Skin traction was used as conservative management, and it was applied on the affected limb where by adhesive plaster was put below knee at the tibial condyl and enhanced by rolling of the clip bandage, 10% of patient's body weight was applied for 4 weeks and limb kept on abduction position. After four weeks the limb was assessed for features of clinical union like tenderness on palpation. Control x-rays were done for radiological union.

- Patient was discharged with instructions of non weight bearing and were followed up at 8^{th}, 12^{th} and 16^{th} weeks, AP view of pelvis and lateral view x-rays were obtained. The union was assessed clinically and radiologically. Physical examination was also perfomed to assess limb length, range of hip motion and ability to bear weight.

Surgical treatment

Angled plate and SIGN hip construct were used as surgical implants. Patients were operated within 21 days of admission. Prophylactic antibiotics, typically 3^{rd} generation cephalosporins such as ceftriaxone were given during induction of anaesthesia.

AO Angled plate (blade plate)

Patient was positioned in supine on a standard operating table. Standard lateral approach to the hip was done. Fracture site was identified. Cuttings was done on the proximal fragment through neck to the head, by cutting chisel under guirding angles, for settlement of the blade of the plate. The angles depends on the fracture pattern. Then the blade was hummered to the neck and head. Reduction of the fracture was done. Shaft of the blade plate was fixed on both cortices of the proximal femur.

SIGN hip construct

Patient was positioned on the lateral position on the standard operating table. Lateral approach to the hip around the greater trochanter and vastus ridge was made. Lateral dissection of the lateral vastus muscle done. Fracture identified and reduced. Anterior compression screw applied at the base of the vastus ridge under the aid of pilot drill. Through the tip of greater trochanter the proximal and distal fragments were reamed to size 12mm. Standard SHC nail was inserted antegradelly and locked with 1 distal and 1 proximal interlock screws. Then posterior compression screw was applied 2cm distal to vastus ridge under the aid of pilot drill.

The size of the compression screw and proximal interlocking screw were identified through the template on the AP pelvis x-rays.

- The open reduction was performed with manual traction and manipulation with inconsistency use of image intensifier based on individual surgeon decision. Fracture table was not used.

- Immediate post operative x-rays were obtained. Patient began physiotherapy programme 1st day post surgery.

- After discharge study participants were requested to attend a follow up clinic on 2nd week post surgery. At this visit the researcher assessed the surgical wound and limb length.

- Additional follow up visit were scheduled at 6th, 12th and 16th weeks post surgery. During these visits AP view of pelvis and lateral hip x-rays were obtained. Union was determined radiologically and clinically, physical examination was performed to assess the limb length and hip joint movement.

- Patient with reduced range of hip movement were instructed to attend physiotherapy. Those patients whose fracture line persisted at the 16th week, were considered to have delayed union. Appropriate treatment for delayed union was given.

- Radiological union was defined as the absence of the fracture line/lines. Fractures were considered healed when the patients had radiological union, no tenderness to palpation and was able to bear weight without pain in the hip.

- Salvati and Wilson hip scoring system was used. Score below 20 was considered as poor hip function.

Measurement of limb length

Limb shortening was determined by comparing the true limb length of affected and normal limb. Limb shortening was considered when there was shortening of 2cm and above.

Measurement of neck shaft angle

Neck shaft angle was measured on the AP view of the pelvis. Neck shaft angle reduced to 90 degrees was considered varus displacement hence coxa vara deformity [17]

2.8 Data Management and Analysis

All filled in questionnaires were coded accordingly before entering data into the computer. Data entry and management were performed using **Epidata software version 3.0** (Epidata Association, Odense, Denmark) and data cleaning was done by using consistence checks.

Data were summarized and presented as mean ± standard deviation (SD) for continuous variables and differences between means was tested using student t-test. The level of significance was set at 5%.

All statistical data analysis was performed using **SPSS** (Statistical Package for Social Sciences) **version 18.0** (SPSS, Inc, Chicago, IL USA).

