Prevalence of ipsilateral neck of femur fractures among patients with diaphyseal femoral fractures admitted at Muhimbili Orthopaedic Institute

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PREVALENCE OF IPSILATERAL NECK OF FEMUR FRACTURES AMONG PATIENTS WITH DIAPHYSEAL FEMORAL FRACTURES ADMITTED AT MUHIMBILI ORTHOPAEDIC INSTITUTE

By

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A Dissertation Submitted in (Partial) Fulfillment of the Requirements for the Degree of Master of Medicine (Orthopaedics and Traumatology) of

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CERTIFICATION

The undersigned certifies that, he has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled; **"Prevalence of ipsilateral neck of femur fractures among patients with diaphyseal femoral fractures who are admitted at the Muhimbili Orthopaedic Institute",** in (partial) fulfillment of requirements for the degree of Master of Medicine (Orthopaedics and Traumatology) of Muhimbili University of Health and Allied Sciences

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Date

DECLARATION AND COPYRIGHT

I, **Dr. Emmanuel E. Mlay**, 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.

Signature..... **Date** .....

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I furthermore thank Almighty God for giving me good health throughout my study period and enabling me to complete this task.

DEDICATIONS

This dissertation is dedicated to my family for their love and support. It is also dedicated to my sponsor and friend, Giselle DeVetten, M.D, who always supported and encouraged me.

ABSTRACT

Background

Femoral diaphyseal fractures with ipsilateral neck of femur fractures occurs in 1-9% of all femoral diaphyseal fractures.

Femoral diaphyseal fractures are observed across all age groups and most frequently in young males after high-energy trauma. The mechanism in young patients tend to be motor vehicle crashes.

It reported, 20%-50% combined fracture of femur and femoral neck can be missed on initial investigation if no combined methods of investigation on initial evaluation of all patients with diaphyseal femoral fracture is not followed.

Objectives

The objective of this study was to determine the proportion of ipsilateral neck of femur fractures in patients with diaphyseal fractures who are admitted at Muhimbili Orthopaedic Institute, Dar es salaam, Tanzania

Methodology

This was a descriptive cross-sectional study which looked into ipsilateral femoral neck and diaphyseal fractures patients who are admitted at Muhimbili Orthopaedic Institute (MOI) from September 2018 to April 2019. Structured questionnaire was used to collect data from patient who consented. Demographic data, mechanism of injury, category of mechanism injury and radiological images findings of femoral diaphyseal, hip and pelvis were recorded. Data was analyzed by statistical package for the social studies (SPSS) version 24. P-value of 0.05 was considered significant.

Results

A total of 101 of patients with diaphyseal femoral fracture were enrolled into the study, in which young adult male 82 (81%) with average age of 33.2 years were observed.

The prevalence of ipsilateral femoral neck and diaphyseal fracture was 10.9% among 101

patients with diaphyseal femoral fracture admitted at Muhimbili Orthopaedic Institute (MOI). Only one patient making 1% of all patients, was missed in the initial investigation of ipsilateral femoral neck fracture using supplementary radiographic views of the hip. The most cause of mechanism of injury among these patients was motor traffic crash 92.1% of all enrolled patients followed by fall from height 6%.

Conclusion

The proportional of ipsilateral femoral neck and diaphyseal fracture was found to be higher than in other previous studies. While the missed ipsilateral femoral neck and diaphyseal fracture was low compared to authors elsewhere.

Recommendations

Ipsilateral femoral neck and diaphyseal fracture should be suspected in all patients sustaining diaphyseal femoral fracture. Additional radiological images like image intensifier and CT scan should be added to in order to detect occult ipsilateral femoral neck and diaphyseal fracture. A similar study should be done of longer duration so have to more power of the proportion of the study.

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LIST OF ABBREVIATIONS

AO	Arbeitsgemeinschaftfür Osteosynthesefragen
ASIF	Association for the study of Internal Fixation
AP	Anteroposterior
EMD	Emergency Medicine Department
MMED	Master of Medicine
MOI	Muhimbili Orthopedic Institute
MUHAS	Muhimbili University of Health and Allied Sciences
ROM	Range of movement
SPSS	Statistical Package for the Social Sciences

DEFINITION OF TERMS

Ipsilateral femoral neck fractures are fracture of diaphyseal femur that are associated with femoral neck fracture of the same side during trauma.

Missed ipsilateral femoral neck fractures are the fracture of ipsilateral femoral neck that are not detected in the initial assessment prior to definitive treatment.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Numerous associated injuries occur in conjunction with fractures of the femoral diaphyseal and are more commonly observed in young patients after high-energy traumatic injuries.

Simultaneous ipsilateral neck femur fractures are seen in high-energy trauma and occur in 1–9% of fractures of the shaft of the femur[1,2].

Femoral shaft fractures are observed across all age groups and are attributable to a variety of mechanisms. There tends to be an age and gender related bimodal distribution of fractures with injuries occurring most frequently in young males after high-energy trauma and in elderly females after falls from standing[3,4,5].

