Alemayehu Tegegn, Maria Elena Suarez Marcillan, Henok Teshome. *Ethiop Med J, 2020, Vol. 58, No. 1*

ORIGINAL ARTICLE

EXPERIENCE OF LAPAROSCOPIC UROLOGY SURGERY AT A TERTIARY HOSPITAL, ADISS ABABA, ETHIOPIA

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ABSTRACT

Introduction*: For several decades minimal access surgery has become the path of preference in the treatment of most surgical diseases of the urinary tract, replacing open surgery. It is a common treatment modality in developed countries, but not in developing countries.*

Objective*: To determine the outcome of laparoscopic urologic surgeries at St. Paul's Hospital Millennium Medical College*

Methods*: An institution based prospective study was conducted on patients for whom laparoscopic urology surgeries were performed from January 1, 2017 to June 30, 2017 at St Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia.*

Results*: 33 laparoscopic urology surgeries were performed in the study period. 20 were renal cysts excision, 11 were nephrectomies and the remaining 2 were ureterolithotomies. For all procedures, there was no significant blood loss (<70ml for the nephrectomies and, <10 ml for the other procedures). After laparoscopic cystectomy, the postoperative hospital stay was 24 hours and all patients had commenced work activities by 15 days. After laparoscopic ureterolithotomy, the total hospital stay was 48 hours, and both patients similarly began routine work after 15 days post op. After laparoscopic nephrectomy, all patients were discharged after 48-hours, and commenced routine work by the 21st post op day.*

Conclusion*: Minimally invasive surgery is a safe and an effective option for the treatment of renal cyst, ureterolithiasis, and pathologies requiring nephrectomy. It provides a shorter hospital stay and earlier return to work than open surgery.*

Keywords*: Retroperitoneoscopy; Renal cyst decortications; Ureterolithotomy; Retroperitoneoscopic Nephrectomy, Hand-assisted transperitoneal laparoscopic nephrectomy*

INTRODUCTION

The benign and malignant diseases of the urinary tract until more than three decades ago were treated with open surgery (retro or trans-peritoneal) until the introduction of laparoscopic surgery and endourology. Currently in the developed world laparoscopic and robotic urologic surgery is the gold standard. However, this is not the case in developing countries, where there are limited laparoscopic and endourology instruments due to high cost, and a shortage of qualified medical personnel (1).

The history of laparoscopy dates back to 1901, when Georg Kelling of Dresden, Germany performed diagnostic laparoscopy on the peritoneal cavity of a dog (2). The first transperitoneal laparoscopic nephrectomy was done by Clayman et al. in 1991 at Washington University and the retroperitoneal approach using a dissecting balloon was introduced by Gaur et al. in 1993 (3,4).

The first laparoscopic ureterolithotomy was performed by Wickham, in 1979, by a retroperitoneal approach (5). Laparoscopic renal cyst excision was first described by Hulbert in 1992 (6).

The advantages of laparoscopic surgeries include reduced postoperative pain, shorter hospital stay, earlier return to normal activities, and improved cosmesis compared with the open approach (1-6).

St Paul's hospital is a tertiary hospital located in the country's capital, Addis Ababa, Ethiopia. Improving the quality of patient care is one of its missions. Accordingly, it has expanded its advanced diagnostics modalities (Ultrasound, Computed Tomography, Magnetic Resonance, etc.), its number of laparoscopic surgical instruments and qualified and trained medical personnel for the practice of complex urological surgeries using minimal access.

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The goal of the current study was to evaluate our initial experiences in laparoscopic procedures. To the best of our knowledge, there are no similar studies in Ethiopia. These findings will be helpful for the hospital and other concerned bodies in understanding the advantages of laparoscopic urology surgery and planning appropriate actions.

METHODS AND MATERIALS

Study site: The study was conducted at St. Paul's Hospital Millennium Medical College (SPHMMC) department of surgery, Urology unit. During the study period, there were 5 urologists in the department. The unit had 12 beds and operates an average of 18 patients in the major operating room (OR) four times per week.

Study design: An institution-based prospective study was conducted on patients for whom laparoscopic urology surgeries were performed from January 1, 2017 to June 30, 2017 in St Paul's Hospital Millennium Medical College, Department of Urology Addis Ababa, Ethiopia.

We conducted this study to show the outcome of minimal access urologic surgeries at SPHMMC and specifically to (i) determine the indications for the laparoscopic procedure, (ii) determine the surgical time and blood loss (iii) determine patients' postoperative course.