CHAPTER THREE

3.0 RESULTS

A total of 97 adult patients with trochanteric fractures were admitted at MOI during this study period (March 2012 to February 2013). Among these, 91 patients met the study inclusion criteria. There were 4 patients excluded from the study due to lost follow up, 1 patient was lost to follow up after discharge from the hospital, and 3 patients were lost to follow up after the 6 week visit. Therefore, 87 patients completed at least 16 weeks follow and were evaluated in this study. Of the 87 patients, 67.8% (59/87) were male. The age ranged from 19 to 93 years with a mean age of 62.26 ± 19.19 years.

In the study majority of the patients were from the age of 56 years and above, 30 (36.8%) being in age group of 56-74 years followed by 26 (29.9%) being in the age group of 75-93 years. With preponderance of males. (Table1)

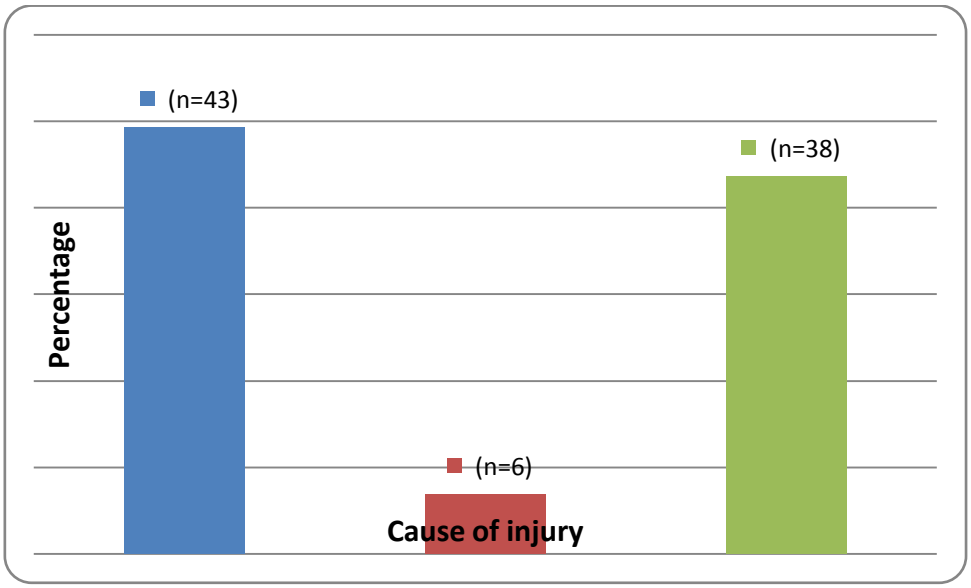
Table1. Distribution of the sample by Age group and Sex.

Parameter	Frequency(n=87)	Percentage
18-27: Male	0	0%
Female	2	7.1%
28-37: Male	8	13.6%
Female	1	3.6%
38-47: Male	10	16.9%
Female	3	10.7%
48-57: Male	8	13.6%
Female	0	0%
58-67: Male	13	22.0%
Female	5	17.9%
68-77 :Male	8	13.6%
Female	7	25.0%
78-87: Male	9	15.3%
Female	5	17.9%
88+: Male	3	5.1%
Female	5	17.9%
Total	**87**	**100%**

Distribution of participants by the cause of injury (n=87).

Of the 87 participants, majority of the cases were due to simple falls 43 (49.4%), followed by road traffic crashes 38 (43.7%). **(Figure 4)**

Figure4: Distribution of participants by the cause of injury (n=87)



Fracture classification by Evan's Classification (n=87).

The trochanteric fractures were classified according to Evan's classification. This study found more cases 25 (28.74%) were in type II Evan's classification. (**Figure 5**)

Figure 5: Distribution of the participants by fracture type based on Evan's Classification (n=87).

