

A profile of laparoscopic ureterolithotomy: four years initial experience at Persahabatan Hospital, Jakarta, Indonesia

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ABSTRACT

Introduction: The introduction of laparoscopy in the field of urology has advanced surgery into a minimally invasive era, achieving better perioperative outcomes and lower incidence of complications. This study reports on the profile of laparoscopic ureterolithotomy performed in Persahabatan Hospital, Jakarta.

Method: This retrospective study examined laparoscopic procedures done during the years 2016-2019. Demographic characteristics, surgical duration, length of stay, perioperative parameters, and antibiotics prescribed were recorded.

Result: A total of 30 cases were reported. The gender ratio was 2:1 (male to female), with a mean age of 54.2 ± 9.9 . Twenty-two (73.3%) had proximal ureteric stone. Surgical duration and length of stay had means of 197.4 ± 46.1 minutes and 3.6 ± 1.1 days, respectively. The mean blood loss, preoperative and postoperative hematocrit was 40.5 ± 27.8 mL, $36.14\% \pm 5.73$ and $35.76\% \pm 5.71$, respectively. Mean preoperative and postoperative hemoglobin was 12.27 g/dL ± 1.84 and 12.12 g/dL ± 1.89 , respectively. The mean postoperative pain VAS score was 2.1 ± 0.8 . The most prescribed antibiotics for the procedure were cefoperazone (53.33%).

Conclusion: Considerably short duration of operations and hospital stay comparable with other study findings were reported. This study can be applied as baseline data for further research.

Keywords: antibiotics, perioperative, laparoscopic ureterolithotomy, urology.

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INTRODUCTION

A laparoscopic procedure was first performed in 1901 by Georg Kelling of Dresden, Germany; he performed a diagnostic laparoscopy in the peritoneal cavity of a dog.¹ He examined the abdominal wall using a cystoscope to evaluate the effects of pneumoperitoneum in dogs. The term laparoscopy is derived from the Greek words lapara and skopein. Lapara means “the soft part of the body between the ribs and hip, flank, and loin”, while skopein is defined as “to look at or survey”.¹

As the procedure was developed, it was found that laparoscopic surgery could reduce the incidence of potential complications. This procedure is now performed through images displayed on TV or LCD monitors for the

magnification of the surgical elements and fields.^{2,3} The modern era of laparoscopy has brought remarkable changes in approaches to surgical disease. The trend towards minimally invasive surgeries has incited surgeons to consider conversion to laparoscopic techniques. Urolithiasis, which is a fairly common urological problem, has traditionally been treated with the minimally invasive shockwave lithotripsy (SWL), ureteroscopy (URS), and percutaneous nephrolithotomy (PCNL). However, with the increasingly sophisticated techniques in urology, laparoscopic ureterolithotomy, and even nephrectomy, pyelolithotomy, etc., has become feasible and effective.⁴

Historically, the first laparoscopic ureterolithotomy was performed by Wickham in 1979 via retroperitoneal approach. Clayman et al. performed a

laparoscopic nephrectomy, and Gaur et al. followed in 1991 by introducing a balloon dissection technique of retroperitoneoscopy.⁵ Laparoscopic ureterolithotomy becomes the treatment of choice for primary treatment of large, impacted, proximal or medial ureteral stones, and for failed cases of SWL and attempted URS of stones in this locations, in patients with anatomical abnormalities of morbid obesity.⁶

This study aimed to describe the experience of laparoscopic ureterolithotomy performed in Persahabatan Hospital, one of Indonesia’s referral hospitals.

METHODS

Data were retrospectively collected from medical records at Persahabatan Hospital,

Jakarta, for the years 2016-2019. The demographic and stone characteristics, perioperative parameters, and antibiotics prescribed were obtained.

The measurements of the stones were reported in millimeters (mm). We divided stones based on size, and position as stated by the EAU Guidelines on Urolithiasis and Clinical Management Guide on Urolithiasis by Indonesian Urological Association.^{7,8} Perioperative parameters in this study include duration of operation, length of stay, blood loss, pre and postoperative hemoglobin and hematocrit. The intensity of postoperative pain was documented by a visual analog scale (VAS) score. The VAS scale was an unlabeled 10-cm horizontal line with word anchors at each end, ranging from 0 = "no pain at all" to 10 = "pain as bad as it could be." The patients were asked to make a mark on the line representing the maximum pain intensity suffered since the last scoring. This mark was converted to distance in centimeters from the "no pain" anchor to give a pain score that could range from 0 to 10 cm.