The mechanisms in young patients tend to be motor vehicle crashes, pedestrians struck by vehicles, or falls from heights[6].

In the conscious patient, the diagnosis of a femoral diaphyseal fracture is usually obvious however, the presence of associated injuries or other fractures may be distracting, both for the patient and the examining physician. A complete history is an important part of the initial evaluation of the traumatized patient; this includes determination of the injury mechanism, the time elapse from injury to presentation, the need for a prolonged extrication, the location of the accident, and any known associated injuries. The mechanism of injury is an important aspect of the history that may suggest the fracture location, fracture configuration, and associated soft tissue injury. The physical examination can be difficult in a patient with a femur fracture. However, the examination should not be limited to sites of obvious pain and deformity. Advanced trauma life support protocols should be followed in the initial evaluation.

The orthopedic examination should include visual inspection and palpation of all extremities, the pelvis, and the spine. The ipsilateral knee and hip should be examined to determine whether there are associated noncontiguous fractures or ligamentous injuries. The radiographs should be critically evaluated to determine the fracture pattern, bone quality, presence of bone loss, associated comminution, presence of air in the soft tissues, and amount of shortening[3,7,8].

Diaphyseal fractures are classified based on their pattern, degree of comminution and soft tissue disruption if open. Fracture may be Transverse, Oblique, or Spiral. According to AO/Muller classification, Diaphyseal femoral fractures are 32 where by 3 is for Femur and 2 for Diaphysis. The letters **A, B, C** are used to explain fracture pattern (*AO Principles of fracture management 2007*).

Table 1: Shows AO classification of diaphyseal femur fracture

32 AO Groups	AO subgroups		
32A (simple fracture)	A1 Spiral	A2 Oblique	A3 Transverse
32B (Wedge fracture)	B1 Spiral	B2 bending wedge	B3 Fragmented wedge
32C (complex fracture)	C1 Spiral	C2 segmental	C3 irregular

Winquist and Hansen Classification categorizes femoral shaft fractures based upon the degree of comminution (see Table 2).

A femoral shaft with associated ipsilateral neck of femur fracture is typically in the middle third and mostly comminuted[9].Most of the patients with ipsilateral neck of femur fracture and shaft of femur fracture have been associated with severe comminution(Winquist III or IV) indicating a high energy mechanism[10].

Table 2 : Winquist and Hansen Classification

Type	**Description**
I.	Transverse or short oblique fractures with no comminution or a small butterfly fragment of less than 25% of width of the bone
II.	Comminuted with a butterfly fragment of 50% or less of the width of the bone
III.	Comminuted with a large butterfly fragment of greater than 50% of the width of bone
IV.	Segmental comminution

Sixty percent of ipsilateral neck of femur fractures with shaft fracture are mostly likely to be un-displaced at presentation[10]. The reason behind un-displacement of ipsilateral neck of femur is that at time of injury, the shaft of femur absorbs most of the energy, hence the comminution and little is dissipated at the neck[10].

The neck of femur fracture can be classified using the Garden classification, which is based on the grade of displacement (see 3)

Table 3: Garden Classification

Type I	Incomplete, i.e. Valgus impacted
Type II	Complete fracture, non-displaced
Type III	Complete, partially displaced
Type IV	Complete, fully displaced

1.2 Literature Review

Social demographic distribution

Femur diaphyseal fractures are observed across all age groups and are attributed to a variety of mechanisms[11]. There tends to be an age and sex-related bimodal distribution of fractures with injuries occurring most frequently in young males after high-energy trauma and in elderly females after falls from standing[8].

The mechanisms in young patients tend to be motor vehicle crashes, pedestrians struck by vehicles, or falls from a height. The relative distribution of these fractures depends on multiple factors including the geographic location (urban vs. rural) and country of study. In a review of 515 patients with 551 femoral shaft fractures in a typical urban US city, the average age was 27.2 years and 70% were males[1,8].

In a prospective clinical trial conducted at Municipal referral hospital in India from January 1997 to January 2004, 43(6.3%) ipsilateral neck femur and diaphyseal fracture were observed in which 32 were men and 11 women. The average age was 43.2 ± 9.4 (range 29-55) years[10].Another descriptive cross-sectional study done at Mulago hospital in Uganda showed an average age of 24 years with ipsilateral femoral neck and diaphyseal fracture and all were males[12].

Mechanism of injury

Ipsilateral femoral neck and diaphyseal femur fractures usually occur as a result of high-energy trauma in young adult. The common injury mechanism are fall from height, motor vehicle accidents, pedestrians struck by motor vehicles[8,9]. In 1958,Ritchey et all noted front-seat passengers sustain comminuted midshaft femur fracture caused by axial load in motor-vehicle collision and when the hip is abducted during the axial load acetabular fracture or femoral neck fracture may occur[8].