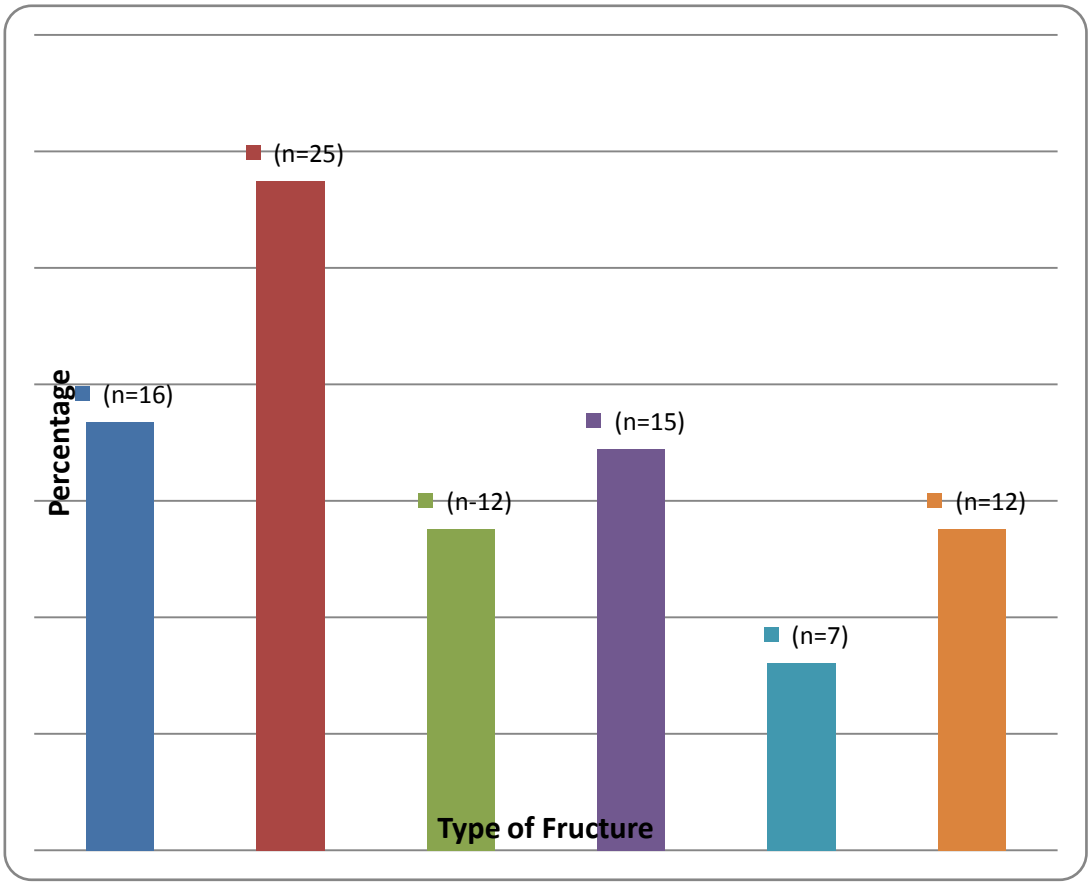


Table 2. **Distribution of the participants by definitive treatment modality (n=87).**

In this study 60 (69.0%) of the participants with trochanteric fractures were surgically treated whereas 27 (31.0%) were treated non surgically.

Treatment	**Frequency(n=87)**	**Percentage**
Surgical	60	69%
Non surgical	27	31%
Total	**87**	**100%**

Distribution of Treatment Modality by limb shortening (n = 87)

In this study, limb shortening was found in 16 (26.7%) of those treated surgically and in 19 (70.4%) of those treated non surgically. The difference between the two treatment modalities was highly statistically significant ($p = <0.001$; $\chi^2 = 14.8$). (Table 3)

Table 3: Distribution of Treatment Modality by limb shortening (n = 87)

	Limb Shortening n (%)		
	Yes	No	Total
Non surgical Treatment	19 (70.4)	8 (29.6)	27 (31.0)
Surgical Treatment	16 (26.7)	44 (73.3)	60 (69.0)
Total	35 (40.2)	52 (59.8)	87 (100)

χ^2 = 14.8 (p-value = <0.001)

Distribution of the participants by Coxa vara deformity (n = 87).

