



OUTCOME OF URETEROSCOPY (URS) AT ST-PAUL HOSPITAL MILLENNIUM MEDICAL COLLEGE, ADDIS ABABA, ETHIOPIA

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**A RESEARCH PAPER TO BE SUBMITTED TO DEPARTMENT
OF SURGERY, ST. PAUL HOSPITAL MILLENNIUM MEDICAL
COLLEGE**

**SEPTEMBER, 2018
ADDIS ABABA, ETHIOPIA**

A 1 YEAR RETROSPECTIVE REVIEW ON OUTCOME OF URETEROSCOPY (URS) AT ST-PAUL HOSPITAL MILLENNIUM MEDICAL COLLEGE, ADDIS ABABA, ETHIOPIA

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SUMMARY

Background:

Ureteroscopy is a safe and minimally invasive method of treating stone disease in the kidneys and ureter and gradually become a major diagnostic and therapeutic technique for lesions of both the ureter and intrarenal collecting system. Complications of URS range from minor complications such as colic, fever and haematuria to major complications like ureteric perforation and avulsion.

Objective

The objective of this study is to review a 1 year experience and assess the outcome of Ureteroscopy (URS) for the management of ureteral stones at St. Paul's Hospital Millennium Medical College (SPHMMC) Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C

Methods:

A retrospective cross-sectional review is conducted for patients who have undergone URS procedure from February 1, 2017 up to January 31, 2018. All patients who underwent URS procedures in the given time were included with no sampling. Medical records are reviewed and data retrieved by a preset questionnaire. After the data is collected, it is analyzed with computer programs (SPSS version 20) and the result is presented by numbers, ratios, tables and graphs. Depending on the result appropriate interpretations, discussions, conclusions and recommendations are made. The total cost of the project is 33049.5 birr.

Result:

A total of 106 patients were included in the study. Majority 88 (83%) patients were between age of 21-50 years, the mean age was 36.4 and 64.2% patients were males. Most 96 (90.6%) patients had stone disease during ureteroscopy while 9 (8.5%) were diagnosed as ureteric stricture and 1 (0.9%) normal. Left and right ureteric stones were present in 44 (45.8%) and 45 (46.9%) respectively and 7 (7.3%) had bilateral ureteric stones. Ureteric stones were present in the lower ureter in 38 (41.3%) patients, in mid ureter 13 (14.1%) patients, in upper ureter 41 (44.6%) patients. Size of the stone was < 1 cm in 32 (43.8%) patients, 1 cm to 2 cm in 38 (52.1%) patients and 2 cm to 3 cm in 3 (4.1%) patient. Stones were completely removed in 51 (56%) of patients. The procedure was successful in 93(87.7%) and unsuccessful in 13(12.3%). Among all patients Ureteric stents were passed in 91 (85.8%) patients. Ureteric stents were passed after Ureteroscopy in 82(77.4%) for ureteric stone disease. There was ureteric avulsion in 1 patient (0.9%), ureteral perforation in 3 patients(2.8%) and gross hemorrhage in 2 patients(1.9%).

Key terms: *ureteroscopy, indication, outcome, SPHMMC*

Acknowledgements

I would like to thank St Paul's Hospital Millennium Medical College for giving me the chance to conduct this research and for providing me with necessary materials and fund.

I would like to express my deepest gratitude to my advisors Dr. TEKLEBIRHAN and Dr. SEID for their continuous guidance during the proposal and research paper development. My gratitude also extends to all staffs of St Paul's Hospital Millennium Medical College, the St. Paul's Hospital Millennium Medical College Department of Surgery and SPHMMC research office for giving me the chance and support to develop this research paper.

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ACRONYMS

CROES ---Clinical Research Office of the Endourological Society

EAU--European Association of Urology

SFR---stone free rate

SPHMMC – St. Paul’s Hospital Millennium Medical College

URS- Ureteroscopy

CHAPTER ONE

1. Introduction

1.1 Background Information

Ureteroscopy (URS) is defined as retrograde instrumentation performed with an endoscope passed through the lower urinary tract directly into the ureter and calyceal system. Although, it was first described in 1912, it was in 1977 that Goodman reported the first rigid ureteroscopy for therapeutic purposes (5). However, ureteroscopy has gradually become a major technique for the diagnosis and treatment of lesions of both the ureter and intrarenal collecting system. The major therapeutic indications of ureteroscopy include urolithiasis, Ureteric strictures, pelviureteric junction (PUJ) obstruction, and ablation of transitional cell carcinoma and retrieval of migrated stones(1).

Urinary stone disease is a major health problem that concerns millions of patient's worldwide affecting 2-3% of the human population with a high recurrence rate of almost 50%. Ureteric colic is a urological emergency in terms of the severe pain experienced by the patient. They occur most commonly in men aged between 30 years and 60 years. Various treatment modalities have been proposed in literature for ureteral calculi including shock wave lithotripsy (SWL), percutaneous removal, ureteroscopic lithotripsy (URSL), retro-peritoneoscopic ureterolithotomy, laparoscopic ureterolithotomy, and classical open ureterolithotomy. (5)

The recent development of small caliber semi rigid and flexible deflectable ureteroscopes and the new generation of various lithotripters have made this procedure safer and more effective. There are several types of lithotripter energy sources. These include electrohydraulic, mechanical, electromechanical, ultrasonic and laser energy sources. The miniaturization of ureteroscopes and introduction of the holmium (Ho: YAG) laser has improved stone free rates. Several authors showed ureteral strictures can be treated by dilatation or endoscopic incision through a retrograde, antegrade or combined approach using rigid and/or flexible ureteroscopes. Overall success rates of about 60% are reported, but these rates are influenced by the length of the stricture. URS can also be used as a diagnostic procedure. It can be used in the evaluation of ureteric transitional cell carcinoma, filling defects and undiagnosed haematuria. Beginning the 1980s endourological approaches have been used to treat localized transitional cell carcinoma of the upper urinary tract in patients with contraindication to nephroureterectomy. Ureteronoscopy performed to evaluate an upper urinary tract (UUT) filling defect greatly enhance diagnostic accuracy. In addition to visualizing UUT, it offers opportunity to biopsy any lesion encountered, allowing histopathological confirmation (1).

1.2 Statement of problem

Since its first description over 30 year ago, ureteroscopy(URS) has been refined from a diagnostic procedure with limited visualization to an accurate surgical intervention allowing access to the entire urinary system. In particular, the development of smaller caliber semi rigid and flexible ureteroscopes and the introduction of improved instrumentation, including deflectable tip endoscopes, ureteral access sheaths, superior optics, and improved lasers and stone retrieval devices, have dramatically expanded the diagnostic and therapeutic applications for URS. Such technological advances combined with improved surgeon capabilities have established URS as a safe and effective treatment option for active stone removal. For ureteral stones, URS and shockwave lithotripsy (SWL) have become the most common treatment modalities. With the exception of proximal ureteric stones sized <10 mm, where SWL has a slightly better outcome, URS leads to higher stone-free rates (SFRs) compared with SWL. Confirming the clinical utility of URS, the European Association of Urology guidelines on urolithiasis specify that apart from general problems (eg, with general anaesthesia or untreated urinary infections), URS can be performed to remove ureteral stones in all patients without any definite contraindications (7).