The femoral diaphyseal fracture is frequently comminuted as a result of the high-energy trauma. The femoral neck fracture is commonly basilar in location, vertical in orientation, and minimally displaced or non-displaced. It has been postulated that the femoral diaphyseal

absorbs most of the injury energy as demonstrated by the shaft comminution, decreasing the amount of force transmitted across the femoral neck, as demonstrated by the frequent lack of femoral neck displacement[8].

Proportion of ipsilateral neck of femur fracture

Before 1974, 41.7% of ipsilateral neck of femur fractures with femoral diaphyseal fractures were initially undiagnosed[13]. After awareness of the combined injury, improved radiographic assessment, and the implementation of standardized protocols it has led to decrease the number of unrecognized cases of ipsilateral neck of femoral fracture in patients with femoral shaft fractures[9].

Ipsilateral neck of femur fractures with associated femur shaft fractures are rare with incidence of between 1 and 9%[7,8,13]. A significant percentage of femoral neck fractures are minimally or non-displaced[4].

Femoral neck fractures are commonly missed initially and discovered during and after surgery, the rate varies between 19 and 50%[1,10,12,14,15]. A rise of this combination of injuries has been attributed to the increase in high velocity trauma, a shift toward smaller motor vehicles with dashboards located at the knee level resulting in a directional force necessary to produce this combine femoral fracture pattern[4,5].

After diagnosing femur diaphyseal fracture, dedicated radiological x-rays of the hip should be taken, including Anteroposterior (AP) and lateral of the hip and AP pelvis to evaluate the ipsilateral femoral neck fracture. Intraoperative fluoroscopy should also be used to evaluate the hip for femoral neck fracture and control radiological images after diaphyseal femoral fracture fixation[1,3].

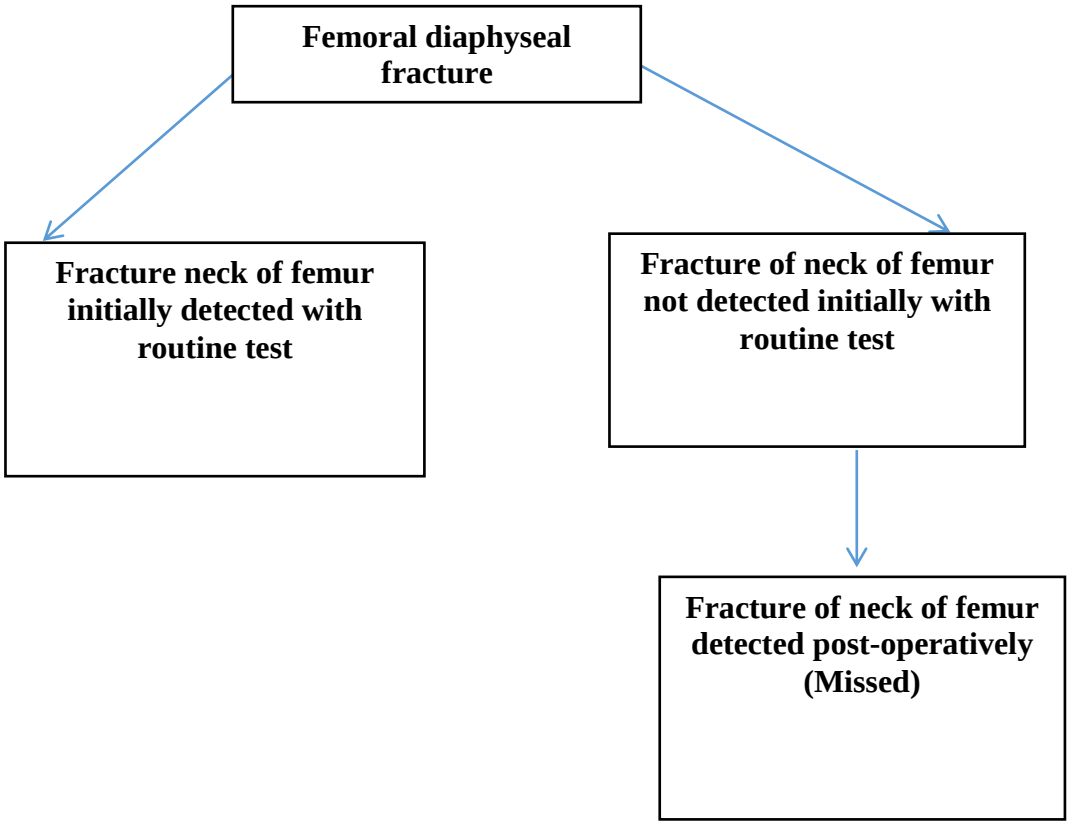
Proportion of missed ipsilateral neck of femur fracture

The proportion of missed diagnosis depended on the diagnostic routine of the hospital and on the type of fracture[4]. The rate was low in hospitals where routine included the hip radiographic study of every femoral shaft fracture[4,17].The proportion of missed primary

diagnosis with a delay from one to several months has been around 30%[4].Despite of good-quality hip and pelvic radiographs and pelvic CT scan, ipsilateral femoral neck and diaphyseal fractures were still missed preoperative[17].Reducing the frequency of missed diagnosis of ipsilateral neck of femur fracture is dependent upon maintaining a high index of suspicion in all femoral shaft fractures resulting from high-energy mechanism[5].