The source population for the study was all urology patients operated at the urology unit of SPHMMC. Patients who underwent laparoscopic procedures for urologic indications were the study populations.

All patients with renal cysts who were symptomatic or with Bosniak grade three during the study period The ureterolithotomies were performed for failed or anatomically difficult Extracorporeal Shock Wave Lithotripsy (ESWL) and Ureteroscopy (URS). After renal cyst excision (laparoscopically) one patient's pathology result was malignant, hence laparoscopic nephrectomy was done.

Data collection: Data was collected using a structured questionnaire from the time the individual patient was admitted until discharge, and also in the referral clinic. Data were collected in three separate formats. The first format assessed the sociodemographic characteristics of the patient and the indication for surgery. The second format assessed the surgical technique and the intraoperative findings including the surgical time and blood loss.

The third format assessed the postoperative course of the patient. Data were collected by the investigators themselves.

Data analysis: Collected data were checked for completeness, cleaned, coded and entered in into SPSS version 20. The results were described within tables. Intraoperative pictures were used to show the intraoperative findings and techniques.

Ethical clearance was obtained from SPHMMC IRB. Data about individual patient records was used only for the study purpose and confidentiality maintained throughout the study.

Surgical Techniques

In all cases, ultrasonography (US) and contrasted/ non contrasted computed tomography (CT) scan, were done to determine the appropriate location, size, and Bosniak classification of renal cysts (Figure 1). For simple nephrectomies, CT and US was used to evaluate renal parenchyma and in stone

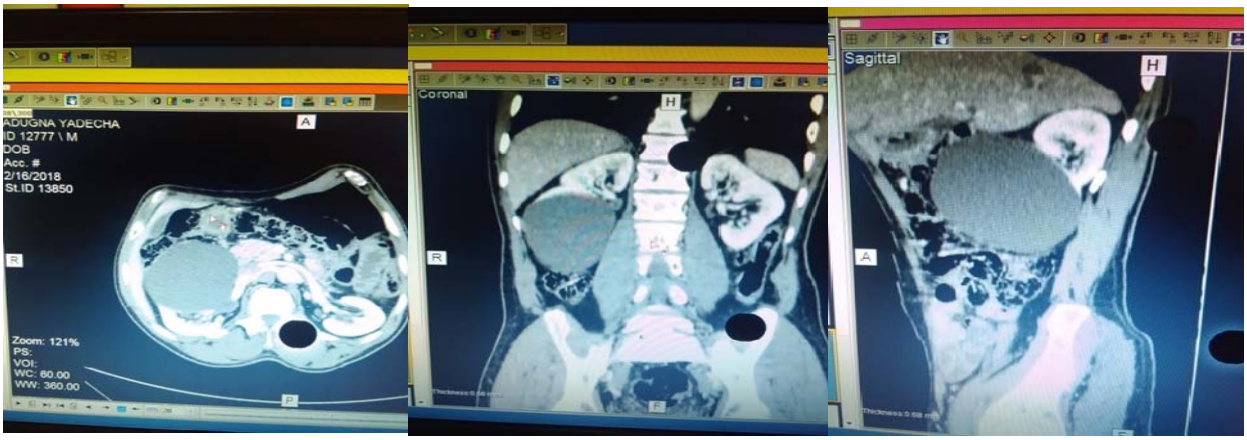


Figure 1: CT scan. Right Renal Cyst in the lower pole.

All surgeries were performed by the same two urologists (from Cuba and Ethiopia). Written consent was taken from all patients after disclosing the advantages and disadvantages of the procedures with the risk of open conversion.

All patients were operated under general anesthesia. The standard technique was used for all of the procedures. For retroperitoneal access three operating trocars (one 10 mm and two 5 mm) were used. Gaur's balloon was used afterinflation with 200 ml of normal saline to achieve adequate retroperitoneal space. CO_2 was insufflated at a pressure of 15 mm Hg.

Gerota's fascia was opened using grasping-forceps and dissector to identify the kidney and the cyst (Figure 2).

The cyst was then opened, aspirated and decortications performed with scissors or hooks using a monopolar electrosurgical unit (Figure 3). Finally, homeostasis of the edges was done and drainage inserted when needed. Urethral catheter was not inserted for the patients

Figure 2: Right Retroperitoneoscopy: opening and drainage of a renal cyst cavity.