With widespread practice of URS, however, have come various incidents or complications and new solutions for prevention. Complications of URS can range from minor complications such as colic, fever, hematuria to major complications like ureteric perforation and avulsion. In a review of the early Mayo Clinic experience, complications were reported in 20% of patients and included fever, failure to remove stone and ureteral injury. Patients with same session bilateral URS have a significantly higher postoperative complication rate than those with unilateral(1).

The immediate and long term complication rate with URS varies with the expertise of the surgeon. Ureteric stents are used at the end of the URS if stone fragments after URS are multiple and have big stone burden. Ureteric stenting is optional in case of uncomplicated URS. The use of flexible URS along with stone fragmentation with Lasers is the best option in this regard. The cost and wear tear of flexible URS is very high. Mostly semi-rigid URS is used in our setup So outcome of ridged URS in treatment of stones is assessed in our setup.

The Clinical Research Office of the Endourological Society (CROES) undertook the URS Global Study to establish a prospective global database to examine the worldwide use of URS and to determine factors affecting outcome. The first publication from the study confirmed that while URS results in high SFRs with low morbidity across a wide variety of clinical settings, the frequency of postoperative complications (2.5–4.6%) varied according to location(7) . In the current analysis of our Study, we aimed to investigate the outcomes of URS in the setting of ureteral stones.

1.3 SIGNIFICANCE OF THE STUDY

Epidemiologic data from several sources suggest that the incidence and prevalence of urologic stone disease is increasing. This trend has important implications for many aspects of health care, the quality of management of affected patients, and research in the field of urolithiasis, as well as resource planning for centers and regions.

However, to our knowledge there is no research done in SPHMMC and only one study done on this topic in Ethiopia. The intention of this study is to identify and analyze the major indications, success and encountered complications of URS in SPHMMC. .

In addition, the study is intended to have key information with regard to improvements in quality of hospital service deliveries and patient care. In addition, it will also be a good source of information for future establishment of endo urologic centers in different part of the country.

Medical personnel, researchers and students can also use the results of the study for references and future studies in relation with renal stone, especially URS and other related subjects.

CHAPTER TWO

Literature review

In urology, as in other disciplines, the trend toward a minimally invasive procedure is strong. With technological advances ureteroscopy has evolved dramatically in technique and instrumentation; this evolution has substantially expanded the

Indications for and use of ureteroscopy. However, as with most advances, after a period of enthusiasm for a new technique, drawbacks are observed, and reports of early and late complications have been collected. In 1979, Lyon and associates predicted that “disasters, such as perforation of the ureter, are a distinct possibility if care and thought are not practiced.”(6).

With the widespread practice of ureteroscopy, however, have come various incidents or complications and new solutions for prevention. With growing experience and better equipment, however, the safety of the procedure has increased. Complications during ureteroscopy have decreased over the past 20 years because of improvements in ureteroscopes, ancillary devices, intracorporeal lithotriptors, and surgical skills. In 1986, Carter and coauthors reported that 8% of patients suffered ureteral perforation or stricture and 3% of patients required a ureteral reimplantation. More recent experience has demonstrated that the perforation rate has decreased to between 0% and 4.7% (Harmon et al, 1997; Daneshmand et al, 2003; Boorjian et al, 2004). Risk factors for ureteral perforation included longer operating room times, stones located in the kidney, use of EHL, and surgeon inexperience.(2)

A paper from Pakistan by G.M. Subhani, Safdar Hassan Javed, et.al done on 540 patients with ureteric calculi showed, Cause of ureteric obstruction was stones in all cases. Among these 540 patients, 209 (38.6%) patients presented with lower ureteric stones, 266 (49.20%) patients presented with stones in the mid ureter, 65 (12.2%) patients presented with stones in the upper ureter. Bilateral ureteric calculi were present in 95 (17.5%) cases. Out of 540 cases 57 (10.62%) patients presented with anuria and they were initially treated by Percutaneous Nephrostomy PCN to relieve the obstruction followed by URS and Lithoclasty. Overall, ureteric stones at different levels and of different sizes were treated successfully in 480 (89.0%) patients and in remaining 60 (11.0%) patients' stones could not be broken. Stones were successfully fragmented and cleared in the 198 (94.73%) of 209 patients with stones in the lower ureter, in 253 (95.11%) of 266 patients with stones in the mid ureter and in 29 (44.61%) of 65 patients with stones in the upper part of ureter. Stones were successfully fragmented in 347 (98.21%) out of 354, 92 (85.18%) out of 108 and 41 (52.56%) out of 78 patients with stone sizes of <1 cm, 1-2 cm and 2-3 cm respectively. DJ stents were inserted in 426 (78.81%) cases. Procedure was not successful in 60 (11.0%) patients. Stones were migrated up in to renal pelvis in 31 (5.73%) patients, stone fragmentation failure was in 13 (2.40%) patients, failure of URS insertion up to stone was in 6 (1.10%) patients and ureteric avulsion was in 1(0.18%) (4).

A paper from India by Krishna Reddy SV1* and Ahammad Basha done on 268 patients who underwent ureteroscopic lithotripsy (URSL) showed, 156 (58.21%) were males, while 112 (41.79%) were females. Age range was 18-59 years with mean age of 37.55±12.31 years.

The patients were grouped based on placement of DJ Stent. Group I (n=98) patients had no DJ stent while Group II (n=96) patients had DJ stent due to prolong procedure. Group III (n=74) patients had DJ stent placed due to complications during the procedure or due to large volume

of fragments that are left without retrieval after fragmentation. The results were analyzed on aspects of stone clearance, hospital stay, complications and patient compliance. 80 patients in Group I, 82 patients in Group II and 42 patients in Group III completed the procedure in single session. The stone clearance at one week for mid ureteric stones in Group I (89.78%), Group II (91.67%), and Group III (91.89%) and in lower ureteric stones clearance was in Group I (97.96%), Group II (96.88%) and in Group III (95.95%). At one month 100% stone clearance was seen in all the three groups. The stented group had 26.5% colic, 10.6% hematuria, 15.3% bladder spasm and irritative voiding symptoms and even double chances of developing steinstrasse as compared to non-stented group. (5).

