



A STUDY OF PATIENTS WITH RENAL STONES WITH RECURRENT URINARY TRACT INFECTIONS AND ROLE OF LAPAROSCOPIC SURGERY IN IT

Surgery

Dr. Sanjay Ghate Associate Professor in the Department of General Surgery, GMC, Chandrapur.

Dr. Pranay Gandhi* Assistant Professor in the Department of Community Medicine, GMC, Chandrapur.
*Corresponding Author

ABSTRACT

The management of a large unilateral staghorn calculus especially associated with recurrent urinary tract infections is difficult to treat surgically hence laparoscopic approach can be used to manage it effectively in a single sitting. the present study aims at studying the role of laparoscopic pyelolithotomy in the management of unilateral staghorn renal stones with recurrent infections.

Methodology:

It was hospital based retrospective observational study carried out in the department of general surgery in a tertiary hospital in central India with certain inclusion and exclusion criteria and a total of 30 patients were studied from January 2018 to December 2018.

Observations and results:

A total of 30 patients were selected of which 18 were males and 12 were females. The present study aims at studying the role of laparoscopic pyelolithotomy in the management of unilateral staghorn renal stones with recurrent infections. The mean hemoglobin drop at day 3 after the operation was 0.4 ± 0.88 g/dl and there was no blood transfusion required in any patient.

KEYWORDS

Renal Stones, Staghorn, Laparoscopic Pyelolithotomy.

INTRODUCTION:

The most common presentation of a present of renal stones is pain. The sight of a patient pressing his lateral abdomen with back coming in emergency always arouses the doubt of a possible renal colic. Also, long standing renal stones especially the staghorn calculus causes urinary tract infections which if occur repeatedly are difficult to manage. The management of staghorn renal stones remains a challenge in urology. The success rates and widespread application of endourological, ureteroscopic and percutaneous techniques have limited the open surgical nephrolithotomy to cases with complex staghorn calculi. According to the European Association of Urology (EAU) guidelines, most complex stones, including partial and complete staghorn stones, should be approached primarily with PCNL (1). Although PCNL is a minimally invasive procedure with a comparatively higher stone-free rate (SFR), it bears a considerable risk of serious complications, including severe bleeding and post-operative sepsis (2). Single-session PCNL is normally selected for large renal stones with infections due to high risk of post-operative sepsis, and surgical decompression (drainage of the kidney) is more crucial for life-saving procedures in obstructed urinary tracts (3).

The ideal procedure for large or staghorn renal stones should achieve a complete stone-free status with minimal morbidity and with the least number of procedures (2). Therefore, laparoscopic pyelolithotomy (LP) is an eligible monotherapy for complex staghorn renal stone with UTI. Hence, the present study aims at studying the role of laparoscopic pyelolithotomy in the management of unilateral staghorn renal stones with recurrent infections.

MATERIALS AND METHODS:

This was retrospective observational study done in the department of general surgery in a tertiary hospital in Central India. A total of 30 patients were studied having staghorn renal stone and concurrent UTIs who underwent laparoscopic pyelolithotomy (LP) between January 2018 and December 2018. The inclusion criteria included patients with unilateral staghorn stones and concurrent UTIs, patients' personal preference for decisive single-session treatment and predicted difficulties of stone removal due to the small renal calyx or large stone burden. The exclusion criteria included combined distal ureteral calculi, stone size of <2 cm severe obstruction of the urinary tract and history of ipsilateral open renal surgery, surgical contraindications and patients' preference for more minimally invasive procedures. All P-value analyses were two-sided and $P < 0.05$ was considered to indicate a statistically significant difference.

OBSERVATIONS AND RESULTS:

A total of 30 patients (18 males and 12 females) were studied who successfully underwent the procedures and there was no conversion to open surgery in any case. The mean age was 38.0 ± 9.12 years and the

mean stone size (largest diameter) was 3.2 ± 0.65 cm. The calculi of 21 patients were located in the intrarenal pelvis and those of 9 patients were in the extrarenal pelvis. The mean operation time, warm ischemia time and post-operative hospital stay were 112.2 ± 11.7 min, 27.2 ± 3.3 min and 5.1 ± 1.2 days, respectively. (Table 1 and Table 2)

The mean hemoglobin drop at day 3 after the operation was 0.4 ± 0.88 g/dl and there was no blood transfusion required in any patient. The change in the serum creatinine levels (pre-operative vs. post-operative day 3) was 5.7 ± 18.03 $\mu\text{mol/l}$ (t-test $P=0.51$) and -4.6 ± 14.83 $\mu\text{mol/l}$ (pre-operative vs. post-operative after 6 months; t-test $P=0.62$). While there was no significant difference, it is possible that the renal function was slightly decreased by the influence of surgical procedure in the short-term outcome and increased in the long-term.

