Profile and treatment outcomes of lower urinary tract injuries in patients with pelvic trauma at Muhimbili National Hospital and Muhimbili Orthopaedic Institute

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PROFILE AND TREATMENT OUTCOMES OF LOWER URINARY TRACT INJURIES IN PATIENTS WITH PELVIC TRAUMA AT MUHIMBILI NATIONAL HOSPITAL ANDMUHIMBILI ORTHOPAEDIC INSTITUTE

By

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A Dissertation Submitted in Partial Fulfilment of the Requirements for the Degree of Master Medicine in Urology of

Muhimbili University of Health and Allied Sciences
October, 2018.

CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance of dissertation entitled"***Profile and Treatment Outcomes of Lower Urinary Tract Injuries in Patients with Pelvic Trauma at Muhimbili National Hospital and Muhimbili Orthopedic Institute****"* in partial fulfillment of the requirements for the degree of Master of Medicine in Urology of Muhimbili University of Health and Allied Sciences.

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Prof. Charles Mkony

(Supervisor)

Date_____.

DECLARATION AND COPYRIGHT

I, **SAID Ibrahim**, 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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DEDICATION

I would like to dedicate this research to beloved mother Asma Mohamed Msuo.

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ABSTRACT

Background

Lower urinary tract injuries are common in pelvic trauma cases and they are highly associated with high morbidity and even mortality. There is no data regarding lower urinary tract injuries associated with pelvic trauma in Tanzania. This study described experiences in the management and outcome of lower urinary tract injuries following pelvic trauma in our local setting. In some occasions symptoms of LUT injuries are overlooked in patients with concomitant pelvic trauma which leads to severe complications.

Various complications are seen, associated with lower urinary tract injuries in patients with pelvic trauma in our setting. Different treatment modalities have been used with different outcomes Patients tend to present late, required intervention is often delayed, which contribute to adverse outcome.

Objective

The objective of this study was to determine the proportion of lower urinary tract injuries among pelvic trauma patients and their treatment outcomes at MNH and MOI between April 2017 May 2018.

Method

This was a prospective hospital based study conducted for a period of 14 months at MNH and MOI on patients having lower urinary tract injuries among patients with pelvic trauma. Data collected direct from patients, through history taking and physical examination, as well as from intraoperative findings were used to form data set. Also notes from patients' files and computer database on out-patient follow up visits were used to record patient's particulars, clinical presentation, type of treatment received, and their complications. Data entry and analysis were done by SPSS computer program.

Results

In this study 724 patients with pelvic trauma were identified within the study period, out of those 54 patients with LUT injuries were studied, it has been seen that among the pelvic trauma patients with LUT injuries the majority were males 40 (74.1%) while females were 14 (25.9%). Out of 40 males 29 (72.5%) had bladder injury while 7 (17.5%)patients had urethral injury and 4 (10.0%) had combined bladder and urethral injury. Out of 14 female subjects, 10 (71.4%) had bladder injury, 2(14.3%) had urethral injury and 2 (14.3%) had combined bladder and urethral injury.

The proportion of bladder and urethral injuries for men was4.0% and 0.97% respectively, and in women was 1.4% and 0.28%, respectively. And proportions of combined injuries in men were0.55% and in women was 0.28%.

Following LUT injuries in the study hematuria was the commonest clinical feature of LUT injury in the study sample which accounts for 98.1%, followed by abdominal pain, 87.0%, painful micturition,72.3%, where difficulty in passing urine occurred in 46.3%, and blood per urethral meatus in 29.6%.

Twenty-four (54.5%) patients of bladder injuries were managed conservatively, while20 (45.5%) cases were managed surgically. Twelve (80.0%) cases of urethral injury were treated conservatively with urethral catheter or SPC catheter while only 3 (20.0%) cases were treated surgically.

Conclusion

Due to the above findings having pelvic trauma is a predisposing factor to lower urinary tract injuries including bladder and urethral injuries or both, of which bladder injuries are the commonest. Males are more commonly affected than females. Gross hematuria is the commonest clinical presenting symptom of LUT injuries in pelvic trauma patients which gives an alarming sign of LUT injury in a setting of pelvic trauma so that further evaluation of lower urinary tract is to be done, and appropriate measures will be taken. Other symptoms include abdominal pain, painful micturition and blood per urethra.

Bladder injury treatment for contusion and extraperitoneal raptured is mainly conservative, which is safe with minimal complications, done by ensuring continuous bladder drainage with urethral catheter, but for intraperitoneal bladder rapture,surgical treatment is safer.

For urethral injuries conservative management is the standard primary treatment with fewer complications, done by performing SPC and catheterization while urethroplasty is to be done later if the patient develops urethral stricture.

Recommendations

In every pelvic trauma patient Lower Urinary tract should be well evaluated for injuries, common clinical symptoms should be thoroughly assessed including gross hematuria, abdominal pain, blood per urethra and difficulty or inability to urinate.

ABBREVIATIONS

AAST	American Association for the Surgery of Trauma
ATLS	Advance Trauma Life Support
CT	Computed Tomography
EP	Extra peritoneal
GUI	Genitourinary injuries
IP	Intraperitoneal
LUT	Lower Urinary Tract
MOI	Muhimbili Orthopedic Institute
MUHAS	Muhimbili University of Health and Allied Sciences
RBC	Red Blood Cells
SPC	Suprapubiccystostomy
SPSS	Statistical Program of Social Sciences

CHAPTER ONE

INTRODUCTION

1.1BACKGROUND

Lower urinary tract injuries are not uncommon in pelvic trauma cases and they are highly associated with high morbidity and even mortality. In a study done by Kyukyu in Japan, the records of 500 patients with pelvic fractures admitted to critical and emergency center from November 1, 1980 to December 31, 1993 were reviewed. Of 500 patients with pelvic fractures 18 (3.6%) had lower urinary tract injuries. On the other hand, the incidence of pelvic fracture in 50 patients with lower urinary tract injuries was 36.0% during the same period[1]

There is shortage of data regarding lower urinary tract injuries associated with pelvic trauma in Tanzania, and M.N.H and MOI in particular.