A paper from Egypt by M. El-Qadhi done on 136 patients who underwent ureteroscopic procedures for the treatment of distal ureteric calculi showed, there were 91 (67%) males and 45 (33%) females. Age of the patients ranged between 21 and 47 years (mean age was 34 ± 14 years). Left and right ureteric stones were present in 63 (54%) and 54 (46%) patients, respectively. Bilateral ureteric stones were found in 19 patients (14%). For all these bilateral cases, one side's procedure was operated upon, and the therapies for contralateral side were not included in the results of the study. The size of the stone in the treated patients was 7–21 mm. Size of 0.7–1 cm was found in 89 patients (65.4%), and 1.1–2.1 cm in 47 patients (34.6%). All stones were located in the lower part of the ureter that lies below sacroiliac joint. Radiopaque stones were found in 105 patients (77.2%), while the radiolucent ones were interpreted in 31 (22.8%) patients. Out of the group, only 109 patients had completed clinical and radiological follow-up (74.2%) for a mean of 31.8 months. Among these eligible patients, one stricture and vesico-ureteric reflux cases were reported (0.9%) for each. The initial stone free rate following a single procedure was 79.4% (108/136). Status "stone free" was judged by KUB film in the first day postoperatively. All remaining 28 patients had been diagnosed to have residual fragments/lost stones, i.e. 3 cases passed stones spontaneously, 14 cases migrating/lost stones and subsequently underwent ESWL. The remaining 11 cases have proceeded for a "second look" after 2 weeks. So, a total of 119 ureteroscopic procedures, i.e. 108 initial and 11 "second look" were completed in the study. Among them, the overall stone free rate improved to 95.9%, i.e. 114/119 cases. Postoperative stenting for the operated ureters was done in a total of 84.4%, i.e. 72.8% and 11.6% with internal and external catheters, respectively. In the remaining procedures (15.6%), the stones have been retrieved straightforwardly and then the ureters were left unstented. Ureteral perforation was detected in 4.1% (6/147 procedures). All perforations were associated with impaction of stone. Four perforations occurred with electrohydraulic lithotripsy. One case associated with a retrieving basket and one was detected with a grasping forceps. No perforation happened following balloon dilation. (3)

A paper from Ethiopia by D. Andualem, L. Be-edde, T. Mulat, L. Samodi done on 84 patients who underwent ureteroscopy showed, there were 47(56%) males while 37 (44%) females. There were two peak age incidences in the 21 to 30 and the 41 to 50 age groups. Loin pain was the most common presenting symptom in 83 (98.8%) of the patients, 21 (25%) presented with haematuria 21(25%) and 7 (8.3%) complained of fever. The most common clinical diagnosis was

stone disease 54 (64.3%). Most 38 (45.3%) patients had stone disease during ureteroscopy while 20 (23.9%) were diagnosed normal and 16 (19.1%) ureteric stricture. Most patients 56 (66.7%) had no post-operative complications. Fourteen (16.7%) patients had abdominal colic while 7 (8.3%) patients reported haematuria. Three patients had post-operative fever while 4 (4.8%) patients were found to have both colic and haematuria. Only a single patient had ureteric perforation. Out of the 38 patients with ureteric stones, complete stone extraction was done for 19 (50%) of patients Nine (23.7%) patients had only double J stenting while no other therapeutic ureteroscopy procedure was done for 6 (15.8%) patients. For 2 (5.3%) patients the stone was crushed and in 2 (5.3%) others stone was dislodged. Of the 38 stone patients 24 (63.2%) were discharged after the ureteroscopy while 12 (31.5%) patients had to undergo other procedures and 2 (5.3%) patients for a repeat ureteroscopy(1).

CHAPTER THREE

3. Objectives

3.1 General Objective

To review 1 Year experience and assess the outcome of Ureteroscopy (URS) for the management of ureteral stones at St. Paul's Hospital Millennium Medical College (SPHMMC) Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C

3.2 Specific Objectives

3.2.1 To identify the demographic pattern patients for whom URS done.

3.2.2 To identify the indications of URS.

3.2.3 To describe Complications of Patients who Underwent URS.

3.2.4 To determine type of Therapeutic Procedures done.

3.2.5. Postoperative Recommendations of Patients who Underwent URS.

CHAPTER FOUR

4. Methodology

4.1 Study area and period

The study is carried out on patients who undergone URS from February 1, 2017 up to January 31, 2018 G.C. In SPHMMC, a teaching hospital located in, Addis Ababa the capital city of Ethiopia. SPHMMC is one of the two specialized referral hospital in the Addis Ababa Ethiopia. The hospital has a predominantly urban catchment population for tertiary level care. SPHMMC is also serving as a clinical postgraduate specialty teaching hospital for different specialties including general surgery, Urology, orthopedics, neurosurgery, obstetrics and gynecology, pediatrics and child health, internal medicine, ophthalmology, ENT surgery, forensic ,maxillofacial surgery, psychiatry and Emergency medicine since 2012G.C. Although it is one of the two leading center in the capital, the endourology unit has less than 2years experience on URS and worked only with a rigid ureteroscope, and the stones were fragmented with a pneumatic and lesar lithotripter. Department of Urology has one ward (total bed of 21), one daycare endo urologic unit and one outpatient referral clinic where cases with urologic problems are seen on different days of the week. It has five senior urologists, 1 guest urologist from Cuba and General surgery and urology residents of different years (levels) of study.

4.2 Study design

Institution based retrospective descriptive study design is used in carrying out this study.

4.3 Study populations

Patients who underwent URS procedures at SPHMMC Hospital, Addis Ababa, Ethiopia, from February 1, 2017 up to January 31, 2018 G.C.

4.4 Sample size and sampling technique

There were 116 patients underwent URS procedure in the study period. All patient charts were studied without sampling. 10 charts were excluded from the study. (6 charts couldn't be retrieved while 4 other charts had either incomplete data or incompatible diagnosis).

Inclusion criteria

-All patients who were underwent URS at SPHMMC in study period.

Exclusion criteria -Any patient chart with no proper data registered, incomplete investigations
And poor follow up documentation.

4.5 Variables

4.5.1 Independent variable:

Age and Sex of the patient, diagnosis, site of ureteric stone and size of stone.

4.5.2 Dependent variables

Length of hospital stay, Hematuria, Mucosal Lacerations, Perforation, Ureteral Avulsion, infection, success and failure of the procedure are the dependent variables.

4.6 Data collection methods

Medical records of patients are reviewed and retrieved by a preset questionnaire. The clinical notes and imaging studies are examined. The clinical data is retrieved includes demographic data, clinical presentation, operative findings and postoperative course. Other data that is reviewed are imaging studies such as plain abdominal X-ray (KUB), ultrasonography, intravenous urography (IVU), CT scan and renal function tests (blood urea nitrogen (BUN) and creatinine (Cr.)). We also went through operative findings and recommendations of all patients who underwent URS procedures at SPHMMC Hospital, Addis Ababa, Ethiopia, from February 1, 2017 up to January 31, 2018 G.C.

4.7 Data collectors

Data is collected by the principal investigator and trained urology residents.

4.8 Data quality control

The principal investigator has supervised each day during the data collection to ensure the quality of data by checking filled formats for their completeness and consistency.

4.9 Data analysis and interpretations

Data is checked for completeness, cleaned and entered into SPSS version 20 on a daily basis. Statistical analysis is done by using SPSS version 20 statistical software package. Data is presented using descriptive statistics in the form of frequencies and percentages for categorical variables and means and standard deviation for quantitative variables.

4.10 Ethical consideration

The proposal is reviewed by the colleges ethical review board and a written permission paper is obtained to conduct the study. Before the data collection an official letter from SPHMMC research office is sent to SPHMMC hospital administrative office to get the permission for patients' chart access and subsequent data collection. Patients' information used in the research is kept confidential and will not be used except for further studies on the subject matter. Patients identities are not revealed in the study.

4.11 Limitations

Some patients didn't have proper clinical data and follow up documentations, posing difficult on analysis and correlations.