To minimize the incidence of missed femoral neck fractures in association with femoral diaphyseal fracture additional radiological evaluation should be considered including internal rotation plain radiograph of the hip, thin cut computed tomography(CT)scan of the femoral neck, intraoperative fluoroscopic of the neck of femur after stabilization[8].However there is still a 4.9% rate of missed diagnosis [5].

1.3 Conceptual Frame Work



The main independent variable of this study was femoral diaphyseal fracture, which contributed to ipsilateral femoral neck fracture. The detection of the ipsilateral femoral neck fracture will depend on the degree of displacement of ipsilateral femoral neck fracture on the initial routine test.

1.4 Problem Statement

Currently there is more than 500 patients with femoral diaphyseal fractures admitted at Muhimbili Orthopaedic Institute (MOI). Femoral diaphyseal fracture is a high energy trauma and is often associated with ipsilateral femoral fractures. Most are motorcyclist related trauma and it's the major cause of mortality and morbidity in young productive age in developing world. Unfortunately, there is inadequate data to show the concomitant of ipsilateral femoral neck and femoral diaphyseal fractures. Despite thorough clinical radiological investigation done on all femoral diaphyseal fracture admitted at MOI.

1.5 Rationale

There is no published study or previous study done at Muhimbili Orthopaedic Institute (MOI) on magnitude of ipsilateral femoral neck and diaphyseal fracture despite the increase in number femoral diaphyseal fracture.

The purpose of this study was to determine the proportion of the ipsilateral femoral neck fracture, proportion of missed ipsilateral femoral neck fracture, and mechanism of injury of ipsilateral femoral neck with concurrent diaphyseal femoral fracture admitted at MOI.

The information will be useful in developing a protocol for management of ipsilateral femoral neck and diaphyseal fracture and determining the outcome of patients admitted at MOI

The information will help other authors to look deep into complication on early and late treatment of these fractures.

1.6 Research Questions

1. What proportion of diaphyseal femoral fractures have ipsilateral femoral neck fractures?
2. What proportion of ipsilateral femoral neck fractures are missed in the initial assessment prior to definitive treatment for diaphyseal femur shaft fractures?

1.7 Objective of the Study

1.7.1 Broad Objective

To determine the proportion of ipsilateral neck of femur fractures in patients with diaphyseal fractures who are attended at Muhimbili Orthopaedic Institute (MOI), Dar es salaam, Tanzania

1.7.2 Specific Objectives

1. To determine proportion of ipsilateral neck femur with shaft fractures among patients admitted at MOI
2. To ascertain the proportion of missed ipsilateral neck of femur fractures in patients with diaphyseal fractures admitted at MOI
3. To establish the mechanism of injuries in ipsilateral neck of femur fractures among patients admitted with diaphyseal femur fractures at MOI

CHAPTER TWO

2.0 METHODOLOGY

2.1 Study design

The study was a Descriptive Cross-Sectional Study.

2.2 Study Area

The study was conducted at Muhimbili Orthopaedic Institute (MOI). Located in Dar Es Salaam, Tanzania. MOI has a bed capacity of 270 beds, 9 operating theatres and 38 Orthopaedic surgeons. Its only tertiary hospital offering specialized Orthopaedic, trauma and Neurosurgical Care in Dar es Salaam, neighboring regions (Pwani, Morogoro and Tanga) and the main referral center in the Country. These patients are either referred from regional hospitals or self-referred.

2.3 Study period

The study was conducted from September 2018 to April 2019.

2.4 Study population

The study population involved patients aged 18 years and above who had sustained open or closed femur shaft fracture admitted at MOI.

2.4.1 Inclusion criteria

Patients aged 18 years and above who had clinical radiological fracture of femur diaphyseal admitted at MOI and who had consented to participate in the research.

2.4.2 Exclusion Criteria

Pathological diaphyseal fractures

Patients who had femoral re fracture

Patients who had severe Traumatic brain Injury that could not consent

2.5 Sample Size Estimation

From a pilot study at MOI from March to April 2017 the prevalence of diaphyseal femoral fracture was found to be 7%. Considering the study power of 95%, a random likely error is estimated to be 5%, thus the sample size of this study was calculated from the formula:

$$n = \frac{Z^2 \times p(100-p)}{\varepsilon^2}$$

Where: n is the sample size

p is the prevalence which is 7%

ε is the margin of error which is 5%

At 95% Confidence Interval (CI), z = 1.96

Therefore, n=100

Therefore, the sample size in this study was 101 patients.

2.6 Sampling technique

Convenience sampling was used to all those patients who had femoral shaft fracture attended at MOI and met inclusion criteria.