The incidence of lower urinary tract injuries varies from 0.5% to10% in different studies. The most important determinant of outcome of LUT injuries is the interval between the injury and repair, the longer the interval, the worse the outcome.[1,2,3]

The management of lower urinary tract injuries in our local hospitals particularly MNH and MOI pose major challenges to general practitioners practicing in above mentioned hospitals,where most lower urinary tract injuries after pelvic trauma are diagnosed late when the patient starts having urine leakage, sepsis and peritonitis, abscess, urinoma, and potential reabsorption of electrolytes across the peritoneum and sometimes having urinary fistula (vesicovaginal, vesicocutaneous). Lack of advanced diagnostic and therapeutic facilities is the major challenge of the condition management in developing countries.

Early recognition of the LUT injuries in terms of their symptoms and signs in a setting of pelvic trauma would prompt early evaluation and hence early interventions so that can reduce the morbidity and mortality.

This study describes and evaluates the common clinical features of LUT injuries and their complications, treatment modalities and their outcome after treatment.

1.2 LITERATURE REVIEW

1.2.1 Lower urinary tract injuries

Generally lower urinary tract (LUT) includes urinary bladder and urethra, the two are at great risk once blunt or penetrating pelvic trauma occurs since the two structures are well protected by the bony pelvis.

In a study done by Bjurlin, Marc and his colleagues, of the 31,380 patients with pelvic fractures, 1,444 had Genital-urinary injuries (GUI). Men more commonly sustained pelvic fractures with GUI than women (66.14% vs. 33.86%). The incidence of bladder and urethral injuries for men and 3.41% and1.54%, and for women was 3.37%, 0.15% [2]

The mortality related bladder trauma can be as high as 34% and is largely a consequence of associated injuries rather than bladder perforation.[3] Majority of the urethra injuries are associated with pelvic fracture. The incidence of male urethral injuries occurring with pelvic trauma ranges between 4% and 19% and up to 6% in women.[3]

Andrich and colleagues have recently suggested that pelvic fracture mechanisms play a much larger role in the mechanism of urethral injuries than previously thought.Correlations between pelvic fracture type and urethral injury have been observed. The risk of urethral trauma increases with the number of pubic rami fractured, involvement of the sacroiliac joint, and degree of inferomedial pubic rami displacement. In particular, straddle fractures combined with sacroiliac joint disruption have shown an odds ratio seven times higher than that of straddle or Malgaigne fractures alone.[4]

Aihara and colleagues showed that symphysis diastasis and inferior pubic rami fractures were independent predictors of urethral injury[5]. Much of the literature is retrospective and numbers are small, but the correlation between anterior arch fractures and urethral injuries is seen in all studies.

The female urethra consists of the posterior urethra only. It is rarely injured due to blunt trauma alone and is usually associated with pelvic fracture. Blood at the vaginal introitus is seen in more than 80% of women with urethral trauma and concomitant pelvic ring disruption[6]

Pelvic fractures from blunt force trauma place the bladder and urethra at risk for injury, often resulting in significant complications.

1.2.2 Clinical presentations of LUT injuries

Gross hematuria is the most common sign associated with bladder rupture. It has been reported in almost all bladder injuries and its presence in conjunction with pelvic trauma is a well-documented predictor of injury. Symptoms include blood in urine, inability to pass urine, abdominal pain, and blood per urethral meatus. Signs include abdominal or suprapubic tenderness, signs of shock and abdominal distension and the laboratory finding include microscopic hematuria (5% of patients) [8]

Blood at the meatus is seen in 37% to 93% of posterior urethral tears and in 75% of anterior urethral tears. Hematuria, the inability to pass urine, and dysuria may be present; however, the amount of hematuria correlates poorly to the severity of injury as complete rupture can mean minimal bleeding and small partial tears can result in heavy bleeding [9,10]

1.2.3 Diagnosis of lower urinary tract injuries

Avey and colleagues noted that, in 687 patients with pelvic fracture and no bladder injury, only 196 (27.1%) of them had negative urinalysis results[10.] The presence of gross hematuria without pelvic fracture has been investigated by Fuhrman and colleagues, who prospectively showed that no bladder injuries were found in all 25 patients that were imaged[12.] However, if 25% of IP ruptures occur without pelvic fracture, the use of cystography in these patients when clinical suspicion is high is appropriate.

1.2.4 Complications of LUT injuries

As suggested by the study done by Flancbaum et al, delayed diagnosis of bladder trauma can lead to severe consequences, which are largely related to urine leakage and include sepsis and peritonitis, abscess, urinoma, and potential reabsorption of electrolytes across the peritoneum. Urinary fistula (vesicovaginal, vesicocutaneous) can develop if persistent defects are not repaired. When treated appropriately, bladder trauma has an excellent prognosis[.13]

Strictures developed in 49% of the early realignment group for those who get urethral trauma and in 100% of the suprapubic tube group. Impotence (33.6%) and incontinence (17.7%) were less frequent in the early realignment group than in the delayed reconstruction group (42.1% and 24.9%, respectively)[14]

1.2.5 Treatment of LUT injuries

Historically, all bladder ruptures were managed by operative primary repair. Currently, many EP injuries can be managed successfully with a conservative strategy [(15).] Simple catheter drainage (urethral or suprapubic) followed by a cystogram after 10 days is successful in the majority of cases, with almost all ruptures healed by 3 weeks. Trauma victims who require emergency laparotomy for associated injuries may undergo primary repair of large or complex EP ruptures at the same time.

Inaba and colleagues suggested that IP ruptures can lead to sepsis and carry a higher mortality than EP injuries. They tend to be large, > 5 cm, and occur most commonly at the dome of the bladder. All of these injuries should be treated with prompt surgical exploration through a midline laparotomy incision and associated abdominal injuries should be excluded.[15]

The aim of treatment in urethral trauma is to maintain continence and potency and to reduce the occurrence of strictures. Victims do not die of urethral trauma alone, but closely related pelvic ring disruption and multiple organ injury occur in 27% of patients).