4.12 Operational definitions

Ureteroscopy - upper urinary tract endoscopy performed most commonly with an endoscope passed through the urethra, bladder, and then directly into the upper urinary tract.

Stone-free status -it is consider when there is no residual stone in the ureter on imagining studies (KUB, non-contrast CT scan and abdominal U/S) during first 6month of follow up after URS.

Successful procedure – successful introduction of ureteroscope into the ureter.

Gross hematuria- blood in the urine that can be seen with naked eye.

upper third ureter: from renal pelvis to the top edge of the sacrum

middle third ureter: from the top edge to the lower edge of the sacrum

distal third ureter : lower edge of the sacrum to the urinary bladd

4.13. Plan for dissemination of findings

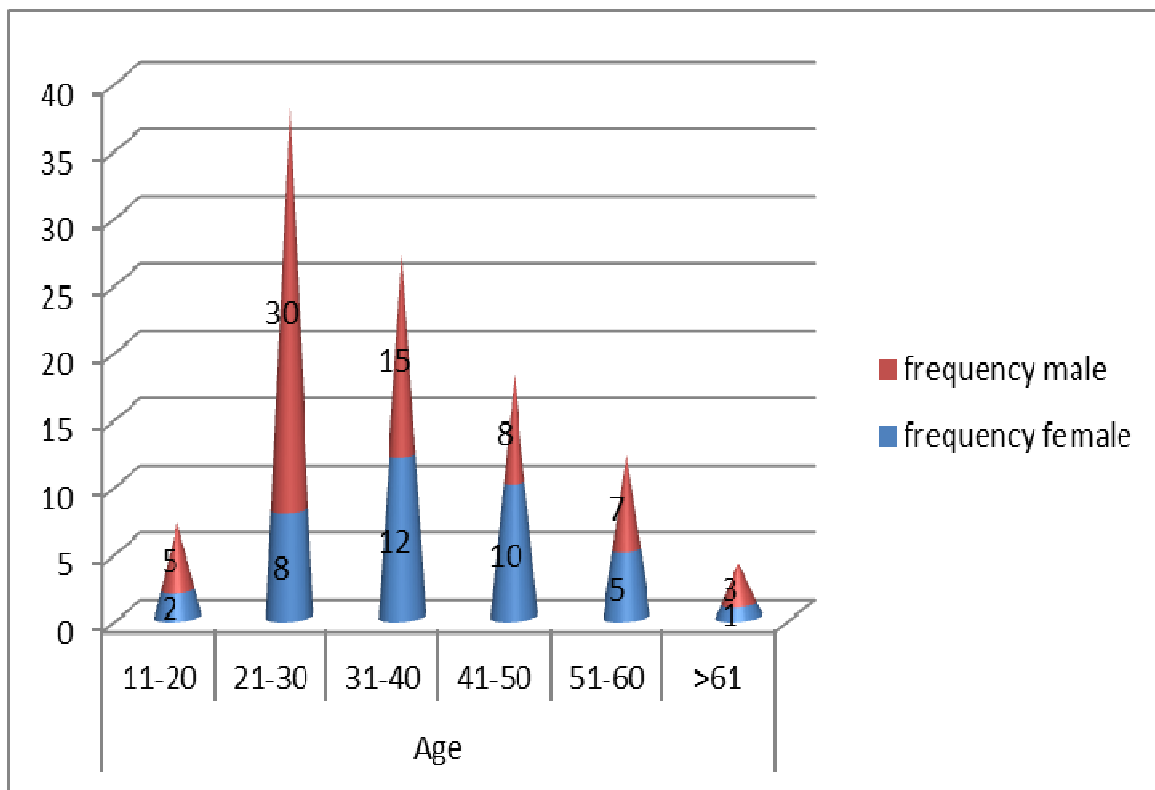
The research finding will be Published and submitted to supervisors, SPHMMC, SPH, SPHMMC library and other concerned bodies.

CHAPTER –FIVE

5.1 Demography

A total of 106 patients who underwent ureteroscopy were included in this study. Among these patients 68 (64.2%) were males while 38(35.8%) were females. Patients age ranged from 13 years to 73 years with mean age of 36.4years. Most of patients (59.4%) come from urban area and the rest come from rural part of the country. Almost all of patients were admitted on elective (98.1%)(figure1).

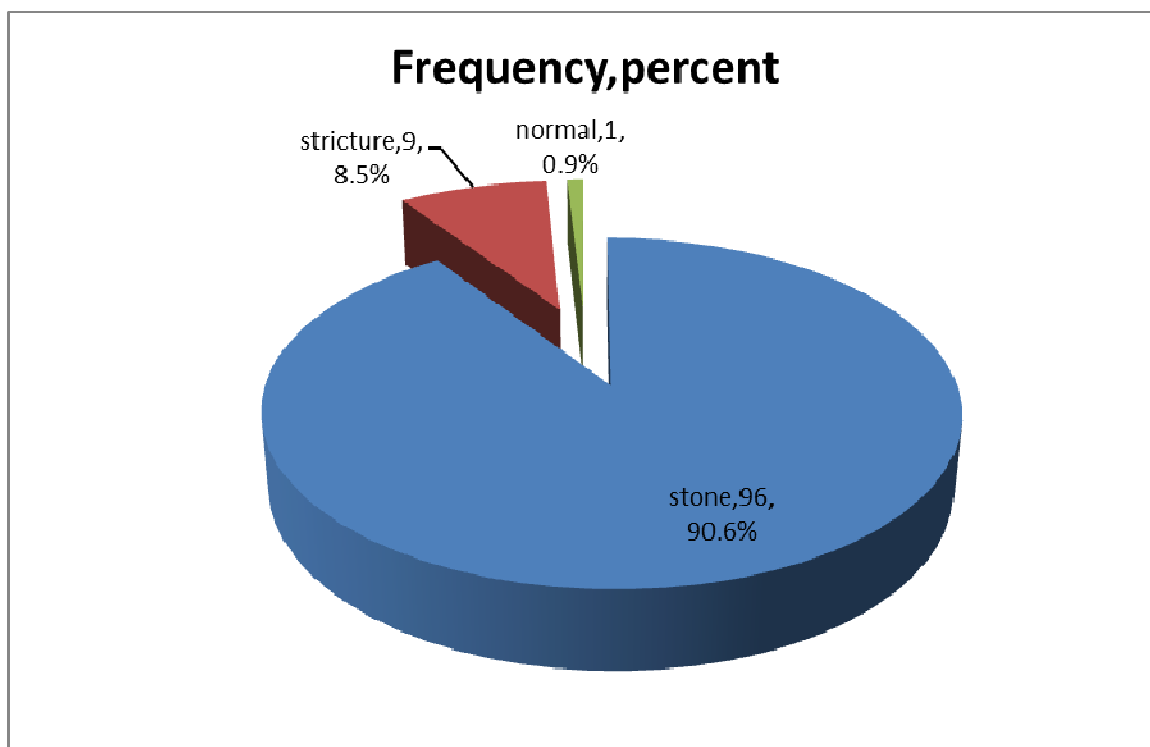
Figure 1.Age and Sex distribution of patients who underwent URS procedures at SPHMMC Hospital, Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C.