2.7 Data collection Tools

Structured questionnaire was used.

2.8 Data collection process

Patients with femoral fractures who were admitted at MOI were assessed and evaluated according to standard protocol of ATLS guideline. Those who met inclusion criteria were enroll into structured questionnaire after consenting. Demographic information, etiology of the injury and side of the thigh involved were entered into a structured questionnaire. Physical examination of the patients was carried out and side of the thigh involved in trauma and associated injuries were recorded. Radiological x-ray of the diaphyseal femur (anteroposterior

and lateral) views, Hip (anteroposterior and Lateral) and Pelvis (anteroposterior) were taken. Radiological images were interpreted with the help of radiologist for fracture of the neck and diaphyseal femur. After radiological interpretations, diaphyseal femur and femoral neck fractures were classified according to AO and Garden classification respectively. Repeated radiological x-rays were taken after diaphyseal femur fracture fixation and interpreted for any missed femoral neck fracture preoperative.

2.10 Data management and analysis

Data obtained were analyzed by using statistical software (SPSS version 24). Continuous variables like age of the patients were summarized by using mean & standard deviation and comparisons of their means were done using student t- test. Categorical variables such as sex, mechanism of injury, category of patient during Road traffic accident, type of fracture classification by AO, neck of femur fracture classification was summarized by using frequency tables and comparisons done using the Chi square test. The level of significance was set at 5%, where a variable with P-value of equal or less than 0.05 was considered to be statistically significant.

The independent variables in this study included demographics such as age and sex. Femoral diaphyseal fracture and mechanism of injury contributed to independent variables but also characteristics of the injury like pattern of femoral diaphyseal fracture was included in the independent variable. The independent variable is ipsilateral femoral neck fracture.

2.11 Ethical Considerations

The Muhimbili University of Health and Allied Sciences Ethical Clearance Board cleared the study before the study was conducted. Written informed consent was obtained from all participants after being informed of the purpose of the study. Confidentiality of their information was assured and used as intended. Refusal to participate didn’t affect patient management.

CHAPTER THREE

3.0 RESULTS

3.1 Social demographic characteristics

A total of 101 patients with diaphyseal of femur fracture were enrolled in the study whom males were 82 (81%) and females 19 (19%).

The average age of all 101 patients with ipsilateral femoral neck and diaphyseal fracture was 33±12 years (Range 18-71). All femoral shaft fractures were distributed across all ages but 71% were between the ages of 21-40. Figure 1.

Right thing injury was most involved in 55.4% of combination of ipsilateral femoral neck and diaphyseal fractures. The study also showed 18% had associated long bone fractures and 12% had traumatic brain injuries.

