

Predictors for conversion in Laparoscopic Nephrectomy

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Abstract:

Objective: Laparoscopic nephrectomy is preferred surgery to treat patient with renal mass and Non-functioning kidney (NFK) secondary to urolithiasis/ PUJO/ureteric stricture. Main objective of this study was to assess risk associated with conversion of laparoscopic nephrectomy in patient undergoing laparoscopic nephrectomy in our university hospital.

Material and Methods: This was retrospective descriptive observational study which included 78 patients diagnosed with NFK by CT IVU and diuretic DTPA renogram, renal mass by CT IVU presented to Dhulikhel hospital from 1st January 2023 to 15th May 2025. Patients were reviewed in terms of demographic characteristics and clinical presentation. Statistically correlated with conversion and laparoscopic group which was analyzed by using student's t-test and fischer exact test.

Results: Mean age was 48.69 ± 14.18 years, 42 female (53.85%) and 36(46.15%) male patients. Mean operative duration was 238.5 ± 68.68 minutes in conversion whereas in laparoscopic group was 177.06 ± 43.99 minutes, $p < 0.05$. Mean hospital stay was 6.5 ± 0.53 vs 3 days in conversion vs laparoscopic group, $p < 0.05$. Statistically significant correlation noted between conversion and laparoscopic group in terms of BMI, PCN, SSI with $p < 0.05$. Recurrent UTI and visceral injury were not associated with conversion, $p > 0.05$.

Conclusion: Recurrent UTI, intra-operative visceral injury was not associated with conversion. BMI, PCN, Blood transfusion and SSI was significantly high in conversion group.

Keywords: DTPA, laparoscopy, nephrectomy, NFK, renal cell carcinoma

Introduction

Nephrectomy is indicated for Malignant renal pathology and benign condition leading to non-functioning kidney. Urolithiasis is the major cause of non-functioning kidney. Nephrectomy is usually indicated for severe urinary tract infection and chronic pain in case of non-functioning kidney.¹ Laparoscopic Nephrectomy was first described by Clayman.² Nowadays Laparoscopic approach is considered gold standard technique due to less pain, early recovery and less morbidity.³ Laparoscopic nephrectomy can be done with transperitoneal and retroperitoneal approach. Most of literatures has reveal learning curve ranging from 20-50 cases for laparoscopic nephrectomy.⁴⁻⁸ Due to severe inflammatory condition more complications are seen in nephrectomy done in inflammatory and infective pathology which can be for both malignant and benign condition including donor nephrectomy.^{9,10}

Material and Methods

This was retrospective observational descriptive study in a patient who underwent laparoscopic nephrectomy (simple, partial or radical) from 1st January 2023 to 15th May 2025 at Dhulikhel Hospital, Kathmandu university hospital. Ethical clearance was obtained from Institutional review committee of Kathmandu university school of medicine (KUSMS) with reference number 161/25. All the patient undergoing elective laparoscopic nephrectomy within study period were included in this study. Inclusion criteria were patient diagnosed non-functioning kidney by CT IVU and diuretic DTPA renogram, age above 18 years or renal mass diagnosed by CECT abdomen pelvic with chest CT for metastatic workout.

Surgical Technique

After induction with general anesthesia, foleys

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catheterization was done and patient is placed in lateral position (right lateral for left nephrectomy and left lateral for right nephrectomy). Pneumoperitoneum created with veress needle; intra-abdominal pressure maintained at 12-14mmhg. Three ports were inserted for left nephrectomy and four ports for right nephrectomy, camera port 10mm at paramedian at the level of umbilicus, 10mm working port at left mid spinoumbilical line (for left) 5mm port at mid clavicular subcostal region, for right its 10mm midclavicular subcostal region 5mm mid spinoumbilical line and one extra 5mm port epigastric region for liver traction. Kidney mobilized; gonadal packet was isolated, proximal ureter mobilized. Hilum dissected and pedicle clamped with hemoclip (artery first). For renal mass dissection done from perinephric fat and proximal one third of ureter was removed enbloc with nephrectomy specimen. Specimen were delivered using urobag as endobag by extending iliac fossa port. 20fr Drain was placed in renal fossa.



Fig.: 1 Right lap nephrectomy port placement

Post operative pain was accessed 4hourly upto 24 hours using visual analogue score chart.