Out of 87 study participants, coxa vara deformity was found in 14 (23.3%) of those treated surgically and in 19 (70.4%) treated non surgially. The difference between the two treatment modalities was highly statistically significant (p = <0.001; χ^2 = 17.5). (Table 4)

Table 4: Distribution of the participants by Coxa vara deformity (n = 87).

	Coxa vara n (%)		
	No	Yes	Total
Non gurgical Treatment	8 (29.6)	19 (70.4)	27 (31.0)
Surgical Treatment	46 (76.7)	14 (23.3)	60 (69.0)
Total	54 (62.1)	33 (37.9)	87 (100)

χ^2 = 17.5 (p-value = <0.001)

Distribution of the participants by days of hospital stay (n = 87).

Out of 87 patients 27.3% in age group 78-87 had duration of 4-8 weeks, and 2 patients in age group68-77 had maximum duration of more than 8 weeks. Where by patients in younger age groups had short duration of hospital stay of 1-4 weeks. (Table 5)

Table 5. **Distribution of the participants by days of hospital stay (n = 87)**.

		Duration of Hospital stay		
		1-4 weeks	4-8 weeks	> 8 weeks
Age Group	18 – 27	2	0	0
	28 – 37	8	1	0
	38 – 47	9	4	0
	48 – 57	4	4	0
	58 – 67	13	5	0
	68 – 77	8	5	2
	78 – 87	5	9	0
	88 – 97	3	5	0

Distribution of the participants by Salvati-Wilson hip evaluation score (n = 87)

In the present study, using Salvati-Wilson hip evaluation 55 (91.7%) of the participants treated surgically had scored above 20 (20/40) and 19 (70.3%) treated non surgically scored above 20 (20/40). The difference between the two treatment modalities was statistically significant ($p = 0.002$; $\chi^2 = 14.9$). (Table 6)

Table 6: Distribution of the participants by Salvati-Wilson hip evaluation score (n = 87)

	Salvati-Wilson Hip Evaluation Score n (%)				
	Excellent	Good	Fair	Poor	Total
Non surgical Treatment	3 (11.1)	5 (18.5)	11 (40.7)	8 (29.6)	27 (31.0)
SurgicalTreatment	6 (10.0)	36 (60.0)	13 (21.7)	5 (8.3)	60 (69.0)
Total	9 (10.3)	41 (47.1)	24 (27.6)	13 (14.9)	87 (100)

χ^2 = 14.9 (p-value = 0.002)

CHAPTER FOUR

4.0 DISCUSSION

Total of 87 cases of trochanteric fractures were either treated surgically or non surgically, and the evaluation was done.

These patients were evaluated before treatment. Details were collected using a structured questionnaire, treated and followed up for the period of 16 weeks on OPD basis.

The data collected in this series were analyzed and compared with others wherever.

Age of incidence

The mean age incidence in this study was 62.26 years. This finding was similarly reported by [1,31,32,33,34,35,36]. However, this was in contrast to higher mean age as reported by some western literatures. [37, 38] This could be explained by the fact that, old aged people already being prone to osteoporosis.

Sex incidence

In the present study, male: female was about 2:1.

There was a male sex predominance seen in this study. This is in contrast to female preponderance as observed by various other studies [36,39,40,41]. Reason being males were in a younger age and the injury was due to RTC. Females were found to be preponderance at the older age. Most fractures occurred outdoor. This is due to the fact that elderly female has high osteoporotic incidence as a result of decreased hormonal levels (oestrogen).

Mode of injury

Majority of trochanteric fractures were found in persons aged above 66 years, mechanism were predominantly from simple fall (49.4%) followed by road-traffic accidents (43.7%). This study was comparable with other studies where majority of the cases occurred due to simple falls. Hornby et al 80% [42], Gupta RC 79.4% [33].