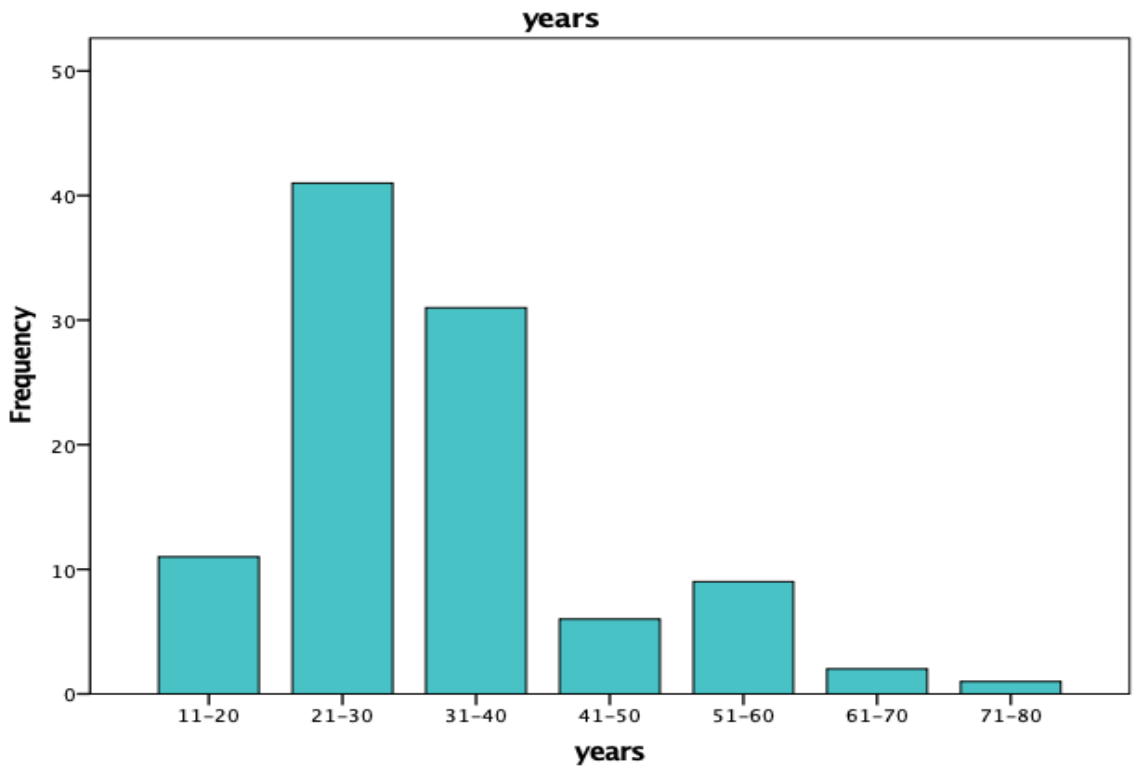


Figure 1: Age distribution patients with femur fracture

3.2 Proportion of ipsilateral femoral neck fractures among patients with femoral shaft fractures

Among all 101femoral shaft fractures that were recruited at MOI, 11 patients had ipsilateral femoral neck and shaft which makes the proportion to be 10.9%. Eight of the Eleven ipsilateral femoral neck fracture were displaced and 45.55% had transverse diaphyseal femoral fracture OTA 32A3.

3.3 Proportion of missed ipsilateral femoral neck and shaft fractures

For those who were not diagnosed with ipsilateral femoral neck fracture preoperative they underwent postoperative radiological images in which only 1(1%) of all diaphyseal femoral fractures was missed and it was no displaced, Garden I. (illustrative picture below)



3.4 Mechanism of injuries in ipsilateral femoral neck and shaft

Motor traffic crash was the leading cause of femoral diaphyseal fracture in 92.1% followed by falls from heights 6%. Five (46%) of all ipsilateral femoral neck and diaphyseal fracture were passenger in motor cycle or motor vehicle followed by pedestrian.

CHAPTER FOUR

4.0 DISCUSSION

Due to increase of motorcycle in the country and reckless riding and driving by young male citizen in poor infrastructures, there has been an increase in motor traffic crush among these young adults[18]. In this study Male and young adult between the age of 21-40 years with average of 33.2 years have been succumb to sustain combination of femoral neck and diaphyseal femur fractures. This is similar to several authors done elsewhere[1,4]. This might be explained by; young men tend to be moving from one place to another to for business and are the most risk takers in their daily activities[18]. Therefore, they are more prone to high energy injuries.

Ipsilateral femoral neck and diaphyseal fracture occur in 2% to 9% of all diaphyseal femoral fracture and most of them being young adult[1,3,4,19]. Though the incidence of ipsilateral femoral neck and diaphyseal fracture is on the rise due to fast moving automobile(20),[21]. This is mostly due to these patients at time of injury had flexed their hip and knee which is the point of directional force toward the hip during collision on the dashboard leading to this combination of fracture and minimal displacement of femoral neck. This has been observed in this study where 72% of all ipsilateral femoral neck fracture were nondisplaced (Garden I and II) similar to study done at University of California[22]. This is due to residual energy absorbed by femoral neck during impaction[20]. In our study, the proportion of ipsilateral femoral neck and diaphyseal fracture was 10.9% than in literature. This is significant high compared to different studies[1,4], and might be explained by different reasons; Muhimbili Orthopaedic institute (MOI) receives patients from every part of the country and most of them are due to high energy trauma. The other reason might be reckless driving by these young adults in a poor road[18]. Also, government not putting more emphasis on educating this group of people on safety measures.

Tornetta et all estimated that 20-30% of combination of ipsilateral femoral neck and diaphyseal fracture are missed in initial assessment due to un-displaced femoral neck fracture. Missed ipsilateral femoral neck fractures were due to patients presenting with multiple trauma injuries, patients not reporting hip pain and radiological images were taken in external rotated affected limb[(1)]. Ipsilateral femoral neck and diaphyseal fractures can be easily missed if antero-posterior Pelvis is not taken[(2)]. This study found that, at MOI missed ipsilateral femoral neck and diaphyseal fracture was found in one patient (1%) of all diaphyseal femoral fractures admitted. This prevalence is low compared to literature[(4,23)] **.**The use of supplementary views has been shown to decrease the incidence of missed diagnosis of ipsilateral femoral neck on initial investigation when using radiological x-ray alone but that has not been enough. The incidence of missed ipsilateral femoral neck fractures in other authors have been found high probable because of using different combination methods like thin cut CT scan of the hip, post fixation of femur fracture fluoroscopy and postoperative radiological x-rays. Dencker et a al observed missed ipsilateral femoral neck and diaphyseal fracture was low in hospital with routine included anteroposterior Pelvis x-ray for every femoral fractures[(16)]. In our institution (MOI), every patient with diaphyseal femur fracture, hip and pelvis x-ray are always included. This might be the reason for low proportion of ipsilateral femoral neck and diaphyseal fracture. Despite several authors advocating using of CT scan to evaluate for ipsilateral femoral neck fracture, O'Toole et al did comparison between the CT and plain radiograph and found the rate of missed ipsilateral femoral neck was similar[(23)]. Only the dedicated images of anteroposterior and lateral hip, AP pelvis, intraoperative image intensifier and control post-operative radiological x-ray have shown to decrease the incidence[(1,23)].

