

## Comparison of Outcomes of Laparoscopic Nephrectomy Performed for Different Indications at a Single Centre

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| Received: 25.04.2019 | Accepted: 06.05.2019 | Published: 10.05.2019

DOI: [10.21276/sasjs.2019.5.5.1](https://doi.org/10.21276/sasjs.2019.5.5.1)

### Abstract

### Original Research Article

Laparoscopic nephrectomy is procedure of choice for variety of indications ranging from non functioning infected, non-infected kidney and renal tumour. We performed this study to analyze perioperative difficulties and postoperative complications after Laparoscopic nephrectomies done for these different type of indications. Retrospective analysis of records of patients who underwent Laparoscopic Nephrectomy (LN) at a single centre from August 2010 to August 2013 was done. The indications were divided into three categories; kidneys with no infection/tumor (Group 1), Grossly Infected/Inflamed (Group2) and tumor bearing kidneys (Group3). Group 1, 2 and 3 had 27, 18 and 10 patients respectively. Conversion rate to open nephrectomy in three groups were; 7% (2/27), 28% (5/18) and 40% (4/10) respectively and it was higher in group 2 and 3 compared to group 1. Mean operative time in group2 and 3 were 125 min and 112 min respectively which were significantly higher when compared to group1 (86min,  $p < 0.0001$ ). Blood transfusion rate were similar in group2 and group3 (22.2% and 20%) while group1 required no transfusion. Postoperative hospital stay were 4.9(3-8), 6.6(3-21) and 6.9(4-10) in Group1, 2 and 3 respectively ( $p = 0.0520$ ). Wound infection rate in group2 was 22.2% as compared to 3% in group1 ( $p = 0.147$ ). Group 2 in addition had 2 colonic injuries and 4 patients had abdominal collection requiring drainage. Postoperative hospital stay were 4.9(3-8), 6.6(3-21) and 6.9(4-10) in gr1, 2 and 3 respectively ( $p = 0.0520$ ). We concluded that LN for Infected kidneys has longer operative time, higher conversion rate and morbidity. Hence these patients require more meticulous preoperative preparation and threshold for conversion to open must be lower in these patients.

**Keywords:** Laparoscopic nephrectomy, infected Kidney, Kidney tumour.

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## INTRODUCTION

First laparoscopic nephrectomy (LN) was performed in 1991 by Claymann *et al.* with the help of lapa-c and morcellator[1]. Studies had shown benefit of laparoscopic nephrectomy over open nephrectomy in terms of less blood loss, fewer hospital stay, lower complications rate, and more rapid recovery [2].

Laparoscopic nephrectomy had been done for variety of indications including both benign and malignant conditions. Studies had compared outcomes after laparoscopic and open nephrectomy in infected kidneys with dense adhesions [3, 4]. But no series had compared different outcomes after laparoscopic nephrectomy done for different indications. We reviewed our series of laparoscopic nephrectomies and compared the peri and postoperative outcomes between different indications for nephrectomy.

## MATERIAL AND METHODS

We retrospectively analyzed the records of patients who underwent LN in single institute- Jawaharlal Institute of Postgraduate Medical Education and Research from August 2010 to August 2013. Total of 55 LN were performed for different indications. Case records of these patients were reviewed to obtain the relevant intraoperative and postoperative data which included demographic profile, preoperative characters, operative time, blood loss, need for blood transfusion, conversion to open procedure, significant intraoperative and postoperative complications and hospital stay.

The indications were divided into three categories; kidneys with no infection/tumor (Group 1), Grossly Infected/Inflamed (Group2) and tumor bearing kidneys (Group3). The results were analyzed using Student T test or Chi square test.

## RESULTS

Total of 55 LN were performed. Mean age was 45.2yrs (4-80yrs). Male: Female ratio was 27:28. Group 1 had 27 patients (non functioning kidney due to pelviureteric junction obstruction-9, calculus-13, Renal artery stenosis-3, MCDK-1, Donor-3). Group 2 had 18

patients (Pyonephrosis -10, GUTB-7, and XGP-1). Group 3 had 10 patients (mean size of tumor - 7.1cm). The demographic profile of the patients in these 3 groups was comparable [Table 1]. The indications for nephrectomy were as given in table2.