It also shows that in our environment RTC is among the leading cause of trochanteric fractures involving the younger individuals. This study shows almost similar results in the study by JB Sié Essoh et al. reported 63.1% of trochanteric fractures occurred due to RTC and were young. This could be explained by the urbanization and increased use motor cycle as mode of transport[25].

Trochanteric fractures were classified based on Evan's classification

Based on Evan's Classification, in this study majority of fractures (28.7%) were type II, followed by (18.4%) type I, then (17.2%) type IV, type III, reverse oblique scored (13.8%) and lastly 8.0% for type V. Similar results were reported in [43]

Treatment modalities

In this study it was found that majority of the cases 60 (69.0%) were treated surgically whereas the remaining 27 cases (31.0%) were treated non surgically. This is in contrast to [43] The choice of treatment was determined by the condition of the patient. Where by those who refused surgery and those found to be unfit for surgery were treated non surgically. Such conditions includes: uncontrolled blood pressure, renal insufficient and those refused surgery.

Coxa vara Deformity

In this study, coxa vara deformity was found in 23.3% of those treated surgically and 70.4% treated non surgically. Similar findings was reported by [43]

This could be explained by the fact that, some patients were not operated on time, as this could be due to co-existing comorbidities, and in some instances due to congested operating list.

However, those treated nonsurgically, it was difficult in maintaining immobilisation of the fractured limb.

Limb - shortening

In the present study, most patients treated surgically had no limb shortening 73.3%. In non surgical treatment 70.4% had limb-shortening. Similar results were reported by [43]. This could be also explained by poor reduction and the occurrence of coxa vara deformity.

Evaluation of cases Salvati and Wilson Hip scoring system

In this study, those patients who were surgically treated 91.7% and 70.3% of those non surgically treated had scored above 20 points (out of 40). These results were similar to those reported by Al-Yassari et al. [44] in which 78% had scored above 20 points.

Study Limitation

1. Due to lack of different options of implants in the auther,s setting, only SHC and Angled plates were used in this study, therefore the outcome might be influenced in one way or another.

2. Some X rays didn't have true AP views, this might have influenced the results of neck shaft angle.

3. The 16 weeks period was not enough to evaluate coxa vara deformity as the implant might migrate on loading weight.

CONCLUSION

Trochanteric fractures in the auther,s setup are due to simple fall and road traffic crashes. Most were treated surgically with satisfactory results

RECOMMENDATION

Trochanteric fractures should be treated surgically, and these fractures should be operated early.

Patients who can not be surgically treated effort should be made for early ambulation so that to avoid non orthopaedic complications.

While these fractures should be treated surgically different types of implants should be introduced (DHS, CBS, SPN)

The government should implement proper traffic regulation so as to reduce the prevalency of road traffic accidents.

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APPENDICES

Appendix I (SWS)

Salvati-Wilson Hip Rating Score
Pain
0 = Constant and unbearable. Frequent strong analgesia
2 = Constant but bearable. Occasional strong analgesia
4 = Nil or little at rest. With activities
6 = Little pain at rest. Pain on activity
8 = Occasional slight pain
10 = No pain
Walking
0 = Bedridden
2 = Wheelchair
4 = Walking frame
6 = One stick, limited distances up to 400 yards
8 = One stick, long distance
10 = Unaided and unrestricted
Muscle power and motion
0 = Ankylosis with deformity
2 = Ankylosis with good functional position
4 = Poor muscle power. Flexion < 60^o abduction < 10^o
6 = Fair muscle power. Flexion $(60\text{-}90)^o$ abduction $(10\text{-}20)^o$
8 = Good muscle power. Flexion > 90o abduction > 20^o
10 = Normal muscle power. Full range of movement
Function
0 = Bedridden
2 = Housebound
4 = Limited housework

6 = Most housework, can shop freely
8 = Very little restriction
10 = Normal activities

