Section: Urology

Original Research Article

LAPAROSCOPIC NEPHRECTOMY IN BENIGN KIDNEY DISEASE: EXPERIENCE OF 104 CASES

Pankaj Trivedi[1], Vishvas Baheti[2], Anil Kumar Bhiwal[3], Pushpendra Choudhary[4]

[1,2]Associate Professor, Department of Urology and Kidney Transplant, Geetanjali Medical College and Hospital, Manavakhera, Udaipur, Rajasthan, India.
[3]Associate Professor, Department of Anaesthesia, Geetanjali Medical College and Hospital, Manavakhera, Udaipur, Rajasthan, India.
[4]Senior Resident, Department of Urology and Kidney Transplant, Geetanjali Medical College and Hospital, Manavakhera, Udaipur, Rajasthan, India.

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Corresponding Author:
Dr. Pushpendra Choudhary
Senior Resident, Department of Urology and Kidney Transplant, Geetanjali Medical College and Hospital, Manavakhera, Udaipur, Rajasthan, India.
Email: dr.pushpendra2k5@gmail.com

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ABSTRACT

Background: Laparoscopic nephrectomy has been increasingly popular as a suitable treatment option for patients who are carefully chosen. It was consistently demonstrated that laparoscopic nephrectomy is equally successful to open surgical extirpation and is more easily tolerated than open surgery. Here we have retrospectively analysed experience of 104 cases of laparoscopic nephrectomy in benign disease over the last 4 years in tribal region of south Rajasthan.

Materials & Methods: Between July 2019 to July 2023, we retrospectively collected all data from our database and analysed total patients who underwent laparoscopic simple nephrectomy at our institution for benign kidney pathology. We reviewed demographics, indications, preoperative parameters, peri operative records, hospitalisation, complications and follow up.

Results: A total of 104 patients underwent laparoscopic simple nephrectomy for benign pathology. Mean age of the 104 patients underwent laparoscopic simple nephrectomy was (range 18-76 years). Male to female ratio was 46 :58 (44.23% v/s 55.76 %). Mean estimated blood loss was 160ml which ranges from 15ml to 400ml. Mean duration of analgesic requirement was 3.8 days range from 1.5 to 5 days. Mean hospital stay was 3.6 days (range 36 hours to 10 days). 4 out of 104 (3.84%) patients required conversion to open nephrectomy.

Conclusion: Laparoscopic nephrectomy has emerged as a significant adjunct to well-established surgical methods. Due to its high level of safety and ability to be consistently replicated, laparoscopic nephrectomy has become the established method of treatment and should be made available to all patients with non-cancerous kidney conditions who are undergoing planned kidney removal surgery.

Keywords: Benign Kidney Disease; Laparoscopic Nephrectomy; Renal Calculus Disease; PUJ Obstructive Nonfunctioning Kidney (NFK).

INTRODUCTION

In past 30 years, minimal invasive urology has moved in to mainstream in pursuit of the goal "disease that harm require treatments that harm less." Clayman RV et al described first laparoscopic Nephrectomy in 1991.[1] It led to increased interest in doing kidney surgery using this method and expanded the range of conditions that can be treated with laparoscopic surgery to include almost all urological diseases. Since then, laparoscopic nephrectomy has been increasingly popular as a suitable treatment option for patients who are carefully chosen. It was consistently demonstrated that laparoscopic nephrectomy is equally successful to open surgical extirpation and is more easily tolerated than open surgery.[2] Since then role of laparoscopic has increased significantly in renal surgeries and lap nephrectomy has become the most common approach for benign or malignant pathology of kidney.[1]

Laparoscopic simple nephrectomy is recommended for the treatment of benign renal disorders that have resulted in permanent loss of renal function. Indications for treatment include chronic pyelonephritis, obstructive or reflux nephropathy, renal tuberculosis, multicystic dysplastic kidney, renovascular hypertension, acquired renal cystic disease in dialysis patients, nephrosclerosis, symptomatic patients with autosomal dominant polycystic kidney disease, and post-kidney transplantation hypertension.[3]

Benefits of laparoscopic over the open nephrectomy are shorter hospital stay, lesser blood loss and early ambulation are established but potential for severe complications is always there.[4,5]

Here we have retrospectively analysed experience of 104 cases of laparoscopic nephrectomy in benign disease over the last 4 years in tribal region of south Rajasthan.

MATERIAL AND METHODS

Between July 2019 to July 2023, we retrospectively collected all data from our database and analysed regarding patients who underwent laparoscopic simple nephrectomy at our institution for benign kidney pathology.