Patients with comorbidities, such as diabetes mellitus and hypertension with pre-operatively uncontrolled blood glucose and blood pressure, were excluded from this study. In addition, patients who received intraoperative conversion to open procedures were ruled out.

RESULTS

A total of 30 samples underwent laparoscopic ureterolithotomy between June 2016 and November 2019. The mean age of patients included in the study was 54 ± 9.9 . There were 19 males and 11 females in the study cohort (Table 1).

All of them had ureteric stones, 22 of them in the proximal ureter and 8 of them in the distal ureter. 15 were right-sided, 14 were left-sided, and 1 patient had bilateral ureteric stone. We describe stone sizes found in the table below (Table 2). Only 2 patients had stone size below the cut-off of 10 mm. Three patients had previous history of surgery, including nephrostomy and double-lumen catheter placement for hemodialysis.

The mean operative time was 197.4 ± 46.1 minutes. The mean blood loss was 40.5 ± 27.8 milliliter (mL). The mean

preoperative hematocrit was 36.14 ± 5.73 %, whereas mean postoperative hematocrit at 24 h decreased to 35.76 ± 5.71 %. Mean preoperative hemoglobin was 12.27 ± 1.84 g/dL, and mean postoperative hemoglobin at 24 h decreased to 12.12 ± 1.89 g/dL. The mean duration of stay was 3.6 ± 1.1 days. There were no major intraoperative complications. No conversion to open surgery was necessary. The mean postoperative pain VAS score was 2.1 ± 0.8 ; range: 1-3 (Table 3).

All of our patients were administered antibiotics pre- and postoperatively. The most common intravenous antibiotics provided were Cefoperazone and

Ceftriaxone. We exclusively gave Cefixime as antibiotics after the patients could tolerate oral antibiotics (Table 4).

DISCUSSIONS

In 2018, Deswanto et al. reported that a total of 64 patients were admitted to Cipto Mangunkusumo Hospital in a 1-year period (2015-2016) with a diagnosis of urinary tract stones. PCNL was the most common procedure done, comprising of 33 patients (51.6%), with only 4 patients (6.4%) undergoing laparoscopic ureterolithotomy.⁹ Whereas in Persahabatan Hospital, within 4 years,

Table 1. Demographic characteristics

Parameter	N (%)
Age, years (mean)	54 ± 9.9
Gender	
● Male	19 (63.33%)
● Female	11 (36.67%)
Stone location	
● Right	15 (50%)
● Left	14 (46.67%)
● Bilateral	1 (3.33%)

Table 2. Stone size and position

Parameter	N (%)
Stone size	
● ≤ 10 mm	2 (6.7%)
● > 10 mm	28 (93.3%)
Stone position	
● Proximal	22 (73.3%)
● Distal	8 (26.7%)

Table 3. Demographics of procedure and perioperative parameters

Parameter	Mean \pm SD
Operative time (min)	197.4 ± 46.1
Hospitalization mean	3.6 ± 1.1
Blood loss	40.5 ± 27.8
Hematocrit	
Pre-operative	$36.14\% \pm 5.73$
Post-operative	$35.76\% \pm 5.71$
Hemoglobin	
Pre-operative	12.27 ± 1.84
Post-operative	12.12 ± 1.89

Table 4. Antibiotics administered to patients undergoing laparoscopic ureterolithotomy

Antibiotics	N (%)
Cefoperazone	16 (53.33%)
Ceftriaxone	11 (36.67%)
Cefotaxime	3 (10%)

a total of 30 patients presented with urolithiasis and underwent laparoscopic ureterolithotomy, which reflects the relatively small number of cases warranting this procedure.