Grading of results

Score: >31 = Excellent 24-31 = Good 16-23 = Fair <16 = Poor

Appendix II: Questionnaire

I. PATIENT'S PROFILE:

1. Name of patient ……..
2. Registration NO. …….
3. Age: …….
4. Sex: a) Male b) Female …….
5. District of residency: ……
6. Date of injury: …….
7. Date of admission
8. Date of discharge
9. Cause of injury:
    a) Simple fall
    b) Falling from height
    c) RTC
10. Simple fall ; in the house.....or out door.....
11. from height

    Less than 10 metres

    10m
12. Side affected
    a) Right

b) Left

c) Bilateral

13. Type of fracture

a) Open

b) Closed

14. Radiological Classification of trochanteric fracture by Evan's classification:

a) Type I

b) Type II

c) Type III

d) Type IV

a) Type V

b) Reversed oblique

15. Treatment modality

a) Non operative

b) Operative treatment

16. If non operative:

a) Skin traction

b) Skeletal traction

17. If operative:

    a) Angled plate

    b) SHC

    c) Athroplasty

    d) DHS

POST TREATMENT PATIENT FOLLOW UP

18. Post treatment post op control x-rays- reduction:

    a) Good reduction

    b) Accepted reduction

    c) Poor reduction

19. Post opearative hospital stay

    a) 2 days

    b) 2-5 days

    c) More than 5 days

20. Days of admission if non operative

    a) 4 weeks

    b) 6 to 8 weeks

    c) More than 8 weeks

21. Post operative wound complication
    a) Healed well
    b) Superficial infection
    c) Deep infection
22. 23.Time allowed to start full weight bearing

    a)6-9 weeks

    b)10-12 weeks

    c) 13-16 weeks

21 Coxa vara deformity(neck shaft angle)

    a) Yes.

    b) No

22. Limb shortening

    a) Yes

    b) No

23. Development of bed sores

    a) Yes

    b) No

23. Salvati-Wilson hip score at 16 weeks

    a)Excellent

    b) Good

    c) Fair

    d) poor

Appendix III: Consent

PARTICIPANT INFORMATION LEAFLET AND INFORMED CONSENT FORM

***Each participant must receive, read and understand this document* <u>before</u> any study-related procedure**

Study Title:

TROCHANTERIC FRACTURES: MECHANISM OF INJURY, TREATMENT AND SHORT- TERM OUTCOME AT MOI

Introduction:

Dear Sir/Madam,

Greetings!

My Name is **Dr. Karama Mankaga Kenyunko** from Muhimbili University of Health and Allied Sciences, department of Orthopaedics, trauma and Neurosurgical care. I am conducting a study as a necessary requirement for the fulfillment of my postgraduate studies. As a principal investigator of this study, with your help I wish to understand more about the trochanteric fractures so as to be able to improve the care of these fractures in terms of treatment, and better outcome after treatment.

Purpose of the Study:

The aim of this study is to determine the mechanism of injury, treatment and short-term outcome of trochanteric fractures at MOI. This will emphasize the need of implementantion of better strategies on treatment and patients' outcome after treatment.

How to Participate:

I am going to recruit all trochanteric fractures patients admitted in wards of the Muhimbili Orthopaedics Institutes.

You will be interviewed on some specific research-related questions followed by physical examination and some relevant investigations will be done; it should take no longer than 40 minutes of your time. Your response is of utmost importance to me.

An individual who is willing to participate in this study must **sign** this form in order to approve his/her willingness to participate and to give permission to use his/her answers. In case the patient has altered level of consciousness and is not able to give the consent, the next of kin/care giver can sign the consent on his/her behalf.

Confidentiality:

All information we collect from you will be confidential and will only be used for the purpose of this study, along with improving care and treatment. Your name will only appear on a special form which will be kept by the principal investigator. The code number will be used, and therefore, none of the participants' names would appear on the data questionnaires. The data will only be accessed by the principal investigator or supervisor and or research group whereas the codes will be used.

Costs:

The costs for investigations will be covered by the Ministry of Health and Social welfare.