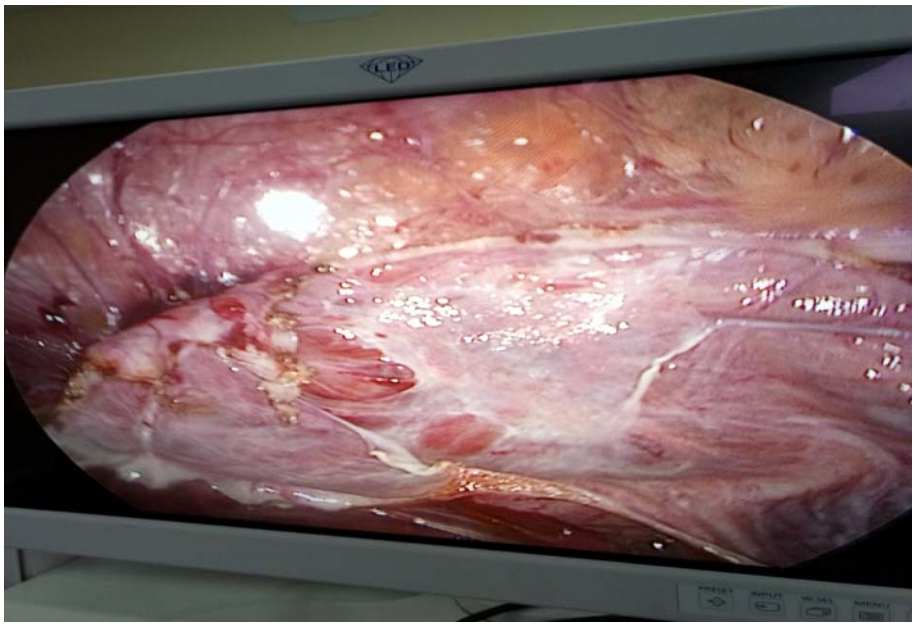


Figure 3: Right Retroperitoneoscopy: Cavity of renal cyst cleaned after decortication.

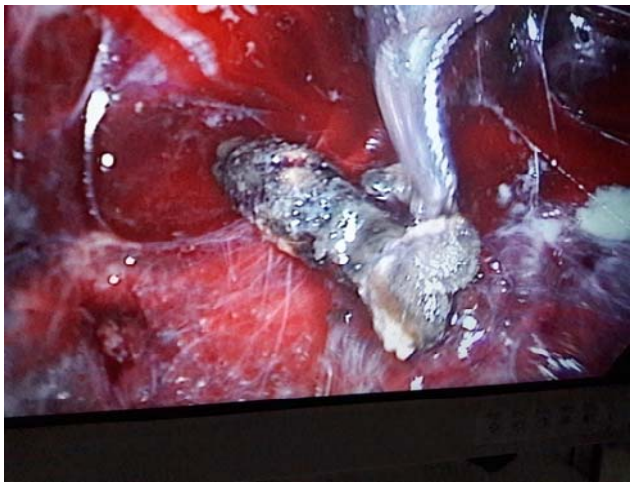
For ureterolithotomy, once the psoas muscle and ureter were located, the ureter was opened with a small incision using a hook and the stone extracted. By a joint maneuver, a guide wire was pushed up and over it and a JJ stent inserted into the kidney if it was not placed previously.

The ureteral incision was closed with 3/0 vicryl. A drain was placed in the retroperitoneal space and a urethral catheter inserted (Figure 4).

A

B

C



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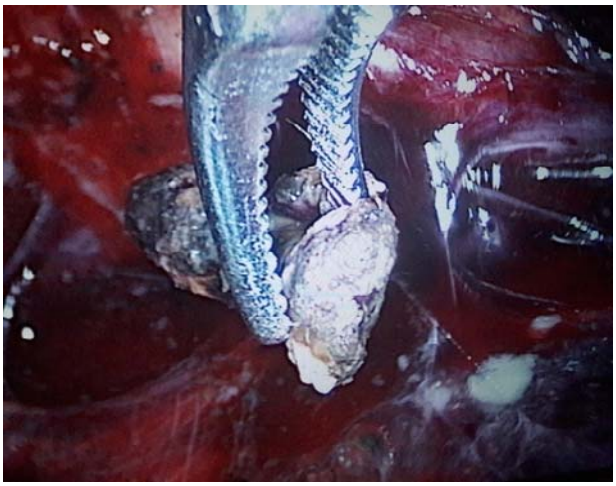