Primary treatment of these patients is in accordance with ATLS guidelines, where life-threatening injuries are assessed and managed first. Urinary diversion is the first step in the management of these injuries.[17]

Although in some good centers they prefer to do primary realignment endoscopically which is highly demanding in terms of equipment and expertise, but still the outcome is not good, in one study done by Leddy and colleagues in 2012 on endoscopic realignment of pelvic fracture urethral injury.[19]

In a study done by Barratt and his colleagues pelvic fracture urethral injury in males-mechanisms of injury, management options and outcomes, they found that **t**he outcomes of; suprapubic catheter (SPC) insertion alone, primary open surgical repair (POSR), delayed primary open surgical repair (DPOSR), primary open realignment (POR), primary endoscopic realignment (PER), delayed endoscopic treatment (DET) and delayed urethroplasty (DU) in male adults and children in all major series have been reviewed and collated for rates of restricture (RS), erectile dysfunction (ED) and urinary incontinence (UI). For SPC, Primary Open Surgical Repair, Delayed Posterior Open Surgical Repair, Primary Open Realignment, Primary Endoscopic Realignment, Delayed Endoscopic Treatment and Delayed Urethroplasty; (I) mean RS rate was 97.9%, 53.9%, 18%, 58.3%, 62.0%, 80.2%, 14.4% [22]

1.3PROBLEM STATEMENT

Lower urinary tract injuries have been documented in both developing and developed countries. They cause significant morbidity, which affect the quality of life of given patients which can led to mortality.

Motor traffic accidents have now been increased in numbers, causing an increase in cases of pelvic trauma associated with lower urinary tract injuries. Various complications are currently seen, associated with treatment of lower urinary tract injuries in patients with pelvic trauma in our settings.

Delaying in treatment may occur in those patients who require immediate surgery, or delayed referrals, which leads poor treatment outcome.

No study has been done in Tanzania especially in our local hospitals on determining the proportion, clinical features, complications, treatment modalities and treatment outcomes of lower urinary tract injuries among patients with pelvic trauma.

1.4 RATIONALE OF THE STUDY

Based on our knowledge there is no available published data showing the proportion of lower urinary tract injuries among pelvic trauma patients.

The study will help in the following aspects;

(i)Promoting early diagnosis of lower urinary tract injuries among pelvic trauma patients, by describing their clinical features, timely and proper intervention and hence reducing the morbidity and mortality.

(ii) Provide evidence based data in our settings for mobilizing resources (human and equipment) for effective care of our patients.

(iii) It will identify issues on LUT injuries which need to be further researched.

1.5 RESEARCH QUESTION

What is the proportion of lower urinary tract injuries in pelvic trauma patients at M.N.H and MOI?

What are the common clinical features and complications of lower urinary tract injuries?

What are the treatment options and treatment outcomes of LUT injuries?

1.6 OBJECTIVES

1.6.1 Broad objective

To determine the profile of lower urinary tract injuries among pelvic trauma patients and their treatment outcomes at Muhimbili National Hospital and Muhimbili Orthopedic Institute between April 2017 May 2018.

1.6.2 Specific Objectives

1. To determine the proportion of Lower Urinary Tract injuries in pelvic trauma patients.
2. To determine common clinical features of LUT injuries among pelvic trauma patients.
3. To determine treatment modalities of LUT injuries among pelvic trauma patients.
4. To determine treatment outcome of LUT injuries in pelvic trauma patients.

CHAPTER TWO

2.0METHODOLOGY

2.1 STUDY DESIGN

This study was a prospective analytical hospital based study that involved all patients of pelvic trauma with concomitant lower urinary tract injury at MNH and MOI from March 2017 April 2018.

2.2 STUDY AREA

The study was conducted at MNH and MOI. The former is the national referral hospitalwhich receives patients from district hospitals in Dar es salaam city i.e. Temeke hospital in Temeke district, Mwananyamala Hospital in Kinondoni district and Amana Hospital in Ilala district, as it also receives patients from nearby regional hospitals along the coast such as Tumbi hospital, Morogoro regional hospital and Tanga and less frequently from up-country regions all over the country.MOI is an independent institution of orthopedics and traumatology located within Muhimbili National Hospital. Bed capacity at MNH is about 1500 beds and that of MOI is around 300 beds.

2.3 STUDY POPULATION

Population included in the study included all patients with pelvic trauma at MNH and MOI within the study period.

2.4 SAMPLING

All patients with lower urinary tract injuries among pelvic trauma patients admitted at MNH and MOI during the study period have been included in the study.

2.5 SAMPLE SIZE

Calculated using a single proportion

Formula $n= \frac{z^2 p (100- P)}{\varepsilon^2}$ Where: n = Minimum sample size

z = the point on standard normal deviation corresponding to 95% Confidence Interval which is 1.96,

p = The proportion of patients having lower urinary tract injury among pelvic trauma patients was 3.6% (Nihon KyukyuZasshi et al) [(1)]

ε = Margin of error set at 5%

$$n = \frac{(1.96)^2 \times 3.6\ (100-3.6)}{5^2} = 53$$

Therefore, from the above formula the required sample size is 53 patients

Adjusting for the non-response rate which is 10%, the minimum sample size will be 58 patients.

2.6 INCLUSIONS

2.6.1 Inclusion criteria

All pelvic trauma patients with concomitant lower urinary tract injuries, either urethral injury or bladder injury or both, male and female of all ages admitted at MNH or MOI within the study period.

2.6.2 Exclusion criteria

Pelvic trauma patients with iatrogenic injuries of the lower urinary tract were excluded. Also this study did not include those patients with lower urinary tract injuries with pelvic trauma who refused to consent after being informed.

2.7 Case definitions

Pelvic trauma patients included were, patients with pelvic ring fracture, acetabulum fracture and avulsions due to penetrating or blunt trauma, or due to pathological fracture in elderly diagnosed clinically and confirmed radiologically.

Lower urinary tract injuries included bladder injuries ranging from bladder contusions to combined extraperitoneal and intraperitoneal bladder injuries.

Urethral injuries include anterior and posterior, partial to complete disruption diagnosed clinically and confirmed radiologically.

2.8 DATA COLLECTION

A well-structured questionnaire was used to collect data from the patients directly through history and physical examination after they signed an informed consent from Emergence medicine department at MNH and MOI. Notes from patients' files and computer database on out-patient follow up visits were used to record patient's particulars, time interval between injury and first medical care, clinical presentations, type of pelvic trauma sustained, type of LUT injury sustained, type of treatment received, and their complications after treatment.