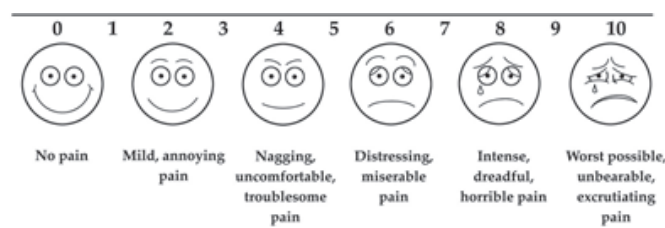


Fig.: 2 Visual Analog chart

Patient were followed up after 2 weeks, 6months, then yearly.

All data were analysed using IBM SPSS version 20.0. Qualitative data was analysed with t-test and Fischer exact test. Quantitative data was analysed with mean and standard deviation. Quantitative data was analyzed with mean and standard deviation. The p-value less than 0.05 was considered statistically significant.

Results:

There was total 78 cases with 42 females (53.85%) and 36(46.15%) males. The age ranged from 18 years to 78 years with mean age 48.69 ± 14.18 . Majority of the patients were in the age group of 40-50 years of age in both male and female.

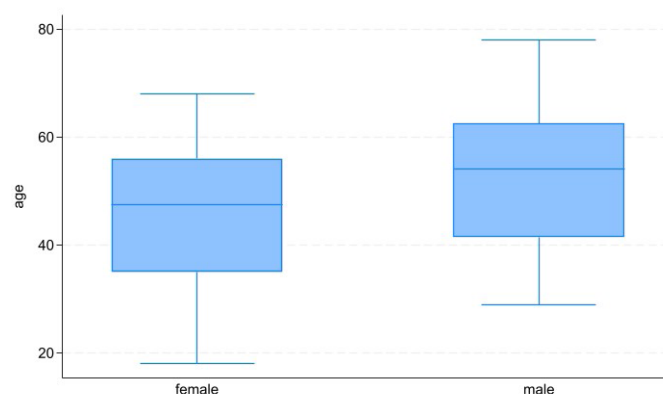


Fig 3: Age distribution according to gender

Result was categorized under two groups, one with conversion and another group that underwent successful laparoscopic nephrectomy. Mean age in conversion group was 56.8 ± 14.36 years whereas in laparoscopic group was 47.5 ± 13.86 . Gender, operative side were similar between both groups. Most of the patient were female in both groups. Most of the cases were of non-malignant cases, with left side being more common than right side. Total 7 malignant cases were included in this study outcome which 2 underwent conversion, majority of malignant cases were of right side. Mean BMI

in conversion group was 23.2 ± 2.39 whereas in laparoscopic group was 21.04 ± 1.29 which was statistically significant. Recurrent UTI was seen in 8(10.26%) cases in conversion group and 42(53.85%) cases in laparoscopic group which was statistically not significant. Four patient (5.13%) were on PCN in conversion group and 8 patient (10.26%) were on PCN in Laparoscopic group which was statistically significant.

Table 1: Demographic and clinical characteristics

Variables	Conversion	Laparoscopic Nephrectomy	p-value
Mean age (years)	56.8 ± 14.36	47.5 ± 13.86	0.05*
Gender Male	3 (3.85%)	33 (42.31%)	0.33**
Female	7 (8.97%)	35 (44.87%)	
Operative side Non malignant			0.31**
Right	3 (3.85%)	28 (35.90%)	
Left	5 (6.41%)	35 (44.87%)	
Malignant			
Right	1 (1.28%)	4 (5.13%)	1(1.28%)
Left	1 (1.28%)	1(1.28%)	
BMI	23.2 ± 2.39	21.04 ± 1.29	<0.05*
Recurrent UTI	8 (10.26%)	42 (53.85%)	0.32**
PCN	4 (5.13%)	8 (10.26%)	0.04**

*t-test

**Fischer exact

Table 2: Operative and post operative status

	Conversion	Laparoscopic Nephrectomy	p-value
Mean operative duration in minutes $\pm$ SD	238.5 ± 68.68	177.06 ± 43.99	<0.05*
Mean VAS score $\pm$ SD	8.4 ± 0.52	6.74 ± 0.44	<0.05*
Mean hospital stay $\pm$ SD	6.5 ± 0.53 days	3.0 ± 0.0	<0.05*
Mean days to return to normal work $\pm$ SD	29.3 ± 0.95	7.06 ± 0.24	<0.05*
SSI	6 (7.70%)	0	<0.05**
Blood transfusion within 72 hours	3 (3.85%)	4 (5.13%)	0.04**
Post operative ileus	2 (2.56%)	18 (23.08%)	1.00**
Re-exploration	0	1 (1.28%)	1.00**
Bowel injury	0	1 (1.28%)	1.00**
Splenic injury	0	2(2.56%)	1.00**