5.2 Diagnoses

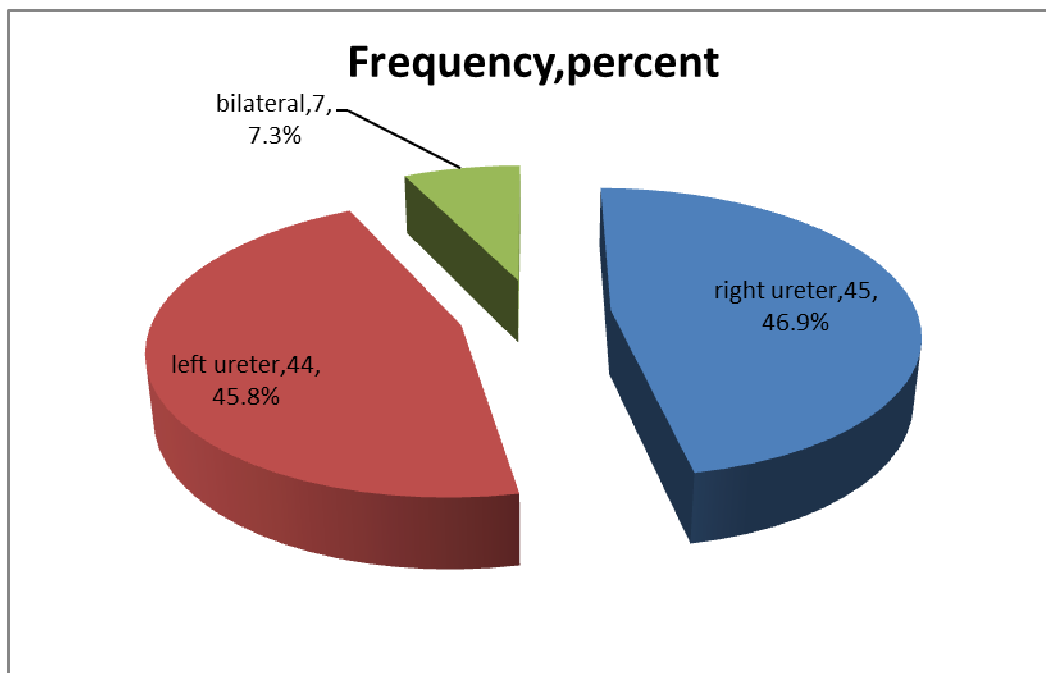
Most patients had ureteric stone during the procedure 96(90.6%), while 9 Patients (8.5%) were diagnosed as ureteric stricture and one had normal findings (figure 2).

Figure 2. Clinical and imaging Diagnosis of Patients underwent ureteroscopy procedures at SPHMMC Hospital, Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C.



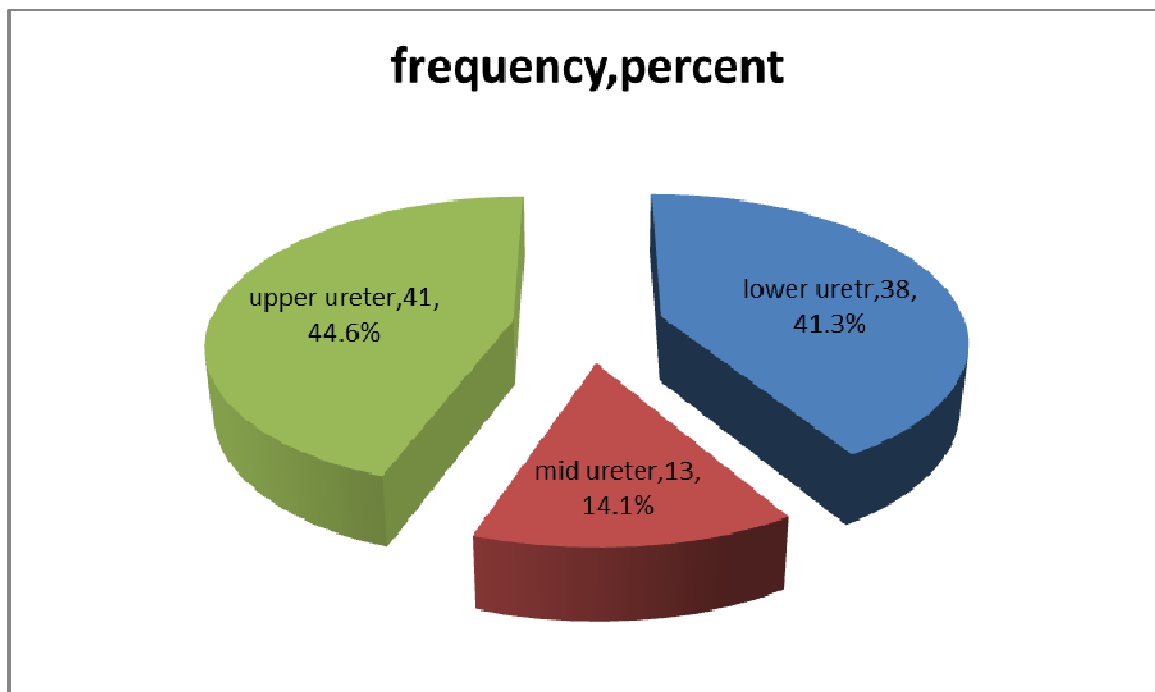
Left and right ureteric stones were present in 44 (45.8%) and 45 (46.9%) respectively and 7 (7.3%) had bilateral ureteric stones (figure 3).

Figure 3. Clinical and imaging Diagnosis the side of stone in the ureter in Patients underwent ureteroscopy procedures at SPHMMC Hospital, Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C.