2.9 DATA ANALYSIS

Patients with registration numbers, demographic data, clinical presentation, treatment modalities and their outcomes were analyzed using SPSS program and frequency distribution tables used to determine proportions. Cross tabulation of data used for correlates and inferences for variables and data interpretation.

2.10 STUDY LIMITATIONS

Faced limitations were poor documentations on history taking and physical examination within patient's files and improper record keeping especially on investigation results. This made data collection difficult. Time limit, study duration was too short, especially on follow up of patients for long time complications. Loss of follow up of patients due to miscommunication or death within study period was another limitation.

2.11 ETHICAL ISSUES

The ethical clearance to conduct the study was obtained from MUHAS IRB. Permission was sought from the hospitals ethical clearance committee before the study was carried out. Direct patient identifiers were not collected from patients' case notes, only such information as necessary to carry out the study have been collected. Since the study is a prospective, hospital based one, all patients were required to provide written informed consent for the study. Preliminary information gathered from this study had helped in the management of the patient but the conclusion obtained from this study might not be of help to the patients studied. However, it will help improve management of future patients with LUT injuries and pelvic trauma.

2.12 DISSEMINATION OF FINDINGS

After data collection and analysis, the results are to be disseminated to the Teaching, Research, and Consultancy Coordination Unit of MNH.

The research report will be presented at the Department of surgery/urology and thereafter disseminated to the Dean School of Medicine and to the Director of Postgraduate Studies.

The university and principal author will hold copyright of the research findings.

2.13 DATA MANAGEMENT

The filling of recording tool and the conduct of in-depth interviews were primarily supervised by the Principal Investigator. This was done to ensure that the data collected were accurate and that the responses given were well understood by the interviewer. The filled tools were examined to check for quality of the data collected. The data collected using the aforementioned tools were verified for completeness. For qualitative data, clear data file naming was conducted followed by a data tracking system. Then, the transcription and translation of the data was undertaken while ensuring quality control procedures. Data was stored in different storage systems for backup including soft and hard copies which were well protected using access codes in which only research members and authorized institution have an access.

CHAPTER THREE

3.0 RESULTS

3.1 Characteristics f Study Sample

Table 1 below shows the characteristics of the study sample, showing distribution of sex and their age groups. The study identified 724 pelvic trauma patients within the period of 14 months starting from March 2017 to April 2018 at MNH and MOI and selected 54 patients, who had LUT injuries and studied them. Of 54 patients, 40 (74.9%) were males and 14 (25.1%) were females. The majority were between 21 and 40 years of age (n=23, 43.4%). The minimum age was 9 years and maximum age was 87 years.

3.2 Proportion of Lower Urinary Tract Injuries Among Pelvic Trauma Patients

Of 724 pelvic trauma patients who had pelvic trauma 54 (7.6%) patients with LUT injuries were identified. In Table 2 below,bladder is commoner than urethral injury which accounts for 72.2%, for urethral injury it is 16.7% and 11.1% is for both injuries.

In this study the proportion of bladder injuriesin men was 4.0%, urethrainjuries 0.97% and combined 0.55% (bladder and urethra), and in women was bladder injuries 1.4%, urethral injuries 0.28%,and combined injuries was 0.28%.

Table 1: Type of injury frequency table

			Type of injury			
			Bladder	Urethral	Bladder + Urethra	Total
Sex	Male	Count	29	7	4	40
		% within sex	72.5%	17.5%	10.0%	100.0%
	female	Count	10	2	2	14
		% within sex	71.4%	14.3%	14.3%	100.0%
Total		Count	39	9	6	54
		% (Total)	72.2%	16.7%	11.1%	100.0%

Table 2: Bladder injury Type frequency table

Type of injury	Frequency	Percent	Valid Percent	Cumulative Percent
Contusion	22	48.9	48.9	48.9
Intraperitoneal (IP)	10	22.2	22.2	71.1
Extra peritoneal (EP)	10	22.2	22.2	93.3
IP+EP	3	6.7	6.7	100.0
Total	45	100.0	100.0	

Of those who have had bladder injury 48.9% had contusion, 22.2% had intraperitoneal, 22.2% had extra peritoneal, and 3% had combined i.e intra and extra peritoneal.

Table 3: Summary of the results

Type of injury	**bladder**	**Urethra**	**both**	**total**
Age-0-20	2	2	1	5 (9.3%)
21-40	17	2	4	**23 (42.6%)**
41-60	14	1	1	16 (29.6%)
61-80	4	4	0	8 (14.8%)
81+	2	0	0	2 (3.7%)
Total	**39 (72.2%)**	**9 (16.7%)**	**6 (11.1%)**	**54 (100%)**
Sex- M	29	7	4	40 (74.9%)
F	10	2	2	14 (25.1%)
Total	**39 (72.2%)**	**9 (16.7%)**	**6 (11.1%)**	**54 (100.0%)**
Clinical feature-Hematuria	**39**	8	6	**53 (98.1%)**
Ab/pain	34	7	6	47 (87.0%)
Dysuria	33	4	2	39 (72.2%)
Failure to void	13	7	5	25 (46.3%)
BPM	1	**9**	**6**	**16 (29.6%)**
Rx-Modality				
Surgery	16	0	5	21 (38.9%)
Conservative	23	9	1	33 (61.1%)
Total	**39**	**9**	**6**	**54 (100%)**