Mechanism of injury in patients with ipsilateral femoral neck and diaphyseal fracture are most due to high velocity trauma[(4,9)]. In car drivers and front seater passengers with abducted hips and flexed knee, the impact exert longitudinal compression force to the femur and buckle or bend[(24)]. The major cause of our cases was motor traffic crush. Five (46 %) were passengers in motorcycle or car. Ipsilateral femoral neck and diaphyseal fracture was associated with other extremities injury especially of the lower limb around the knee. This shows that point of impact could determine the occurrence of ipsilateral femoral neck.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The prevalence of combined ipsilateral femoral neck and diaphyseal fracture have been thought to be rare despite of its morbidity and mortality in young adult but it's on rising due to increase in automobile in developing countries, poor infrastructures, and reckless driving. Despite low prevalence of ipsilateral femoral neck fracture in this study, this might not reflect the actual picture because of using only one method of investigation postoperative, i.e. radiological images which is difficult to detect occult ipsilateral femoral neck.

5.2 Recommendations

Ipsilateral femoral neck and diaphyseal fracture should be suspected in all patients sustaining diaphyseal femoral fracture. Additional radiological images like image intensifier and CT scan should be added to in order to detect occult ipsilateral femoral neck and diaphyseal fracture. A similar study should be done of longer duration so have to more power of the proportion of the study.

5.3 Study limitations and migration

The anticipated limitations to this study are time constraint. Time constraints was mitigated by staying connected with every Doctor on call Emergency Medical Department (EMD) who informed me any patients with diaphyseal femur and therefore captured every eligible case during the limited duration.

There was no published data on the local situation, hence sample size was calculated using pilot study, and this might not be entirely representative.

As part of limitation of a cross sectional study, it was difficult to determine the sequence of outcome and exposure.

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APPENDICES

Appendix I: Consent Form (English Version)

Study Title: PREVALENCE OF IPSILATERAL NECK OF FEMUR FRACTURES AMONG PATIENTS WITH DIAPHYSEAL FEMORAL FRACTURE WHO ARE ADMITTED AT MUHIMBILI ORTHOPAEDIC INSTITUTE

Introduction

My name is Dr. Mlay, Evarist Emmanuel, MMed. Student at MUHAS, department of Orthopaedic and Traumatology I am conducting a study on diaphyseal femoral fracture with ipsilateral neck fractures among orthopedic trauma patients admitted at MUHIMBILI ORTHOPAEDIC INSTITUTE.

Purpose of the study

The proposed study will help in identify the magnitude of ipsilateral neck of femur fracture with diaphyseal femoral fracture and the frequency of delayed diagnosis of ipsilateral femoral fracture with diaphyseal femoral fracture. The findings will assist in making appropriate recommendations on how to improve health care provision in management of femoral shaft fractures with ipsilateral neck of femur at MOI.

Purpose of the study

This information might be of help to establish main stay of treatment of femoral shaft fractures with ipsilateral neck of femur among patients at MOI, identify the limitations which can be improved in order to improve health care provision in management of femoral shaft fractures with ipsilateral neck of femur at MOI. The information obtained is also important for the attainment of MMed degree in Orthopaedic surgery for the principal investigator.

Study procedures

The main information required from you, is your social demographic, place of residence, Date of injury, mechanism of injury and side of the thigh involved in trauma.

Risks and benefits to the participant

No risks are directly related to the study because management is as usual. The benefits will be participation in a study that will result in better management, early detection and treatment of ipsilateral neck of femur at MOI.

Confidentiality

The data collection sheet is strictly confidential. Your name will not appear in it and your telephone number is strictly for follow up purposes.

Participant information

Your participation in this study is voluntary and failure to participate or withdrawal from the study will not affect your management in any way at any stage.

Contacts and Questions

The researcher conducting this study is Dr. Mlay, Evarist Emmanuel

Can be reached by email: beemlay@gmail.com

Mobile number: 0717-345494

If you have any questions or concerns regarding the study and would like to talk to someone other than the researcher, you are encouraged to contact Dr. Bruno Sunguya, the Chairman of the University Senate research and publications, MUHAS P.O.BOX 65001, Dar es Salaam. Telephone (+255) 222-152-489)

Part B

Participant consent form

I have understood the above information that has been fully explained to me by the investigator and I voluntarily consent to participate.

Signature……

Or participants thumb print.