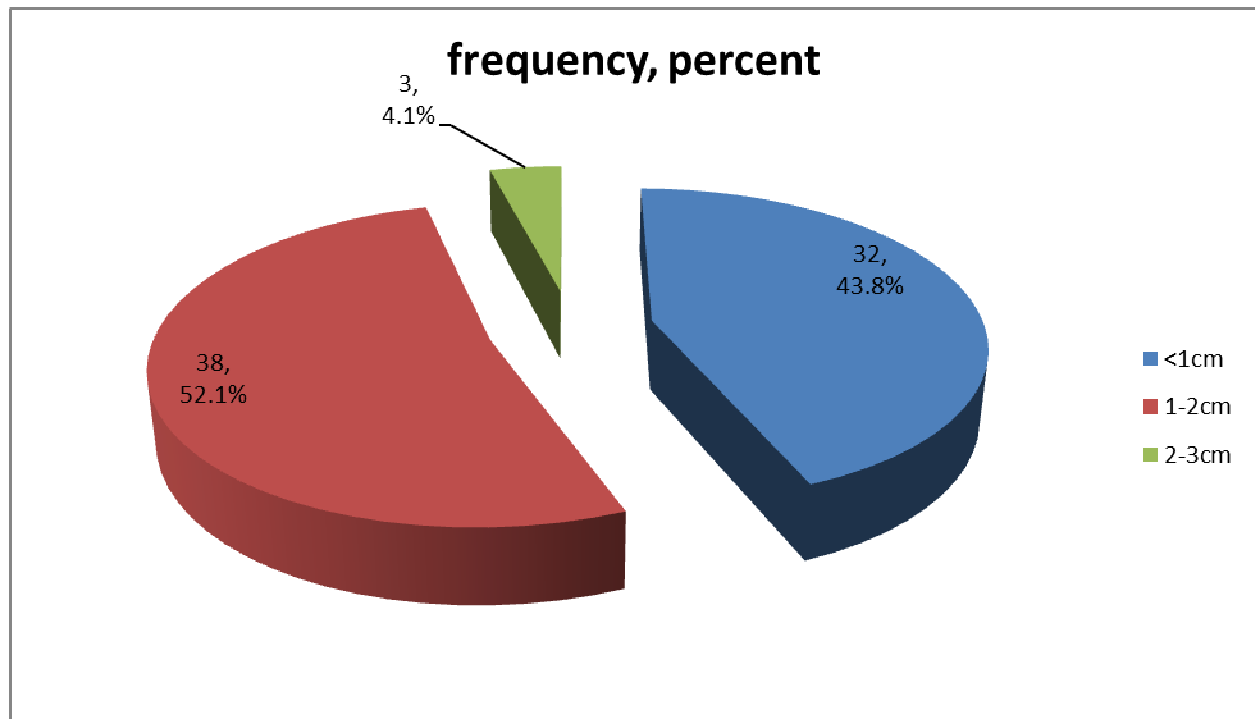
Out 96 patients diagnosed with ureteric stone, exact site of stone in the ureter is mentioned in 92 patients and the rest are not included in analysis based on exact place of stone. Ureteric stones were present in the lower ureter 38 (41.3%) patients, in mid ureter 13 (14.1%) patients, in upper ureter 41 (44.6%) patients (figure 4).

Figure 4. Clinical and imaging Diagnosis of the exact place of stone in the ureter in Patients underwent ureteroscopy procedures at SPHMMC Hospital, Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C.



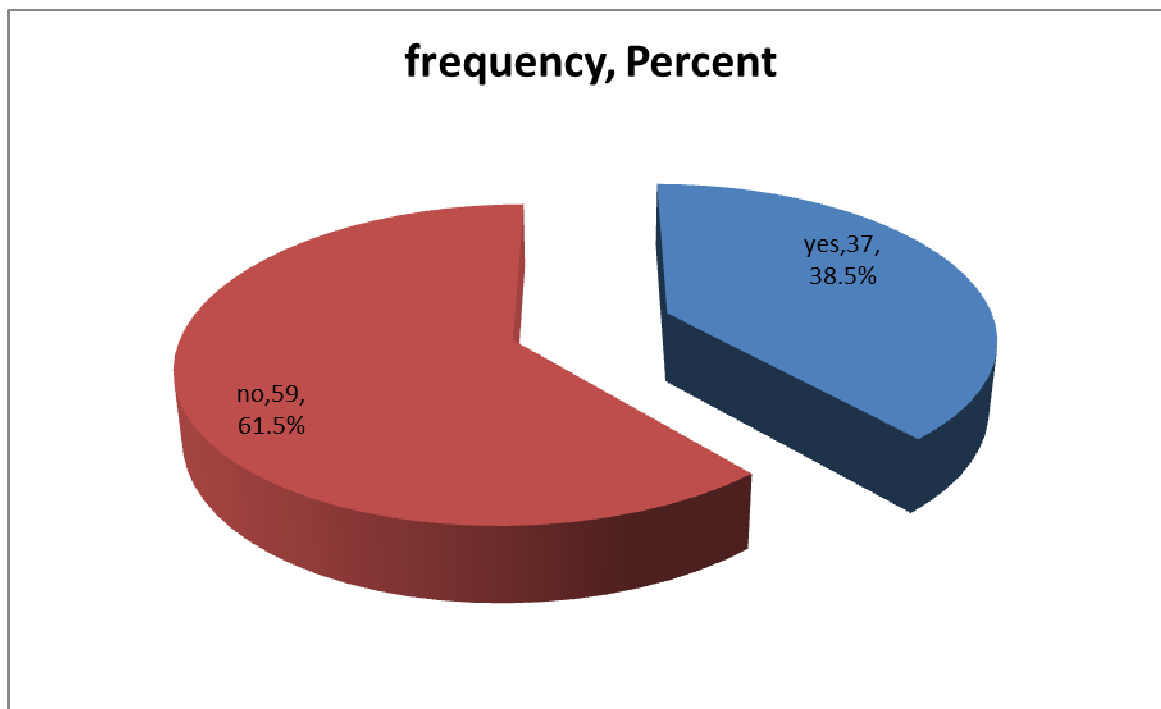
Among 96 patients diagnosed with ureteric stone, the size of the stone is described in 73 patients and the rest excluded from analysis made based on stone size. Size of the stone was < 1 cm in 32 (43.8%) patients, 1 cm to 2 cm in 38 (52.1%) patients and 2 cm to 3 cm in 3 (4.1%) patients (figure 5).

Figure 5. Clinical and imaging Diagnosis of the size of stone in the ureter in Patients underwent ureteroscopy procedures at SPHMMC Hospital, Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C.



In around 37 patients (38.5%) of patients who underwent URS for diagnosis of ureteric stone has concomitant renal stone. (Figure 6)

Figure 6.the frequency of concomitant renal stone in patient who underwent URS for ureteric stone at SPHMMC Hospital, Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C.



5.3 TREATMENT AND OUTCOMES

Stones were approached with Ureteroscope and fragmentation was done with Pneumatic or/and laser Lithotripsy. Out of 96 patients with ureteric stones, 36 (37.5%) patients had only double J stenting, 10 (10.4%) of patients had complete stone extraction intra operatively, 41(42.7%) patients the stone was fragmented, 2 (2.1%) stone was dislodged proximally and failed therapeutic ureteroscopy procedure was done for 7 (7.3%) patients (Table 3).

Table 3. Therapeutic Procedures performed for ureteric stone at SPHMMC Hospital, Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C.

procedure performed	Frequency	Percent
only J stent	36	37.5
stone extraction only	3	3.12
stone extraction + J stent	7	7.29
stone crushing only	4	4.2
stone crushing + J stent	37	38.5
proximal dislodging only	0	0
proximal dislodging + J stent	2	2.1
Failed procedure	7	7.3
Total	96	100

Out of 106 patients Ureteric stent was done in 91(85.8%) patients and in 15(14.2%) patients ureteric stent was not done. From 96 patients with ureteric stone, ureteric stent was done in 82(85.4%) patients. (Table 3) The average duration of post-operative hospital stay is 3.22 days. The average duration of operation was 49 minute.

Out of 92 patients whose exact site of stone in ureter is described, 1 patient is excluded due to lack of post op follow up imaging. Overall, Stone was completely removed in 51 (56%) of patients. Stones were successfully fragmented and cleared in 27 (71.1%) patients from lower ureteric stone, in 6 (46.2%) patients from mid ureteric stone and in 18 (45%) patients from upper ureteric stone (Table 1).

Table 1. Results of URS by Pneumatic/laser Lithotripsy for Ureteric Calculi at Different Levels at SPHMMC Hospital, Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C.