Table 4: Summary of results

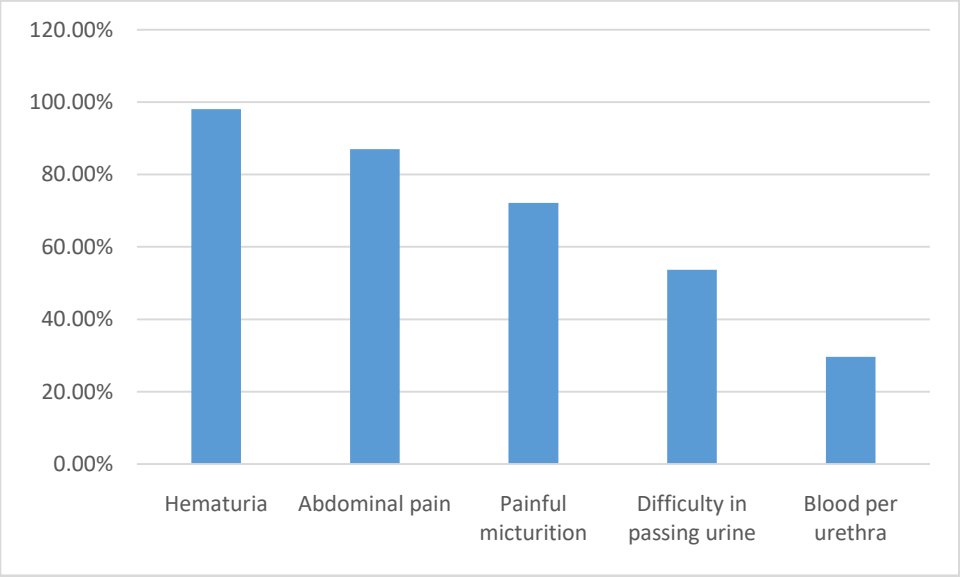
Treatment Outcomes	No of Patients (%) Urethra injury	Bladder injury	Total
Short-term- U/Incontinence	11.1%	20.4%	**31.5%**
Sepsis	9.4%	7.4%	16.8%
Fistula	7.4%	-	7.4%
Peritonitis	-	20.4%	20.4%
Urinoma	-		
Long-term- U/Stricture	13.0%	-	**13.0%**
Erectile dysfunction	7.4%	-	7.4%
Fistula	-	14.0%	14.0%
U/Incontinence	5.6%	1.9.0%	7.5%

3.3 Determination common clinical features of LUT injuries among pelvic trauma patients

The majority of the patients 53 (98.1%) presented with hematuria as clinical feature of LUT injury, where only 1 (1.9%) had no hematuria at all.

Of those who had hematuria majority 50 (92.6%) had gross hematuria while only 3 (5.6%) had microscopic hematuria.

Figure 1: Clinical features-frequency distribution

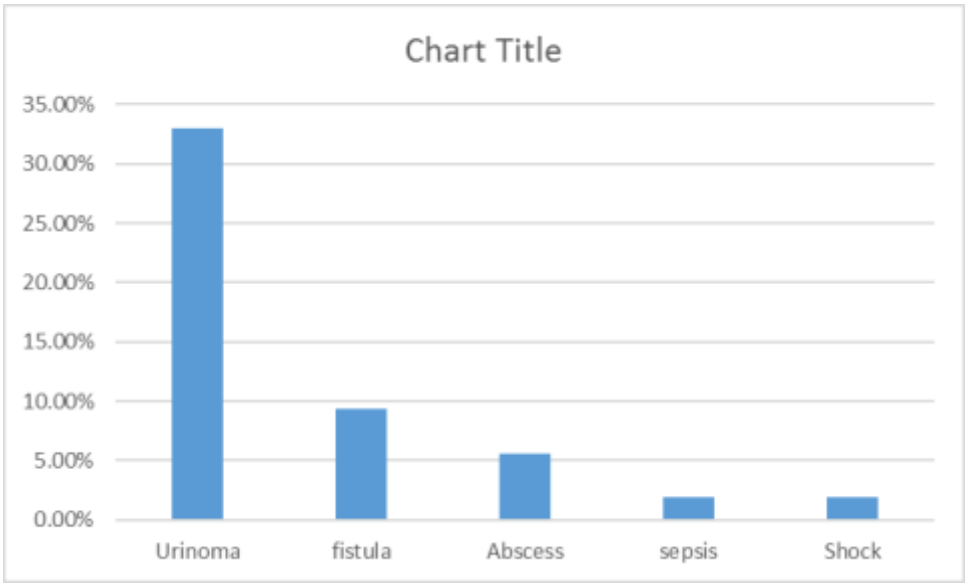


As shown by the figure 1 above, hematuria is the commonest clinical feature of LUT injuries in pelvic trauma patients which accounts for 98.1%

As per figure 2 below urinoma was the most common complication following lower urinary tract injury which accounts for 33.3% out of all LUT injury patients

.

Figure 2: Complications of LUT injury-frequency distribution.



3.4Determination of treatment modalities of LUT injuries among pelvic trauma patients.

In this study 12 (80.0%) patients who had urethral injury were treated conservatively with urethral catheter or SPC while only 3 (20.0%) patients were treated surgically.

3.5 Determination of treatment outcome of LUT injuries in pelvic trauma patients

In this study urine incontinence was the most common short term complication after treatment which accounts for 11.1% of the patients, sepsis was 9.4% followed by fistula which was 7.4% of the patients.Urethral stricture was the most common long term complication after treatment of urethral injury which accounts for 13.0% of total LUT injury patients but 100% for urethral injuries alone. Erectile dysfunction and urine incontinence were 7.4% and 5.6% respectively.

Twenty-four (54.5%) patients were managed conservatively using urethral catheter and SPC, while 20 (45.5%) cases were managed surgically.

In this study following bladder injury treatment urine leakage occurred in 20.4% and urinoma in 20.4% of the cases as a short term complication, sepsis and peritonitis occurred in 7.4% and 5.6% of the cases respectively.

Fistula was the leading long term complication following bladder injury treatment accounts for 14.0% while urine leakage and other complications accountedfor 1.9% for each.

CHAPTER FOUR

4.0 DISCUSSION

4.1 OVERVIEW

This was a 14 months' prospective analytical study conducted to determine the proportion of lower urinary tract injuries and their treatment outcomes among patients with pelvic trauma at MNH and MOI. It involved the alive patients interview and physical examination as well as intraoperative findings and other information retrieved from the files and computer database. This chapter discusses the findings of the study presented in chapter three.

4.2 SIGNIFICANCE OF THE DEMOGRAPHIC FINDINGS

There is importance of demographic findings in this study, males are commonly affected than females, 40 males were affected with LUT injuries among pelvic trauma while only 14 females were affected. This is supported by the study done by Bjurlin and his colleagues, of the 31,380 patients with pelvic fractures, 1,444 had Genito-urinary injuries (GUI), men more commonly sustained pelvic fractures with GUI than women (66.14% vs. 33.86%). The incidence of bladder injuries in men and women was 3.41% and 3.37% respectively, and urethral injuries 1.55% and 0.15% respectively.[2]

Another study done by Johnsen and his colleagues showed that Urethral injury was more common in men (2.0% vs 0.05%; relative risk 43.1[18]. Possible explanations for this are; males are more prone to be involved in motor traffic crushes and get pelvic trauma since most of them are usually engaged daily on motor vehicles or motorcycle riding due to their role in family as bread earners, while most of females remain at home doing family care duties.