We reviewed demographics, indications, preoperative parameters, peri operative records, hospitalisation, complications and follow up.

We have included nonfunctioning kidneys with benign pathology due to renal calculus disease, ureteric calculus, chronic pyelonephritic contracted kidney, PUJ obstructive nonfunctioning kidney (NFK).

We have excluded malignant renal masses, pylonephrotic kidney, XGPN (xenthogranulomatous pyelonephritis) and previously operated cases.

Operative Technique

After thorough preoperative evaluation and anaesthetic clearance, patients were taken for trans peritoneal laparoscopic nephrectomy.

Patients were positioned in modified lateral decubitus position and standard 3 ports were placed after creating pneumoperitoneum using veress needle. In four cases open hasson's technique was used.

Initial 10mm port placed lateral to ipsilateral rectus muscle at the level of umbilicus. another two 5mm ports were placed under vision. In 14 patients, additional 5mm port were placed for retraction.

Then ipsilateral colon reflected medially, and ureter identified and lifted and traced proximally, kidney dissected outside gerota's fascia in most of the benign disease. Hilum vessels clipped using hemolock clips of 5/10 mm size according to need.

Specimen retrived from ipsilateral iliac fossa incision as low as possible to achieve best cosmetic outcome and for ureterectomy up to stone in ureteric stone non-functioning kidney. All intra operative parameters noted.

RESULTS

A total of 104 patients underwent laparoscopic simple nephrectomy during study period for benign pathology. Mean age of the 104 patients underwent laparoscopic simple nephrectomy was (range 18-76 years). Male to female ratio was 46 :58 (44.23% v/s 55.76 %) Average weight of the patients were 58.4 kg and BMI = 28 kg/m² Right side nephrectomy in 48 (46.15%) and Left side nephrectomy in 56 (53.85%)

Indication for nephrectomy was Renal calculus with NFK in 41 (39.42%), Ureteric calculus with NFK in 30 (28.89%), PUJ obstruction with NFK in 18 (17.30%), obstructed Kidney with PCN drainage 8(7.7%) and Chronic pyelonephrotic contracted kidney in 7(6.7%). [Table 1]

Table 2 reveals intra-op and post-op details of laparoscopic simple nephrectomy for benign pathology. Operative time ranges from 70 minute to 180 minute depending on adhesions and need for lower ureteric dissection up to stone level in ureteric calculus with NFK, overall mean operative time was 145 minutes.

Mean estimated blood loss was 160ml which ranges from 15ml to 400ml. Blood transfusion was required in 3 (2.88%) persons.

Mean kidney size was 10.2cm (range 3-18cm).

Analgesic required was given paracetamol 500mg and tramadol 50/100mg twice on first post-operative day and then as and when required basis. Mean duration of analgesic requirement was 3.8 days range from 1.5 to 5 days.

Mean hospital stay was 3.6 days (range 36 hours to 10 days).

4 out of 104 (3.84%) patients required conversion to open nephrectomy. Two was having bleeding and two was converted due to non-progression.

Complication in the form of post-operative paralytic ileus was present in 35(33.65%), major bleeding required conversion to open in 2(2.88%) patients and wound infection in 7(6.73%) patients.

Mean time to ambulation was 24 hours (range 16-30hrs).

Table 1: Demographic and clinical details of laparoscopic simple nephrectomy for benign pathology

No. of cases of laparoscopic simple nephrectomy for benign pathology	104
Age	range 18-76 years
Male to female ratio	46 :58 (44.23% v/s 55.76 %)
Average weight	58.4 kg and BMI = 28 kg/m²
Right side nephrectomy	48 (46.15%)
Left side nephrectomy	56 (53.85%)

Indications	
Renal calculus with NFK	41 (39.42%),
Ureteric calculus with NFK	30 (28.89%)
PUJ obstruction with NFK	18 (17.30%)
Obstructed Kidney with PCN drainage	8(7.7%)
Chronic pyelonephrotic contracted kidney	7(6.7%)

Table 2: Intra-op and post-op details of laparoscopic simple nephrectomy for benign pathology