DISCUSSION:

Urinary stone disease, also known as urolithiasis or nephrolithiasis, is an important healthcare problem affecting adults and children (6,7). The sight of a patient pressing his lateral abdomen with back coming in emergency always arouses the doubt of a possible renal colic. Also, long standing renal stones especially the staghorn calculus causes urinary tract infections which if occur repeatedly are difficult to manage. Technical advances have improved surgical treatment strategies for urolithiasis, including PCNL, extracorporeal shock wave lithotripsy and LP. Staghorn renal stone remains a challenge in urology and the goal of treatment is to inhibit recurrence, control infection-associated complications and protect patients' renal function. Tremendous improvements in endourological procedures have transformed the surgical management of staghorn renal stones (5). According to the AUA and EAU guidelines, which are the most frequently referenced guidelines worldwide, percutaneous nephrolithotomy is the gold standard procedure for management of large renal stone, including staghorn renal stone (1,8).

Stone recurrence (31.2%) and growth (63.2%) were reported as challenges in the study by Aminsharifi *et al* (5) evaluating the long-term outcomes of PCNL monotherapy for staghorn stones in 272 kidneys with a one-session SFR of 76.5%. Thus, it appears that LP, RLP and LAN are the optimal treatments for one-session monotherapy for complex staghorn renal stone with concurrent UTI at experienced centers. The patients were fully informed that, according to the EAU and AUA guidelines, the first-line treatment of staghorn stones was PCNL and that WIT would influence the kidney function to a certain extent.

Owing to the limitation of patients' medical insurance, financial situation and personal preference, no scintigraphy examination was performed for measuring renal function pre- or post-operatively, except for those patients with a highly suspected non-functional

kidney. Furthermore, the patients preferred one-session monotherapy for treatment due to time and financial reasons. The high one-session SFR of laparoscopic technology is a distinct advantage compared to other treatments. Theoretically, RLP with prolonged renal posterior lower segment incision (<2 cm) combined with an acceptable warm ischemia time may not significantly decrease the renal function. Furthermore, removal of staghorn stone resolves the potential obstruction and/or infection of the kidney, providing a benefit for renal function. Although there is insufficient evidence, the mean change in serum creatinine levels ($-4.6 \pm 14.83 \mu\text{mol/l}$) at 6 months post-operatively may suggest an increase in renal function.

Adequate broad-spectrum antibiotic therapy should be provided to patients pre-operatively, since the UTI requires to be controlled at an acceptable level for surgery. Thus, concurrent UTI was diagnosed according to the different aspects of each individual patient's clinical criteria. UTI (particularly obstructed UTI) may pose an imminent threat to the patient and may induce significant morbidity, including pyonephrosis, sepsis, septic shock and even death (9).

The mean operation and warm ischemia time, post-operative complication rate and long-term SFR of the present study demonstrated the technical feasibility and safety of the procedure. So far, LP, RLP and LAN are all considered as suitable treatments for complex stones with a single-session SFR of up to >90% (2,4,5,10,11). Even for large staghorn calculi (>4 cm), an overall SFR of ~90% was attained in one session (10). Gaur *et al* (12) first reported the feasibility of RLP for the treatment of staghorn stones in three patients who were considered for open surgery. Singh *et al* (13) reported on their experience of RLP in 25 patients (including 9 patients with staghorn calculi) and indicated that RLP was a safe and effective procedure for management of staghorn, large and multiple renal calculi. Singal and Dhar (14) compared RLP and open surgery in the management of renal pelvic stone.

CONCLUSION:

The present study indicated that Laparoscopic Pyelolithotomy in a patient with staghorn renal stones and concurrent UTI is a suitable alternative surgical treatment for difficult endourological procedures, particularly as a single-session monotherapy considering the patients' financial and medical situations.

TABLE 1 Showing the demographic profile of the patients (n=30)

PARAMETER	VALUE
AGE	38±9.12 years
SEX	
MALE	18
FEMALE	12
SIDE	
LEFT	18
RIGHT	12
PELVIS	
INTRARENAL	18
EXTRARENAL	12
STONE SIZE	3.2±0.65 cm
URINE ANALYSIS (WBC/HPF)	22.1±11.21
POSITIVE URINE CULTURE	6 (16.8)

Table 2 Showing perioperative and post operative data for the cohort. (n=30)

PARAMETER	VALUE
OPERATION TIME(MINS)	112.2±11.7 mins
HAEMOGLOBIN DROP AT DAY 3 (G/DL)	0.4±0.88 g/dl
CREATININE CHANGE (umol/L)	5.7±18.03
PRE VS POST OP DAY 3	4.6±14.83
PRE OP VS 6 MONTHS	
BLOOD TRANSFUSIONS	0
POST OPERATIVE STAY IN DAYS	5.1±1.2 DAYS
STONE FREE STATUS	31 (100)
3 DAYS	31 (100)
6 MONTHS	

POST OP COMPLICATIONS GRADE 1	6 (17.8 Temporarily elevated body temperature)
GRADE 2	1 (3.5 constant elevated body temperature>38.5 degree celcius)

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