Also by considering mechanism of injury for urethral disruption, anatomically,in male they have long urethra which is prone to injury compared to female urethral length which is shorter, also males havepubo-prostatic ligament, a fibrous tissues adjoining the pubic bone and prostate, of which in pelvic fracture which involves pubic bone it pulls up the prostatic part of the urethra and may cause urethral tear of which in female is unlikely to occur. This finding is supported by other study done byDjokovic et al which shows the incidence of male urethral injuries occurring with pelvic trauma ranges between 4% and 19% and up to 6% in women.

Also another demographic finding, the age also has importance, in this study most of the patients are in age group between 20 to 41 years, and few in extreme, this is because this is an active productive age engaged in daily activities in towns where MTA are common.

4.3 THE PROPORTION OF LUT INJURIES AMONG PELVIC TRAUMA PATIENTS

In this study, 8 patients out of 100pelvic trauma patients had LUT injuries, either bladder, urethra or both.This number is two times the finding by a study done by Kyukyuand Igakukaiin Japan, the records of 500 patients with pelvic fractures admitted to critical and emergency center from November 1, 1980 to December 31, 1993 were reviewed. Of 500 patients with pelvic fractures 18 (3.6%) had lower urinary tract injuries.The difference may be contributed by advances in technology for automobile transport devices due to economic growth nowadays in town areas where the study was done compared to those days.

In another study done by Vaite and his colleagues they found that333 patients with pelvic fractures were identified: seven sustained urethral injuries, three bladder injuries and one with bothwith the overall proportion of 3.3% of LUT injuries among pelvic trauma patients[23]. In another study done by Johnsen and his colleagues, it showed that of 5518 pelvic fracture patients, 233 (4.2%) had LUT injuries. There were 3.2% of men and 3.3% of women with pelvic fracture who had bladder injuries ($P = 0.94$). The incidence of lower urinary tract injuries variesfrom 0.5 to 10% in different studies.For mechanism of injury in bladder injuries possible explanation is that, bone fragments following pelvic fracture may likely to cause penetrating bladder injuries, (either IP or EP), or urethral injuries.[18]

Following pubic bone fracture may cause pubo-prostatic ligament tear which may cause urethral disruption (posterior urethral injury).For contused bladder is more likely usually caused by a sudden deceleration, such as in a high-speed motor vehicle crash or fall.

4.4COMMON CLINICAL FEATURES OF LUT INJURIES IN PELVIC TRAUMA PATIENTS

Over ninety-eight percent of patients with LUT injuries following pelvic trauma present with gross hematuria as the first alarming symptom. This is due to the fact that there is mechanical disruption of detrusor muscle integrity or mucosal surface erosion following rapid deceleration force or direct penetration of bone fragments in pelvic trauma.

This is supported by many studies including the study done by Avey and colleagues about radiographic and clinical predictors of bladder rupture in blunt trauma patients with pelvic fracture whereby all patients with LUT injuries had hematuria. The degree of hematuria correlates poorly with the severity of injury as most of the literatures suggest, as complete rupture can occur with minimal bleeding and small partial tears can result in heavy bleeding[9,10]

Abdominal pain is another clinical symptom due to severe nerve ending stimulation over the bladder caused by mechanical or physical bladder trauma, or may be caused by severe bladder distension following urethral injury where hematoma may set in and cause outlet obstruction.Also abdominal pain is highly associated with urine collection to the peritoneal space (urinoma) which has been observed in the study findings as the complication causing peritoneal irritation (chemical peritonitis)

Difficulty in passing urine may occur caused by a degree of bladder outlet obstruction contributed by edema over the bladder neck or severe urethral obstruction caused by hematoma formation, or likely to be caused by complete urethral tear. This may be accompanied by severe pain during micturition.

Blood at the meatus seen in almost all males and females' urethral injuries (posterior)is caused by direct mucosa laceration or urethral tissue disruption following pelvic fracture.Blood at the meatus is seen in 37% to 93% of posterior urethral tears and in 75% of anterior urethral tears.Aihara and colleagues showed that symphysis diastasis and inferior pubic rami fractures were independent predictors of urethral injury[6]

4.5 TREATMENT MODALITIES OF LUT INJURIES AMONG PELVIC TRAUMA PATIENTS

As pointed out earlier, the majority of contused bladder injuries managed by conservative management byensuring continuous bladder drainage by putting urethral catheter and hematuria is likely to clear within few days with no or minimal complications, while others with intraperitoneal bladder injuries repaired by surgery.

In study findings, the majority of urethral injuries repaired by ensuring urinary diversion by putting an SPC as initial treatment followed by urethroplasty later after developing urethral stricture or urethral disruption or stenosis. With an SPC urine may not flow through the urethra which may give time for tissue edema to subside and scar tissues to be well defined after maturity in accordance with principles of wound healing from inflammation stage to collagen deposition stage through proliferartory phase.

In a certain study done by Mouraviev et al in 2005 on comparative experiences of realignment and urethroplasty as the treatment modalities of urethral disruption in pelvic trauma patients, they concluded that early realignment may provide better outcomes than delayed open urethroplasty after posterior urethral disruption.[20]

4.6 TREATMENT OUTCOME OF LUT INJURIES AMONG PELVIC TRAUMA PATIENTS.

Of the patient with urethral injury who underwent conservative management in the findings of this study,the majority end up with urethral stricture which requiresurethroplasty or direct vision urethrotomy later, none of them had undergone endoscopic realignment. In the study done by Leddy and colleagues on the outcome of endoscopic realignment outcome of pelvic fracture urethral injury, they found that of 19 patients who had pelvic fracture with urethral injury after being treated with primary realignment only 3 had successful outcome but the rest had developed to urethral stricture.[19]

Another study done by Asci and colleagues on the Voiding and sexual dysfunctions after pelvic fracture urethral injuries treated with either initial cystostomy and delayed urethroplasty or immediate primary urethral realignment, they found that after the immediate treatments, 16.7%

and 55% of the patients regained normal urination, and stricture developed in 83.3% and 45% of the patients, respectively.[21]

In the findings above in this study in chapter three, urine incontinence was the most common short term complication after treatment which accounted for 11.1% of the patients, sepsis was 9.4% followed by fistula which was 7.4% and none had impotence, where in a study done by Flancbaum et al, impotence (33.6%) and incontinence (17.7%) were less frequent in the early realignment group than in the delayed reconstruction group (42.1% and 24.9%, respectively)although the conclusion was impotence was due to injury itself rather than the treatment option.[12]

It is difficult to compare this study with other studies because none of the patients in this study had underwentprimary endoscopic realignment or primary open surgical repair. Three patients out of 11 who had urethral injury underwent surgical repair of closing bladder neck of which they had both urethral injury and severe bladder neck tear.