Mean operative time in this study was 197.4 ± 46.1 minutes and blood loss was minimal at an average of 40 mL, with a negligible difference in preoperative and postoperative hemoglobin and hematocrit. VAS score also ranged between 1 and 3, which shows that patients had relatively well-controlled pain. Laparoscopic surgery are favorable because of low postoperative morbidity, less blood loss, reduced hospitalization time, and better cosmetic results. Postoperative analgesics also reduced postoperative pain and analgesic demand.¹⁰ Sahin et al. in 2016, conducted a similar research in Turkey, and reported a considerably shorter mean operative time of 80.9 ± 10.9 minutes, and mean comparative blood loss of 63.3 ± 12.7 mL. The longer duration of operation could be attributed to different techniques used by surgeons. He also reported a slightly higher post-operative VAS score of 6.0 ± 0.8 in patients who had retroperitoneal laparoscopy, and a VAS score of 7.5 ± 0.9 in patients who had transperitoneal ones. However, the patients also reported a reduced VAS score in the next 24 hour.¹¹ El-Feel et al. in 2007, reported a similar mean operative time of 145 ± 42 minutes in patients who had undergone transperitoneal laparoscopic ureterolithotomy. The mean blood loss was 62.5 ± 23 mL with mean hemoglobin decline of 0.78 ± 0.31 g/dL, which was slightly larger than what we reported.¹² Bahar et al. in 2019, reported a similar result of hemoglobin and hematocrit drop in patients who underwent laparoscopic ureterolithotomy, compared to patients who underwent percutaneous nephrolithotomy. They reported mean preoperative hemoglobin of 13.18 ± 1.44 , mean postoperative hemoglobin of 12.88 ± 1.42 , with a mean difference of 0.3. mean preoperative hematocrit was $39.67\% \pm 4.55$, mean postoperative hematocrit was 38.61 ± 4.84 , with a mean difference of 1.06.¹³ This was similar to blood loss we reported.

This study also examines length of stay as a postoperative variable in

laparoscopic procedures. The mean length of stay was approximately 3 days. This was in line with findings by Symes et al. regarding postoperative care for urologic laparoscopies which reported that the length of stay of each patient depended on the type of laparoscopic procedure: with patients undergoing ureterolithotomy averaging a 3-day stay.¹⁴ Wani et al. conducted a study on laparoscopic ureterolithotomy and reported a 3.3 days length of stay, conducted in a hospital in India.¹⁵

According to a study conducted by Molloy et al., a few factors might influence complications in patients undergoing laparoscopic procedures. They include a history of previous illness, the skill and experience of the operator, and the hygiene of the operating theatre available at the hospital.¹⁶ In 2016, Sahin et al. in a study involving a 213 patient cohort undergoing laparoscopic ureterolithotomy. He reported urinary leakage in both the retroperitoneal and transperitoneal group, treated conservatively and without long-term morbidity.¹⁷ We did not record any significant post-operative complications, which was consistent with the relatively lower rate of complications in laparoscopic approach compared with open surgery. In addition, no patients underwent open conversion in this study.

Canadian Urological Association (CUA) Guidelines on antibiotic prophylaxis for urologic procedures reported that administering antibiotics before surgery did not significantly decrease the incidence of postoperative infections in urologic procedures, except for laparoscopies (1.1% vs. 0.7%).¹⁸ Deswanto et al. described the microbial and antibiotics resistance pattern along with the data on the most commonly prescribed perioperative antibiotic prophylaxis among patients admitted to Cipto Mangunkusumo Hospital with urinary tract stones. *Escherichia coli* represents the major isolated microbe in this study (134%). They found the highest sensitivity of the microbes towards Nitrofurantoin (firstline antibiotic) and Cefoperazone-Sulbactam (second-line antibiotic), which showed 50% and 56% sensitivity, respectively, in the antibiotic susceptibility test results.⁹ In contrast,

our study showed that cephalosporins (Ceftriaxone and Cefoperazone) were the antibiotics most commonly administered to patients, arguably because they are effective against both gram-positive and gram-negative bacteria. However, the resistance to an antibiotic of certain bacteria should also be carefully considered, as a study above have shown.⁹ Therefore, we agree that prophylactic antibiotics should be given in the shortest amount of time frame as possible and should cover the expected pathogen profile while simultaneously conforming to the local or regional resistance pattern.

CONCLUSIONS

This study describes 4 years of experience with laparoscopic ureterolithotomy procedures in Persahabatan Hospital. The data collected shows a considerably short duration of operations and hospital stay comparable with other studies. It is expected that this study can be applied as baseline data for future research. Further studies using a larger sample are also needed.

CONFLICT OF INTEREST

All author declares there is no conflict of interest regarding publication of this study.

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ETHICAL CONSIDERATION

This study has been approved by Ethical Committee Faculty of Medicine, Universitas Indonesia. All study protocol in accordance to Helsinki Declaration of Human Rights.

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AUTHOR CONTRIBUTION

All authors had contributed equally to writing the original draft, reviewing the manuscript, data analysis, and

brainstorming of the idea. All authors agreed for the final version of the manuscript for publication.

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