**Table-1: Demographic profile of the patients**

	Group1	Group2	Group3
Number	27	18	10
Age range in yrs(mean)	27-59(47.5)	5-65(39.8)	47-80(55.9)
Male: Female ratio	14:14	11:7	6:4

**Table-2: Indications for nephrectomy**

Group1 (non-infected kidneys)	Group2 (infected/inflamed kidneys)
Nonfunctioning kidney due to pelviureteric junction obstruction-9,	Pyonephrosis -10
calculus-13	GUTB-7,
Renal artery stenosis-3	XGP-1
Donor-3	
MCDK-1	

Clinical outcomes are shown in table3. Conversion rate to open nephrectomy in three groups were; 7% (2/27), 28% (5/18) and 40 % (4/10) respectively and it was higher in group 2 and 3 compared to group 1 (p=0.0976). Mean operative time in group2 and 3 were 125min and 112min respectively which were significantly higher when compared to

group1 (86min, p<0.0001.) Blood transfusion rate were similar in group2 and group3 (22.2% and 20%) while group1 required no transfusion. Postoperative hospital stay were 4.9(3-8), 6.6(3-21) and 6.9(4-10) in Group1, 2 and 3 respectively (p=0.0520). Wound infection rate in group2 was 22.2% as compared to 3% in group1 (p=0.147).

**Table-3: Clinical outcomes of patients in three groups**

	Group1	Group2	Group3	P value
Conversion rate (Lap to open)	7%	28%	40%	0.0976
Mean operative time	86 min	125 min	112 min	<0.0001
Blood tranfusion rates	0	22.2%	20%	1.00

Overall there were 13 major and minor complications in group2, whereas Group1 and Group3 had only 2 and 3 complications respectively. Group2 had 2 colonic injuries and 4 patients had abdominal collection requiring drainage (Table4). There was one mortality in group2, patient had colonic injury that was detected postoperatively for which he was explored and injury repaired. Postoperative hospital stay were 4.9(3-

8), 6.6(3-21) and 6.9(4-10) in Group 1, 2 and 3 respectively (p=0.0520) Table5.

Overall conversion rate in all three groups was 20% (11/55). GroupWise conversion rate is given in table6. In group2 most common cause for conversion was inability to proceed due to adhesions. While in group3 conversion was done mostly due to uncontrollable bleeding at renal vessels.

**Table-4: Complications in three groups**

Complication	Group1	Group2	Group3
SSI	3%(1)	22.2%	0
Abdominal collection	1	4	0
Colonic injury	0	2	0
Ventilatory support	0	0	1
Hypotension + blood transfusion	0	0	1
Ileus	0	3	1
Mortality	0	1	0
Total	2	13	3

**Table-5: Postoperative parameters**

	Group1	Group2	Group3	P value
Postoperative hospital stay – mean (range in days)	4.9(3-8)	6.6(3-21)	6.9(4-10)	0.0520
Wound infection	3%	22.2%	0	0.147
Morbidity (Major+minor)	2	13	3	

**Table-6: Data of patients who underwent conversion to open**

Reason for conversion	Group1 n=27	Group2 n= 18	Group3 n=10
Inability to proceed	2	4	1
Adhesions	0	4	1
Adjacent organ injury	0	1	0
Renal vessel bleeding	0	1	3
Total	2(7%)	5(28%)	4(40%)

## DISCUSSION

Ever since Clayman *et al.* described laparoscopic nephrectomy in 1991, it has been used in several urological procedures and had become the procedure of choice in appropriately selected patients requiring nephrectomy [1]. Several studies have shown advantages of LN like less blood loss, less postoperative pain, shorter convalescence period and better cosmesis [2]. Laparoscopic nephrectomy is expected to be more difficult in kidneys with perinephric adhesions i.e history of pyonephrosis, genitourinary Tuberculosis, Xanthogranulomatous pyelonephritis and history of previous surgery. Manohar T (2007) and Kapoor R (2006) had shown acceptable results and outcome of laparoscopic nephrectomy in infected/inflamed kidneys [3, 4]. In our series, most common indication in infected group was pyonephrosis. Conversion rate was 28% in infected kidneys whereas Manohar et al and Kapoor *et al.* Showed conversion rate of 9.5% and 20% respectively [3,4]. Conversion rate of 28% in our series was significantly higher as compared to noninfected kidneys (7%). Also mean operative time was much higher for infected kidneys as compared in noninfected kidneys and tumour bearing kidneys. Morbidity and mortality was also maximum in infected kidneys. This increased operative difficulty and poor outcomes in infected kidneys may be due to perinephric adhesions causing anatomical distortion and poor planes causing more injury to adjacent structures and blood vessels. Threshold for conversion to open nephrectomy must be lower in patients with infected kidneys. Preoperatively patient selection should be done meticulously according to imaging and other factors that may cause difficulty in laparoscopic approach. Patients must be counseled preoperatively regarding higher chances of conversion to open. There had been few studies of subcapsular and retroperitoneoscopic nephrectomy in infected and tuberculous kidneys showing good outcomes in these heavily adhesive kidneys [5-7]. But these approaches are technically more difficult and time consuming. Larger randomized studies are needed before accepting these techniques.

## CONCLUSION

Laparoscopic nephrectomy in previously infected or inflamed kidney is technically more demanding and may be associated higher morbidity and higher conversion rates. Hence preoperative preparation and counseling must be done accordingly, also threshold to convert to open nephrectomy must be lower I these patients.

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