Urethral stricture was the most common long term complication after treatment of urethral injury which accounted for 13.0% of total LUT injury patients but 100% for urethral injuries alone.

Although other complications such as fistula and abscess formation may occur, due to the extravasation of urine out of damaged urethra to tissues, where stasis occurs and predispose to microbes hence abscess is formed, with pus collection and necrotic tissues and continuation of urine flow to the pocket with stasis fistula tracts are formed are not associated with treatment rather the injury itself.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

LUT injuries in pelvic trauma is not rare, so having pelvic trauma is a predisposing factor to lower urinary tract injuries including bladder and urethral injuries or both, of which bladder injuries are the commonest. Males are more affected than females. Gross hematuria is the commonest clinical presenting symptom of LUT injuries in pelvic trauma patients which will give an alarming sign of LUT injury in a setting of pelvic trauma, so that further evaluation of lower urinary tract is to be done, so appropriate measures will be taken. Other symptoms include abdominal pain, painful micturition and blood per urethra.

Bladder injury treatment for contusion and EP rapture is mainly conservative which is safe with minimal complications, done by ensuring continuous bladder drainage with urethral catheter, but for IP rapturesurgical treatment is the safer option.

For urethral injuries conservative management is the standard primary treatment with fewer complications, done by putting an SPC and urethroplasty is to be done later if the patient develops urethral stricture.

5.2 RECOMENDATIONS

In every pelvic trauma patient Lower Urinary tract should be well evaluated for injuries, common clinical symptoms should be thoroughly assessed including gross hematuria, abdominal pain, blood per urethra and difficulty of inability to urinate.

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7.0 APPENDICES

7.1 APPENDIX I: QUESTIONNAIRE- ENGLISH VERSION

1. Serial No ----------
2. Hospital reg. no----------
3. Ward ----------
4. Recruitment date ----/----/----
5. Age ----------
6. Sex ----------

7. What type of pelvic fracture is he/she sustained?
   a. Type A
   b. Type B
   c. Type C
   d. Others
8. is there hematuria
   a. YES
   b. NO
9. If YES, is it
   a. Gross
   b. Microscopic
10. Is the patient having abdominal pain/tenderness following trauma
    a. YES
    b. NO
11. Is he/she having blood on the meatus?
    a. YES
    b. NO
12. Is the patient having inability to urinate?
    a. YES
    b. NO
13. If NO, is he/she having painful micturition
    a. YES
    b. NO

14. What type of LUT injury did he sustained? (if the answer is (b) go to question number 16

a. Bladder injury

b. Urethral injury

c. Both

15. If bladder injury, which type?

a. Contusion

b. Intraperitoneal

c. Extraperitoeal

d. Both EP and IP

16. If urethral injury

a. Anterior

b. Posteior

c. Both

17. If urethral injury was it

a. Partial

b. Complete

18. Duration from the time of injury to treatment

a. Less than 24hours

b. 24 -72 hours

c. More than 72 hours

19. Complication associated with injury

a. shock

b. peritonitis

c. urinoma

d. Abscess

e. Fistula

20. Treatment modality for urethral injury

a. Conservatively by SPC/ Urethral catheter alone

b. SPC/ Urethral catheter then urethroplasty later

21. Treatment outcome of Urethral injury, short term
    a. Abscess formation
    b. Fistula
    c. Sepsis
    d. Urine leakage
    e. Others, mention……
22. Treatment outcome for Urethral injury long term
    a. Urethral stricture
    b. Erectile dysfunction
    c. Incontinence
    d. Chordee
    e. Others, mention……
23. Treatment modality for bladder injuries
    a. Conservatively
    b. Surgical repair
24. Treatment outcome for bladder injury –short term
    a. Urine leakage
    b. Urinoma
    c. Peritonitits
    d. Sepsis
    e. Others, mention……
25. Treatment outcome for bladder injury –long term
    a. Fistula
    b. Incontinence
    c. Others, mention……

7.2 QUESTIONNAIRE- SWAHILI VERSION

1. Nambaya dodoso……

2. Nambayahospitali……

3. Wodi……..

4. Tareheyamahojiano……..

5. Umri…….

6. Jinsia…….

7. Ni ainaganiyamvunjikowakiunoalioupata?

. a. Aina A

b. Aina B

c. Aina C

8. Je amekojoamkojowenyedamu?

a) Ndio

b) Hapana

9. Kama NDIO, je niainaipi?

a) Inayoonekanakwa macho

b) Inayoonekanakwadarubini

10. J e mgonjwaalipatamaumivuyatumbobaadayaajali?

a) Ndio

b) Hapana

11. Je, mgonjwaalipatakutokwanadamukwenyenjiayamkojo?

a) Ndio

b) Hapana

12. Je, mgonjwaalishindwakukojoabaadayaajali?

a) Ndio

b) Hapana

13. Kama HAPANA, je alipatamaumivuwakatiwakukojoa ?

a) Ndio

b) Hapana

14. Ni ainaganiyajerahaambalomgonjwaalipata ? (kamajibuni (b) nendaswali la 16)
    a) Kibofu cha mkojo
    b) Njiayamkojo- Urethira
    c) Zote
15. Kama nikibofuniainaipi?
    a) Mtikisiko
    b) Ndniyamatumbo
    c) Njeyamatumbo
    d) Zote
16. Kama ninjiayamkojo (urethira) nisehemuipi?
    a) Yambele
    b) Yanyuma
    c) Zote
17. Kama ninjiayamkojo (urethira) niainaipi?
    a) Isiokamilifu
    b) iliokamilifu
18. Mudaganiumepitatangukupatajerahampakakupatahudumayamatibabuyaawali?
    a) Ndaniyamasaa 24
    b) Kati yasaa 24 na 72
    c) Zaidiyasaa 72
19. Je nimadharaganiyaliyopatikana na majerahahayo?
    a) Shoki
    b) Maambukiziyadamu
    c) Urinoma
    d) majipu
    e) Fistula
20. Kama nijeraha la njiayamkojourethiraniainaganiyamatibabualipata?
    a) Kwakutumiamipirayamkojobilaupasuaji
    b) Kwaupasuaji.