*t-test

**Fischer exact

Conversion was seen in 10 cases (12.82%)

Mean operative duration in conversion group was 238.5 ± 68.68 minutes whereas in laparoscopic group was 177.06 ± 43.99 minutes which was statistically significant. VAS score in first 24 hours postoperative period was 8.4 ± 0.52 in conversion group and 6.74 ± 0.44 in laparoscopic group which

was statistically significant. Mean hospital stay was prolonged in conversion group than in laparoscopic group (6.5 ± 0.53 vs 3 days). Statistically significant outcome seen between two groups in terms of return to normal work, SSI and blood transfusion within 72 hours of surgery which were 29.3 ± 0.95 days vs 7.06 ± 0.24 days, 7.7% vs 0% and 3.85% vs 5.13% respectively. Bowel injury, splenic injury, re-exploration and post operative ileus were more in laparoscopic group than in conversion group however that was not statistically significant. Post operative ileus was seen in 2(2.65%) patients in conversion group and 18(23.08%) in laparoscopic group, all managed conservatively. Re-exploration was done in 1(1.28%) patient under laparoscopic group for bleeding which was managed laparoscopically. Bowel injury was seen in 1(1.28%) patient in laparoscopic group which was managed without conversion. There was 2(2.56%) splenic injury in laparoscopic group which was managed with simple electro cautery laparoscopically.

Discussion

This retrospective observational study explained about the risks associated with conversion during laparoscopic nephrectomy for non-functioning kidney or laparoscopic radical/partial nephrectomy for renal cell carcinoma (RCC).

Conversion rate in our study was 12.82% which was more than other series showing around 4% conversion.^{11,12} However Sohail M et.al had shown conversion rate of 6.6%, up to 17.4% in radical cases.¹³ Only 7(8.97%) cases were of malignant pathology in our series, other cases were of NFK mostly due to urolithiasis which are of infective pathology. Study done by Danilovic et al. Reported 19% conversion rate in patient undergoing laparoscopic nephrectomy with infective pathology due to pararenal abscess and bowel adhesion.¹⁴ In our study there was 2 cases of laparoscopic converted partial nephrectomy which was done for positive margin and intra-operative bleeding respectively.

Blood transfusion was significantly higher in conversion group, $p=0.04$. Prolong Operative duration in conversion group than in Laparoscopic group (238.5 ± 68.68 vs 177.06 ± 43.99 mins) similar to other series.¹¹

Most conversion seen in female gender (7 vs 3)

however it was not statistically significant. In study by Out of 78 cases 36(46.15%) were of right side and 42(53.85%) were of left side. There were 4(5.13%) conversion on right side and 6(7.69%) conversion on left side however it was statistically not significant ($p=0.31$). Other series had shown more conversion on right sided nephrectomies.¹⁵

Recurrent UTI was noted in 8 (10.26%) cases in conversion group and 42 (53.85%) cases of laparoscopic group which was statistically not significant ($p=0.32$). Recurrent UTI was not associated for conversion in our series like other study by Singh et.al.²

Higher conversion rate was seen in obese patient in our study ($BMI\ 23.2\pm2.39$ vs 21.04 ± 1.29) which was statistically significant $p<0.05$. Other study have also shown more conversion in obese patient however their average BMI in conversion group was more than 29kg/m^2 .¹⁶

In our study visceral injury like bowel injury and splenic injury were managed laparoscopic, which are not associated with conversion like in other study.¹⁷

Operative time, hospital stay was significantly prolonged in conversion group than laparoscopic group.¹⁸ Prolong hospital stay with monitoring increase economic burden to patient and healthcare system.¹⁹

SSI was significantly high in conversion group like in other series, laparoscopic group have benefit of early return to normal work.²⁰

Study Limitations

This is retrospective study. All the surgery was done by single surgeon in single center.

Conclusion

High BMI, urinary diversion in the form of PCN were associated with conversion of laparoscopic nephrectomy in our study however recurrent UTI, intra-operative visceral injury was not associated with conversion.

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