Date……

Witness signature……

Appendix II: Consent Form (Swahili Version)

Study title: PREVALENCE OF IPSILATERAL NECK OF FEMUR FRACTURES AMONG PATIENTS WITH DIAPHYSEAL FEMORAL FRACTURE WHO ARE ADMITTED AT MUHIMBILI ORTHOPAEDIC INSTITUTE

Idhini ya Kushiriki:

Sehemu A:

Utambulisho

Mimi ni Dr. Mlay, Evarist Emmanuel, Mwanafunzi wa Chuo kikuu cha Afya cha Muhimbili (MUHAS) Idara ya Mifupa na Ajali. Nachukua shahada ya uzamili ya Tiba (MMED) ninafanya utafiti juu ya kuvunjika kwa shingo ya mfupa wa paja sambamba na mvunjiko wa katikati wa mfupa wa paja.

Hivyo unakaribishwa ushiriki kwenye utafiti huu ambao unaangazia kuvunjika kwa shingo ya mfupa wa paja sambamba na mvunjiko wa katikati wa mfupa wa paja. Tafadhali soma maswali vizuri uyaelewe kabla hujaya jibu.

Dhumuni la Utafiti

Dhumuni la utafiti huu ni kukusanya taarifa muhimu ili kutafuta njia bora za kugundua mapema wagonjwa waliopata mvunjiko wa shingo ya mfupa wa paja sambasamba na mvunjiko wa katikati wa mfupa wa paja.

Aidha taarifa hizi zitamsadia mtafiti kuhitimu shahada yake ya uzamivu ya tiba katika upasuaji wa mifupa.

Taratibu za Utafiti

Taarifa muhimu zinazohitajika kutoka kwako zitaingizwa kwenye fomu maalum ya kukusanyia taarifa. Taarifa hizo zinahusu i kuvunjika kwa shingo ya mfupa wa paja sambamba na mvunjiko wa katikati wa mfupa wa paja.

Athari na Faida za Kushiriki kwenye Utafiti

Hakuna athari zozote zinazoweza kujitokeza. Vile vile kwa kushiriki kwenye utafiti huu utafaidisha utakufaidisha katika matibabu yako pamoja na hospitali kwa ujumla kuandaa sera sahihi ya kuwahudumia wenye kuvunjika kwa shingo ya mfupa wa paja sambamba na mvunjiko wa katikati wa mfupa wa paja.

Siri

Taarifa zote zitakazo kusanywa zinatajazwa kwenye fomu maalum na zitakua siri, Jina lako au namba yako ya simu zitatumika kwa madhumuni ya matibabu na kufuatilia maendeleo yako.

Taarifa za Mshiriki

Ushiriki wako kwenye utafiti huu ni wa hiari, unaweza kushiriki au kutoshiriki , Aidha unaweza kujiondoa kushiriki na hautaathiri matibabu yako

Sehemu B

Kiapo cha ridhaa ya Kusiriki

Nimesoma na kuelewa taarifa zilizotolewa hapo juu kama zilivyo fafanuliwa na mtafiti na kwa ridhaa yangu mwenyewe nimeamua kushiriki.

Sahihi……

Au alama ya dole gumba

Tarehe……

Sahihi ya Shahidi……

Appendix III: Questionnaire

PREVALENCE OF IPSILATERAL NECK OF FEMUR FRACTURES AMONG PATIENTS WITH DIAPHYSEAL FEMORAL FRACTURE WHO ARE ADMITTED AT MUHIMBILI ORTHOPAEDIC INSTITUTE

1) Questionnaire number: ……
2) Registration NO. ……
3) Age:……..
4) Sex: a) Male…… b) Female…….
5) Place of residency: …… Phone no: ……
6) Date of injury: ……
7) Date of admission.....
8) Mechanism of injury
    a) Motor Traffic Crash…
    b) Ballistic injury…
    c) Farmyard injury….
    d) Falling from height…
    e) Sports injury…
    f) Assault…
    g) Industrial…….
    h) Trivial Injury…….
    i) Others: specify……..

9) Category of patient during RTA
    a) Pedestrian……
    b) Passenger……
    c) Driver/rider……
    d) Motorcyclist ……..

10) Side involved
    a) Right thigh……
    b) Left thigh ……
11) Classification
    a) Proximal femur…
    b) Middle femur…
    c) Distal femur…
12) Associated injuries……
13) AO Classification
    a) 32-A1 … b) 32-A2…. c) 32-A3… d) 32-B1… e) 32-B2… f) 32-B3…. g) 32-C1…. h)32-C2 f) 32-C3…
14) Winquist and Hansen classification
    a) Type I… b) II… c) III… d) IV…
15) Preoperative Radiological Assessment Ipsilateral Neck of femur with shaft fracture
    a) Present ipsilateral neck of femur fracture…
    b) Absent ipsilateral neck of femur fracture…
16) Garden Classification
    a) Type I b) Type II c) Type III d) Type IV

17) Postoperative Radiological Assessment Ipsilateral Neck of femur with shaft fracture in Internal Rotation limb(if Neck of femur Absent in preoperative)
    a) Present of ipsilateral neck of femur fracture…
    b) Absent of ipsilateral neck of femur fracture…
18) Garden Classification
    a) Type I.. b) Type II.. c) Type III.. d) Type IV..