Exact place of stone in ureter		post op follow up imaging			Total
		stone removed completely	remaining stone	proximal migration	
lower ureter	frequency	27	11	0	38
	% within exact place of stone	71.1%	28.9%	0.0%	100%
mid ureter	frequency	6	7	0	13
	% within exact place of stone	46.2%	53.8%	0.0%	100%
upper ureter	frequency	18	19	3	40
	% within exact place of stone	45%	47.5%	7.5%	100%
Total	frequency	51	37	3	91
	% of Total	56.0%	40.7%	3.3%	100.0%

Out of 73 patients with known stone size, it was successfully fragmented and cleared in 20 (62.5%) patients with stone size <1 cm, in 17 (44.73%) patients with stone size 1-2 cm and in 1 (33.3%) patients with stone size 2-3 cm (table 2).

Table 2. Results of URS by Pneumatic or laser Lithotripsy for Ureteric Calculi of Different Sizes at SPHMMC Hospital, Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C.

size of ureteric stone		post op follow up imaging			Total
		stone removed completely	remaining stone	proximal migration	
<1cm	Frequency	20	11	1	32
	% of size ureteric stone	62.5%	34.3%	3.2%	100%
1-2cm	Frequency	17	20	1	38
	% of size ureteric stone	44.73%	52.63%	2.63%	100%
2-3cm	Frequency	1	1	1	3
	% of size ureteric stone	33.3%	33.3%	33.3%	100%
Total	Frequency	38	32	3	73
	% of Total	52.1%	43.8%	4.1%	100.0%

The procedure was 93(87.7%) successful and 13(12.3) unsuccessful. The individual success rate of the procedure for the stone of the lower ureter, mid ureter and upper ureter was 38(95%), 9(64.2%) and 41(89.1%) respectively. Based on stone size, the procedure was successful for the ureteric stones size <1cm, 1-2cm and 2-3cm was 29 (90.6%), 32 (82.05%) and 3(100%) respectively.

5.4 TREATMENT COMPLICATION AND RECOMMENDATIONS

The ureter was avulsed in 1 (0.9%), ureteral perforation in 3(2.8%) and gross hemorrhage 2(1.9%) of patient. Ureter avulsed while retrieving stone with basket and reconstructed with open procedure (Ureteroneocystostomy with Boary's flap) . All perforations were associated with impaction of stone. One perforation reconstructed by open procedure and for 2 of perforation repeats URS done. For one patient with gross hemorrhage repeat URS done and for the other one PCL done (Table 4).

Table 4. Intraoperative complications of procedures at SPHMMC Hospital, Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C.

Intraoperative complication	Frequency	Percent
ureteral avulsion	1	0.9
ureteral perforation	3	2.8
Gross hemorrhage	2	1.9
No major complication	100	94.3
Total	106	100.0

Out of 106 patient 55(51.9%) discharged improved, 25(23.6%) recommended to have repeat URS, 11(10.4%) recommended to have ESWL, 10(9.4%) open surgical procedure done, 3(2.8%) recommended to have PCL and 2(1.9%) done other procedure (table5).

Table 5.Postoperative Recommendations of Patients who Underwent URS for ureteric stone procedures at SPHMMC Hospital, Addis Ababa, Ethiopia from February 1, 2017 up to January 31, 2018 G.C.

Postoperative Recommendations		Frequency	Percent
	Discharged	55	51.9
	repeat URS	25	23.6
	ESWL	11	10.4
	open surgery procedure	10	9.4
	PCNL	3	2.8
	Others	2	1.9
	Total	106	100.0

CHAPTER SIX

DISCUSSION

Ureteroscopic lithotripsy has become the method of choice for the management of ureteric calculi in many centers worldwide, although some prefer SWL. The main advantage of URSL is because it offers both immediate reliefs from symptoms and good stone fragmentation. Factors affecting safety and effectiveness of intra ureteral fragmentation of stones by endoscopic techniques include: stone size, its location within the ureter, type of instrument used and the operator's experience. The success rate was attributable to the learning curve, accumulation of experience with ureteroscopy and advancement of the instrument. (2)

A total of 106 patients who underwent ureteroscopy were included in this study. Among these patients 68 (64.2%) were males while 38(35.8%) were females. It is comparable with study undertaken in Egypt by M. El-Qadhi on ureteroscopic procedures for the treatment of distal ureteric calculi. (3) A paper from India by Krishna Reddy SV1* and Ahammad Basha done on ureteroscopic lithotripsy (URSL) showed same result.(5) A paper from Ethiopia by D. Andualem, L. Be-edde, T. Mulat, L. Samodi done on Ureteroscopy in a Resource Limited Setting.(1)

In our study, the age of patient ranges between 13 years to 73 years with mean age of 36.4years. In consensus with study undertaken in Egypt by M. El-Qadhi on ureteroscopic procedures for the treatment of distal ureteric calculi. (3) A paper from India by Krishna Reddy SV1* and Ahammad Basha done on ureteroscopic lithotripsy (URSL). (5) A paper from Ethiopia by D. Andualem, L. Be-edde, T. Mulat, L. Samodi done on Ureteroscopy in a Resource Limited Setting. (1)

Most patients had stone diseases during the procedure 96(90.6%), while 9 Patients (8.5%) were diagnosed as ureteric stricture and one had normal findings. Left and right ureteric stones were present in 44 (45.8%) and 45 (46.9%) respectively and 7 (7.3%) had bilateral ureteric stones. Ureteric stones were present in the lower part of 38 (41.3%) patients, in mid ureter 13 (14.1%) patients, in upper ureter 41 (44.6%) patients. Size of the stone was < 1 cm in 32 (43.8%) patients, 1 cm to 2 cm in 38 (52.1%) patients and 2 cm to 3 cm in 3 (4.1%) patients. It is slightly different from study done in Pakistan by G.M. Subhani, Safdar Hassan Javed, et.al done on ureteric calculi showed, 209 (38.6%) patients presented with lower ureteric stones, 266 (49.20%) patients presented with stones in the mid ureter, 65 (12.2%) patients presented with stones in the upper ureter. Bilateral ureteric calculi were present in 95 (17.5%) cases.(4) also study undertaken in Egypt by M. El-Qadhi on ureteroscopic procedures for the treatment of distal ureteric calculi showed Left and right ureteric stones were present in 63 (54%) and 54 (46%) patients, respectively. Bilateral ureteric stones were found in 19 patients (14%).(3) A paper from Ethiopia by D. Andualem, L. Be-edde, T. Mulat, L. Samodi done on ureteroscopy showed, Most 38 (45.3%) patients had stone disease during ureteroscopy while 20 (23.9%) were diagnosed normal and 16 (19.1%) ureteric stricture.(1)