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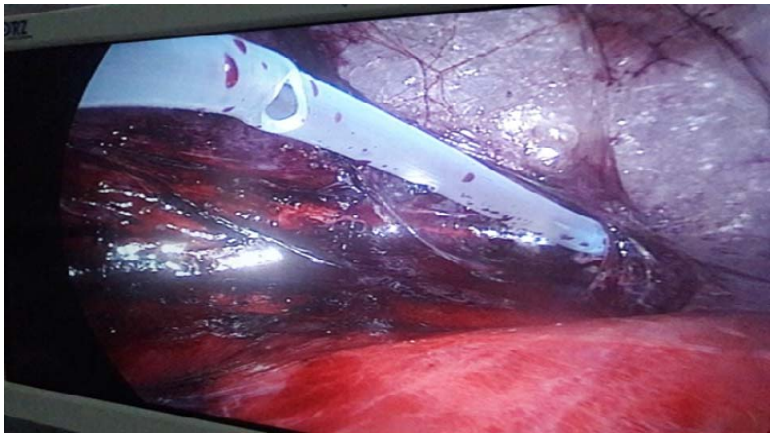

Figure 4: A: Right Retrograde Pyelography. Note stone located in the upper lumbar ureter. B: Small ureteral incision for the extraction of the stone. Note the ureteral inflammation at the site of the lithiasis. C and D: stone extraction. E: tubular drainage in place.

In laparoscopic nephrectomies, we combined the two previous procedures. The ureter was identified, dissected, ligated and sectioned. Gerota's fascia was opened and partial dissection of the kidney was done. The renal pedicle was dissected and clipped (Hemoclip) and cut with scissors. At the end of the dissection, the kidney was exteriorized through a bag via the telescope port, and morcellatión was done. The retroperitoneal space was checked and drainage placed.

For the hand-assisted radical nephrectomy, a 6 cm vertical incision was made above the umbilicus, as the hand port. Mobilization of the colon was done with an incision at the level of the Toldt line. Dissection of the kidney was done with a joint maneuver (manual and dissector), renal pedicle was dissected, clipped (Hemo-clip) and cut with scissors. The ureter was ligated and sectioned. When the dissection of the kidney was complete, it was placed in an endobag and removed entirely through the hand port.

Table 1: Characteristics of patients with renal cysts operated retroperitoneoscopically at SPHMMC: from January 1 to June 30 of 2017.

Age (Mean)		**52 years**
Sex	Male	12 (60%)
	Female	8 (40%)
Bosniak classification	I	13 (65%)
	II	3 (15%)
	IIF	3 (15%)
	III	1 (5%)
Size (Mean, longest diameter)		8.5 cm
Surgical time (mean)		64.7 minutes
Average time to return to routine work		15 days

Therefore, we did retroperitoneoscopic ureterolithotomy with complete removal of the stones. Later a JJ stent was placed. The operation time for both cases was 106 and 114 minutes. In the first post OP day we removed the urethral catheter, and the second day the retroperitoneal drain; bleeding was minimal. The total hospital stay was 48 hours. The JJ stent was removed after 2 weeks. On the 15th postoperative day both patients started their routine work.

All nephrectomies were performed entirely laparoscopically without conversion to open surgery (Table 2).

A drain was placed in the retroperitoneum and urethral catheter was inserted.

All specimens (cyst walls, morcellated and complete kidneys) were sent for histopathology, to check for malignancy.

RESULTS

In the study period, 33 urological laparoscopic surgeries were performed and analyzed, 20 were retroperitoneoscopic decortications for renal cysts (Table 1), and 11 were laparoscopic nephrectomies (10 simple and 1 radical nephrectomy) and the remaining 2 were ureterolithotomies. 32 of procedures were done by retroperitoneal access and 1 via a transperitoneal approach.

The patients were followed from 48 days to 9 months post operatively.

The mean (±SD) surgical time for laparoscopic cystectomy was 64.7 (±8.3) minutes. There was no significant blood loss (<10 ml). The postoperative hospital stay was 24 hours for all cases of renal cyst and all patients had commenced work activities by 15 days. In six months of follow up, the patients remained asymptomatic with no signs of recurrence of the cyst on follow up US and CT scan. The pathology exam of all patients showed a simple cyst, except one patient whose biopsy result was renal cell carcinoma for whom laparoscopic radical nephrectomy was done.