21. Ninimatokeoyamudamfupiyamatibabuhayo?

a) Majipu

b) Fistula

c)Maambukiziyawadudukwenyedamu

d) Kuvujakwamkojo

f) Mengineyo, taja…….

22. Ninimatokeoyamudamrefubaadayamatibabuhayo

a) Kuzibakwanjiayamkojo

b) Kupunguakwanguvuzakiume

c) kushindwakuzuiamkojo

d) kupindakwauume

e) Mengine ,taja ……

23. Kwajeraha la kibofu, alipatamatibabugani?

a) Bilaupasuaji

b) Kwaupasuaji

24. Kwajeraha la kibofumadharaganiyamudamfupiyalipatikanabaadayamatibabu?

a) Kuvujakwamkojo

b) urinoma

c)maambukiziyamatumbo

d) maambukiziyadamu

e) mengineyo, taja

25. Kwajeraha la kibofu, nimadharaganiyamudamrefuyalipatikana?

a) fistula

b) kuvujakwamkojo

c) mengineyo, taja…….

8.0 APPENDIX II:INFORMED CONSENT FORM

ID no_____

Consent to participate in the study assessing the at Muhimbili National Hospital

Greetings! My name is Dr Said Ibrahim, a postgraduate student at Muhimbili University of Health and Allied Sciences.

The purpose of the study

To assess the profile of lower urinary tract injuries among pelvic trauma patient at Muhimbili National Hospital.

What participation involves

If you agree to participate in the study, you will be asked questions as regard to your condition during this admission time and during clinic visit.

Confidentiality

All information collected on the questionnaires will be entered into a computer with identification number. The questionnaires will be handled with great secrecy in order to maintain confidentiality throughout the study.

Risks

No other expected risks.

Right to withdraw and alternatives

Taking part in this study is completely voluntary. If you choose not to participate in the study, you will continue to receive all services that you would normally from the hospital.

Benefits

If you agree to participate in this study, there is no direct benefit apart from knowing the profile or pattern of lower urinary tract injuries among pelvic trauma patient and the appropriate management rather the results will be used for future plan in order to attain best treatment outcome so as to improve quality of life with less complications.

Who to contact

If you have any question about the study, you should contact Dr. Said IBRAHIM on +255713074254, P. O. Box 40341 Dar es Salaam

I you have questions/concerns about your rights as participant, you may contact

Muhimbili University of Health and Allied Sciences (MUHAS),

P.O Box 65001,

Dar es salaam

Phone= + 255-22-2152489

Signature

I ..... have read the content of this form. My questions have been answered. I agree to participate in this study.

Signature of participant .....

Signature of witnes .....

Date of signed consent ..../...../201..

Participant agrees ___ participant does NOT agree ____

8.2. KISWAHILI VERSION OF INFORMED CONSENT

ID no .....

Hati ya ukubali wa kushiriki kwenye utafiti utakaoangalia ukubwa wa maambukizo kwenye vidonda vya upasuaji na viashiria vyake katika upasuaji wa njia ya mkojo, aina ya vimelea vinavyohusika na aina ya dawa inayoweza kuwaua katika Hospitali ya Taifa Muhimbili.

Salaam! Naitwa Daktari Said IBRAHIM, mwanafunzi wa uzamili katika chuo kikuu cha Tiba za Afya cha Muhimbili.

Lengo la utafiti

Ni kuangalia mtiririko wa majeraha ya njia za chini za mfumo wa mkojo kwa wagonjwa waliopata ajali ilohusisha sehemu ya kiuno na matibabu yake pamoja na matokeo yake baada ya matibabu hayo katika hospitali ya taifa Muhimbili.

Ushiriki wako ni wa namna gani?

Utakua ukiulizwa maswali yahusuyo ugonjwa wako na utatakiwa kuyajibu kipindi hiki ambacho umelazwa na kipindi ambacho utakua unahudhuria kiliniki kwa ufatiliaji wa ugonjwa wako.

Usiri

Taarifazotezitakazokusanywakwenye dodoso, pamoja na vipimovitatambulikakwanamba na siojinailikuongezausiri. Usiri huu utalindwahatabaadayakukamilikakwa utafiti huu.

Madhara

Hakunamadharayatarajiwayokwenye utafiti huu.

Hakiyakujitoa

Ushirikiwakokwenye utafiti huu siowakulazimishwa. Ukiamuausishiriki, utaendeleakupatahudumazahospitalikamakawaida.

Faida

Hakunafaidayamojakwamojakwenyeushirikiwako katika utafiti zaidiyakulijuatatizolakokwaundanizaidi. Faidaitakuwazaidikamabaadaekujuanamna bora yakutatuatatizolakoilikuboreshahuduma na kupunguzamadharayatokananyo na majerahahayo na matibabuyake.

Mawasiliano

Ukiwanamaswaliyoyotekuhusu utafiti huu, wasiliana name Dr. Said Ibrahim simunamba +255713074254, S.L.P 40341 Dar es Salaam

Ukiwanamaswalikuhusuhakizakokamamshiriki, wasiliana na

Mkurugenziwa utafiti na machapisho,

Chuo Kikuu cha AfyanaTiba Muhimbili (MUHAS),

S. L. P 65001,

Dar es salaam

Simu + 255-22-2152489

Sahihi

Mimi_____ nimekubalikushiriki utafiti huu baadayamaswaliyanguyotekujibiwa.

Sahihiyamshiriki _____

Sahihiyashahidi _____ tarehe __/__/201_

Mshirikiamekubali _____ Amekataa ____