Overall, Stone was completely removed in 51 (56%) of patients. Stones were successfully fragmented and cleared in 27 (71.1%) patients from lower ureteric stone, in 6 (46.2%) patients from mid ureteric stone and in 18 (45%) patients from upper ureteric stone. Stones were successfully fragmented and cleared in 20 (62.5%) patients with stone size <1 cm, in 17 (44.73%) patients with stone size 1-2 cm and in 1 (33.3%) patients with stone size 2-3 cm. which has lower success rate than a paper from Pakistan by G.M. Subhani, Safdar Hassan Javed, et.al done on ureteric calculi showed, Overall, ureteric stones at different levels and of different sizes were treated successfully in 480 (89.0%) patients and in remaining 60 (11.0%) patients' stones could not be broken. Stones were successfully fragmented and cleared in the 198 (94.73%) of 209 patients with stones in the lower ureter, in 253 (95.11%) of 266 patients with stones in the mid ureter and in 29 (44.61%) of 65 patients with stones in the upper part of ureter. Stones were successfully fragmented in 347 (98.21%) out of 354, 92 (85.18%) out of 108 and 41 (52.56%) out of 78 patients with stone sizes of <1 cm, 1-2 cm and 2-3 cm respectively.(4) A paper from India by Krishna Reddy SV1* and Ahammad Basha done on 268 patients who underwent ureteroscopic lithotripsy (URSL) showed, The stone clearance at one week for mid ureteric stones in Group I (89.78%), Group II (91.67%), and Group III (91.89%) and in lower ureteric stones clearance was in Group I (97.96%), Group II (96.88%) and in Group III(95.95%).(5) The discrepancy in the stone clearance rate may be explained by usage of more advanced technological like flexible ureteroscopy.

In our material, the procedure performed for patient with ureteric stones(96), 36 (37.5%) patients had only double J stenting, 10 (10.4%) of patients had complete stone extraction intraoperatively, 41(42.7%) patients the stone was crushed , 2 (2.1%) stone was dislodged proximally and no therapeutic ureteroscopy procedure was done for 7 (7.3%) patients. Ureteric stent was done after Ureteroscopy in 82(85.4%) patients for ureteric stone. It is comparable with a paper done in Pakistan by G.M. Subhani, Safdar Hassan Javed, et.al showed ,DJ stents were inserted in 426 (78.81%) cases.(4) it has slightly different result as compared to a paper from Ethiopia by D. Andualem, L. Be-edel, T. Mulat, L. Samod, complete stone extractin was done for 19 (50%) of patients Nine (23.7%) patients had only double J stenting while no other therapeutic ureteroscopy procedure was done for 6 (15.8%) patients. For 2 (5.3%) patients the stone was crushed and in 2 (5.3%) others stone was dislodged. (1)

The ureter was avulsed in 1 (0.9%), ureteral perforation in 3(2.8%) and gross hemorrhage 2(1.9%) of patient. It is comparable to a paper from Pakistan by G.M. Subhani, Safdar Hassan Javed, et.al done showed ureteric avulsion was in 1(0.18%).(4) A paper from Ethiopia by D. Andualem, L. Be-edde, T. Mulat, L. Samod, 1.2% patient had ureteric perforation.(1)

Out of 106 patient 55(51.9%) discharged improved, 25(23.6%) recommended to have repeat URS, 11(10.4%) recommended to have ESWL, 10(9.4%) open surgical procedure done, 3(2.8%) recommended to have PCL and 2(1.9%) done other procedure. It is slightly different from a paper done in Ethiopia by D. Andualem, L. Be-edde, T. Mulat, L. Samod, Of the 38 stone patients 24 (63.2%) were discharged after the ureteroscopy while 12 (31.5%) patients had to undergo other procedures and 2 (5.3%) patients for a repeat ureteroscopy.(1) These discrepancy in post op outcome and recommendation may be explained by high rate of concomitant renal stone disease in our study patients.

CHAPTER SEVEN

CONCLUSION

- ❖ Majority of patients were males and in their 2nd and 5th decades with male predominance.
- ❖ Most 96 (90.6%) patients had stone disease during ureteroscopy while 9 (8.5%) were diagnosed as ureteric stricture and 1 (0.9%) normal.
- ❖ Ureteric stones were present in the lower part in 38 (41.3%) patients, in mid ureter 13 (14.1%) patients, in upper ureter 41 (44.6%) patients.
- ❖ Size of the stone was < 1 cm in 32 (43.8%) patients, 1 cm to 2 cm in 38 (52.1%) patients and 2 cm to 3 cm in 3 (4.1%) patient.
- ❖ Overall, Stone was completely removed in 51 (56%) of patients. Stones were successfully fragmented and cleared in 27 (71.1%) patients from lower ureteric stone, in 6 (46.2%) patients from mid ureteric stone and in 18 (45%) patients from upper ureteric stone. Ureteric stone was successfully fragmented and cleared in 20 (62.5%) patients with stone size <1 cm, in 17 (44.73%) patients with stone size 1-2 cm and in 1 (33.3%) patients with stone size 2-3 cm, which has lower stone clearance rate compared to other study. This may be due to advent of small caliber semi rigid and flexible ureterooscopy and accumulation of experience.
- ❖ Around half the patients require second look or other form of procedure; these may be due to high rate of concomitant renal stone disease.
- ❖ There was ureteric avulsion in 1 patient (0.9%), ureteral perforation in 3 patients (2.8%) and gross hemorrhage in 2 patients (1.9%).

CHAPTER EIGHT

RECOMMENDATIONS

- The number of studies on URS in our country is very few and further detailed studies especially prospective studies need to be undertaken in the subject matter.
- We should work on improvements in skills and experience's curve which may lead to a significant progress in the success rate and decreased complication.
- In a country like Ethiopia having limited financial resources, transurethral rigid URS along with Lithotripsy is still an acceptable procedure for the stones of different sizes and at different levels in the ureter.

Annexes

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OUTCOME OF TRANSURETHRAL URETEROSCOPY (URS) AT ST-PAUL
HOSPITAL MILLENNIUM MEDICAL COLLEGE, ADDIS ABABA,
ETHIOPIA

DATA COLLECTION FORMAT

1. Age ____
2. Sex ____
3. Card no _____
4. Address
A. Urban B. Rural
5. Pattern of admission
A. emergency B. elective
6. Clinical, imaging and Ureteroscopic Diagnosis
A. stone B. stricture C. normal D. Other _____
7. Site of the Stone
A. right ureter B. Left ureter C. ureter and kidney
D. bilateral in ureter E. other
8. The exact place of Stone in Ureter
A. Lower Ureter B. Middle Ureter C. Upper Ureter D. Not mentioned
9. Size of ureteric Stone
A. < 1cm B. 1 -2cm C. 2-3cm D. Not mentioned
10. Therapeutic Procedures performed
A. Only J stenting B. Stone extraction
C. Stone crushing D. Proximal dislodging E. None

11. if for Question number to 7 the answer is none, why?

12.Type of Anesthesia

A. spinal anesthesia B. general anesthesia

13. Time taken for the procedure.....

14. Intraoperative and postoperative complications of procedures

A. Ureteral avulsion B. Ureteral perforation C. Mucosal Lacerations

D. Gross hemorrhage E. Urinary tract infection F .Renal colic

15. Duration of post-operative hospital stay.....

16. post-operative follow up imaging

A. stone removed completely B. remaining stone

C. proximally migration D. J stent incorrect place

17. Postoperative Recommendations of Patients who Underwent URS

A. Discharge

B. Repeat URS

C.ESWL

D. Open stone removal

E, Other