Operative time	Mean 145 minutes (ranged 70 minutes to 180 minutes)
Factors affecting Operative time	▪ depending on adhesions and ▪ need for lower ureteric dissection up to stone level in ureteric calculus with NFK
Mean estimated blood loss	160ml which ranges from 15ml to 400ml.
Blood transfusion required	3 (2.88%) persons
Mean kidney size.	10.2cm (range 3-18cm)
Mean duration of analgesic requirement	3.8 days range from 1.5 to 5 days.
Mean hospital stay	3.6 days (range 36 hours to 10 days)
Conversion to open nephrectomy	4 out of 104 (3.84%)
COMPLICATIONS	
Post-operative paralytic ileus	35(33.65%)
Major bleeding	2(2.88%)
Wound infection	7(6.73%) patients.
Mean time to ambulation	24 hours (range 16-30hrs)

DISCUSSION

Laparoscopic nephrectomy is becoming standardised surgery for benign renal diseases. Urologists are increasingly adopting it and resident training is establishing in institutions. It is crucial for urologists to consistently learn from previous instances of laparoscopic problems in order to prevent the recurrence of similar errors wherever feasible. Our institute has been conducting laparoscopic nephrectomies with a success and this offers a valuable addition to literature regarding the clinical outcomes and complications experienced, particularly with regards to their temporal patterns. Laparoscopic nephrectomy for contracted chronic pyelonephritic kidney due to VUR are easy to remove with minimal blood loss and short duration. Non-obstructed kidneys with renal stones or PUJ obstruction were having more adhesion so perioperative para meter increases.

Kidneys with obstruction and infected hydronephrosis which required percutaneous diversions were having more difficult dissection around kidney and hilum area. It caused more bleeding and operative time, blood transfusion and conversion to open nephrectomy. These were the cases where post-operative analgesic requirements were higher, and hospitalisation was longer.

Kercher KW et al6 reported 264 minutes average operative time in pure laparoscopic group,

we had mean operative time of 145 minutes (ranging from 70 minute to 180 minute), whereas Hiraj GM et al,[7] reported 113.67+/-26.88 minute in laparoscopic group.

In our study mean estimated blood loss was 160ml (range 15 - 400 ml) whereas Singh A et al,[8] has 159 ml and Hiraj GM et al,[7] reported 158.67+/-135.72ml, these are comparable findings but Kercher KW et al,[3] shows 97ml and Mithani MS et al,[9] had 50+ /-70 ml blood loss in their100 cases series.

Hiraj GM et al,[7] reported large number of patients 86.7% required the low dose analgesics. In our series mean duration of analgesic requirement was 3.8 days. Higher dose on day one followed by as required basis. Patient who underwent conversion and had dense adhesions required higher doses. In adequate control of pain in post op period increases chances of chronic pain and have adverse physiological and psychological outcome.

In present study 4 out of 104 (3.84%) patients required conversion to open nephrectomy, 2 patients with left side renal stone and PCN tube had dense adhesions around renal pelvis and during dissection significant bleeding seen and stump couldn't be traced so converted to open for which lumber vein ligated. In 2 more patients, surgery was converted to open due to non-progression because of dense adhesions.

Hiraj GM et al,[7] has conversion rate of 10%, Singh A et al,[8] reported 11% conversion, Henderson JM et al,[10] reported 5.5% conversion rate.

Mean hospital stay was 3.6 days (Range 1.5 to 10 days) in our patients. Whereas Kercher et al,[3] reported 3.9 (ranging 2 to 17 days) and Hiraj GM et al7 showed 3.30 +/-1.74 day (ranging 2-8 days).

Patient who required conversion and dense adhesions had more analgesic requirement. More post-operative ileus and required longer hospital stay.

Mean time to ambulation was 23 hours in Dunn et al,[11] in study of 230 laparoscopic nephrectomies. In our study mean time to ambulation was 24 hours (ranging 16 to 30 hours).

Alan C et al,[12] concluded that lap nephrectomy offers an advantage in case of post-operative pain with regard to analgesic requirements and hospital stay duration.

Laparoscopy has become the primary method for surgically removing benign kidneys due to its demonstrated benefits, including lower

postoperative pain, shorter hospital stays, faster recovery, and decreased operative timeframes.[13]

CONCLUSION

Laparoscopic nephrectomy has emerged as a significant adjunct to well-established surgical methods. After the initial introduction, there was a period of consolidation, and eventually standardization, resulting in positive clinical outcomes. With the continuous advancement of laparoscopic surgery and its widespread use, laparoscopic nephrectomy has emerged as the superior choice compared to open nephrectomy. Due to its high level of safety and ability to be consistently replicated, laparoscopic nephrectomy has become the established method of treatment and should be made available to all patients with benign kidney conditions who are undergoing planned kidney removal surgery.

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