Voluntary Participation and Rights to Withdraw:

Your participation is voluntary and you have the right to withdraw from participating in our study at any time. Whatever your decision may be, it will not affect in any way your rights to care and treatment.

Risks and incase of injury:

We do not anticipate any harm as a result of taking part in this research. radiological investigation required will be performed by radiologist of MOI. Should physical injury occur as result of participation, however, we shall treat you according to the current standards of care in Tanzania.

Contact Persons:

If you have any inquiries about this study, please do not hesitate to contact:

Dr. Karama Mankaga Kenyunko
Principal Investigator
Department of Orthopaedics, Trauma and Neurosurgical care - MUHAS
P.O. Box **65001,** Dar es Salaam.
Tel. 0713- 446448
Dr. K. S. Nungu
Study Supervisor,
Department of Orthopaedics, Trauma and Neurosurgical care – MUHAS
P.O. Box 65001 Dar es Salaam.
Tel: 0754313274

OR in case of any information about your rights as a participant in this study please contact:

Professor Aboud Muhsin.
The Director, Research and Publication Committee
Muhimbili University of Health and Allied Sciences (MUHAS)
P.O. Box 65001 Dar es Salaam
Tel. 2151489

I will be grateful if you willingly agree to participate in this study.

I _____ (name of participant) hereby willingly accept to take part in this research and give Dr. Karama Mankaga Kenyunko consent to use the information obtained from the interview, physical and Radiological investigation following this consent as part of her dissertation for her Masters Degree Programme.

In case for next of kin

I _____ (name and relation of next of kin) on behalf of _____ (name of participant), have understood the above information and my questions have been answered by the investigator to my satisfaction. I, on behalf of _____ (name of the patient) willingly allow him/her to take part in this research.

Name (participant/next of kin): _____ Signature: _____

Name of the Witness: _____ Signature: _____

Date (Witness): _____ Date of signed consent: _____

Appendix IV: Fomu ya Ridhaa ya Ushiriki

WARAKA KWA WASHIRIKI PAMOJA NA FOMU YA RIDHAA YA KUSHIRIKI

Kila mshiriki lazima apate, asome na kuyaelewa maelezo yaliyomo kwenye waraka huu **kabla** ya kuanza hatua yoyote ya ushiriki katika tafiti hii.

Kichwa cha habari cha Tafiti hii:

TROCHANTERIC FRACTURES; JINSI YA UVUNJIKAJI, MATIBABU YATOLEWAYO NA MAENDELEO YA MGONJWA BAADA YA KIPINDI KIFUPI CHA MATIBABU MOI – TANZANIA - 2012

Utangulizi:

Salaam!

Jina langu ni **Dr. Karama Mankaga Kenyunko** mwanafunzi wa shahada ya udhamili ya udaktari, Idara ya upasuaji mifupa, majeruhi na mishipa ya hisia, chuo kikuu cha afya na tiba Muhimbili. Ninafanya tafiti hii ikiwa ni hitaji la lazima ili niweze kukamilisha masomo yangu ya udhamili. Nikiwa mtafiti mkuu katika tafiti hii, kupitia msaada wako nategemea kugundua jinsi ya uvunjikaji na matibabu yatolewayo ili tuweze kuboresha huduma.

Madhumuni ya tafiti hii:

Lengo la tafiti hii ni kuweza kugundua jinsi ya uvunjikaji na matibabu yatolewayo pamoja na maendeleo ya mgonjwa baada ya kipindi kifupi cha matibabu MOI na kuweza kuboresha matibabu kwa wagonjwa wenye tatizo hili.

Jinsi ya kushiriki:

Utaulizwa masuali yahusianayo na tafiti hii ambayo yatafuatiwa na uchunguzi wa mwili wako pamoja na kuchukuliwa baadhi ya vipimo muhimu; haitachukua zaidi ya dakika 30. Ushiriki wako ni wa muhimu sana kwangu.