Two ureterolithotomies were performed, one for mid-ureteric stone after failed Extracorporeal Shock Wave Lithotripsy (ESWL) and Ureteroscopy (URS) and another for tortuous upper ureter (Figure 4) resulting in difficulty in inserting the guidewire and the ureteroscope.

The mean (±SD) operation time and blood loss for the retroperitoneoscopic nephrectomy was 120 minutes (±22.2) and 70 ml (±20.4), while for the transperitoneal approach the operation time and blood loss was 150 minutes and 60 ml respectively. The next day, retroperitoneal drains were removed and fluid diet and ambulation were started for all patients. All of them were discharged after 48-hours and commenced routine work by the 21st post op day.

In the postoperative follow-up at nine months, the patient with a renal tumor showed no signs of local and distant metastases on CT scan.

Table 2: Indications and laparoscopic approaches for patients who underwent laparoscopic nephrectomies at SPHMMC: from January 1 to June 31 of 2017.

Indications	Number and percent	Laparo-scopic approach
Hydronephrotic atrophies by pelviureteric junction (PUJ) obstruction	3 (27.2)	
Hydronephrotic atrophies secondary to stone formation	5 (45.5)	Retroperito-neoscopic approach
Hydronephrotic atrophies secondary to vascular abnormalities	2 (18.2)	
Renal Tumor	1 (9.1)	Transperito-neal approach

In our research, two retroperitoneal ureterolithotomies were done with complete stone extraction. The surgical time was 106 and 114 minutes, no significant bleeding was apparent, and hospital stay was 48 hours. In a similar study conducted by Navarro et al., the mean operation time and mean hospital stay was 110 minutes and 4.2 days respectively, which is comparable with our study (8). The median operative time of all surgeries is expected to decrease with increased surgical experience, as shown by a study conducted by Yusuf Saiffee et al. (9). Thus, we expect improvement in our operation time with increasing experience. The low number of ureterolithotomies by retroperitoneal access was because the majority of ureteric stones were treated by URS with pneumatic or laser lithotripsy, as the majority of the studies consider it as the treatment of choice (10,11).

We performed 10 nephrectomies, in spite of the perinephritis that on many occasions is present; conversion to open surgery was not necessary. The mean (±SD) operation time and blood loss for the retroperitoneoscopic nephrectomy was 120 minutes (±22.2) and 70 ml (±20.4), while for the transperitoneal approach the operation time and blood loss was 150 minutes and 60 ml respectively. The surgical time, minimal blood loss and favorable progress were similar to the studies performed by Saifee et al. and Thompson (9,12). In a study conducted by Gratzke et al. in high burden area Switzerland the operative duration was 113 (48) min during open nephrectomy, with intraoperative blood loss of 424 (361) mL and mortality rate of 16.2%; conversely, we observed a significantly lower blood loss and no mortality.

In all of the laparoscopic procedures (cystectomy, ureterolithotomy and nephrectomy) there were no intra and postoperative complications with excellent performance and recovery of all patients.

DISCUSSION

In our study the mean surgical time for laparoscopic cystectomy was 64.7 minutes. There was no significant blood loss (<10ml). The postoperative hospital stay was 24 hours for all cases of renal cyst excision. This is a shorter postoperative stay compared to a similar study conducted by Gupta et al. who reported of 24 patients who underwent laparoscopic cystectomy, the mean operating time was 95 minutes with an average hospital stay of 2.9 days (range 2–7 days) (7). We found that laparoscopic cystectomy is a good alternative for renal cyst management with good patient outcome, less postoperative stay and early return to work.

Our data support the conclusion that laparoscopic nephrectomy is a good alternative with low intraoperative blood loss, good patient outcome and less postoperative stay when compared with open nephrectomy (13).

A study conducted at SPHMMC to assess the pattern of general surgical and all urologic admissions (including the open procedures) showed the average total hospital stay for emergency urologic patients was 7.08 days. The average total hospital stay for elective urology patients was 9.4 days with an average preoperative stay of 5.3 and a post-operative stay of 4.1 days. Our study showed the maximum postoperative hospital stay was 48 hours, which is almost half of the open urologic procedures (14).

In general, our series demonstrated that minimally invasive surgery is a safe and effective option, for the treatment of renal cyst, ureterolithiasis, and pathologies requiring nephrectomy. It provides a shorter hospital stay, earlier return to work and normal activity than open surgery.

The limitation of the study was the relatively low sample size.

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