Kila mshiriki ambae ataridhia kushiriki katika tafiti hii ni lazima aweke **sahihi** kwenye fomu ya ridhaa ya kushiriki ili kuthibithisha ridhaa yake ya kushiriki na kuruhusu matumizi ya majibu yake kwenye tafiti hii. Na kama itatokea mshiriki amepoteza fahamu na hawezi kutoa ridhaa ya ushiriki, basi ndugu au anaemhudumia kwa karibu anaweza kutoa ridhaa hio kwa niaba yake.

Usiri:

Taarifa zote tutakazozikusanya kutoka kwenu zitahifadhiwa kwa usiri mkubwa sana na zitatumika tu kwa malengo ya tafiti hii, pamoja na uboreshaji wa huduma na matibabu. Herufi maalum zitatumika na hakutakuwa na jina la mshiriki yeyote Yule ambalo litaandikwa kwenye dodoso.

Gharama:

Gharama za vipimo zitalipiwa na Wizara ya Afya na Ustawi wa Jamii.

Uhuru wa kushiriki na haki ya kujitoa:

Ushiriki wako ni huru na una haki ya kujitoa kushiriki katika tafiti hii wakati wowote ule. Maamuzi yoyote utakayoyachukua, hayataathiri kwa namna yoyote haki zako za kupata huduma na matibabu.

Athari na kama kutakuwa na madhara:

Hatutaraji athari au madhara yoyote zaidi yatokanayo na ushiriki wa tafiti hii. Na kama kutatokea athari au madhara yoyote yatokanayo na ushiriki katika tafiti hii, utatibiwa kwa kupatiwa huduma bora zitolewazo kulingana na taratibu za tiba za hapa Tanzania.

Mawasiliano:

Kama kutakuwa na shida yoyote juu ya tafiti hii, tafadhali usisite kuwasiliana na hawa wafuatao:

Dr. Karama Mankaga Kenyunko
Mtafiti Mkuu
Idara ya Upasuaji wa Mifupa, Majeruhi na Mishipa ya Hisia,
Chuo kikuu cha afya na tiba, Muhimbili
S.L.P 65001 Dar es Salaam.
Simu ya kiganjani: 0713 446448

Dr. K. S. Nungu
Msimamizi mkuu wa Tafiti hii,
Idara ya Upasuaji wa Mifupa, Majeruhi na Mishipa ya Hisia, MUHAS
Chuo kikuu cha afya na tiba, Muhimbili
S.L.P 65001 Dar es Salaam
Simu ya Kiganjani: 0754313274

Au, kama unahitaji taarifa zaidi juu ya haki zako za ushiriki katika tafiti hii tafadhali wasiliana na:

Professor Aboud Muhsin.
Mwenyekiti, Bodi ya Utafiti na Uchapishaji
Chuo kikuu cha afya na tiba, Muhimbili
S.L.P 65001 Dar es Salaam
Simu ya mezani: 2151489

Nitashukuru sana kama utaridhia na kukubali kushiriki katika tafiti hii.

Mimi _____ (jina la mshiriki) kwa ridhaa yangu nakubali kushiriki katika tafiti hii na kumpatia ruhusa Dr. Karama Mankaga Kenyunko ya kuweza kutumia taarifa atakazozipata kupitiana majadiliano, uchunguzi na vipimo katika tafiti hii ikiwa ni sehemu ya masomo yake ya udhamili.

Kama mtoa ridhaa ni ndugu kwa niaba:

Mimi _____ (jina la jamaa au ndugu) kwa niaba ya _____ (jina la mgonjwa), nimeyaelewa kwa kina maelezo yote ya hapo juu na kwamba masuala yangu yote yamejibiwa na mtafiti mkuu na nimeridhika.

Mimi, kwa niaba ya _____ (jina la mgonjwa) naridhia na kuruhusu ushiriki wake katika tafiti hii.

Jina (mshiriki/ndugu): _____ Sahihi: _____

Jina la shahidi: _____ Sahihi: _____

Tarehe ya kusaini maridhuano: _____