

Laparoscopic Nephrectomy for Benign Renal Diseases: An Initial Experience

Khizar Hayat,¹ Kamran Zaidi,² Nisar Ahmed,³ Ather Hameed,⁴ Ahmed Salman Waris⁵

Abstract

Objective: To evaluate the safety and efficacy of Laparoscopic nephrectomy for benign renal diseases at Department of Urology Post Graduate Medical Institute / Lahore General Hospital Lahore.

Introduction: Since the first laparoscopic performed by Clayman in 1991¹ for a benign kidney disease. Laparoscopic Nephrectomy became a procedure of choice for both the benign and malignant renal diseases. As well as the live kidney donation developed rapidly laparoscopically. This surgical procedure has various advantages like short hospital, quick post-operative reco-

Professor, Department of Urology, PGMI / Lahore General Hospital, Lahore

very; early return to work and cosmesis. At the same time there are various challenges which include long learning curve conversion to open surgery and other complications. We performed 16 laparoscopic nephrectomies for benign renal disease. We analyzed our data according to these parameters operative time, blood loss conversion rate, analgesia requirement in post-operative hospital stay and complications.

Patients and Method: A total number of 16 patients' undergone laparoscopic nephrectomy. We use transperitoneal approach in all cases. The data was analyzed regarding preoperative and postoperative variables including operative time, blood loss, complications, hospital stay, conversion rate and analgesia requirements.

Results: All patients underwent Transperitoneal Laparoscopic Nephrectomy. Out of 16 patients 9 had renal stone disease, four had pelviureteric junction obstruction, and one each had reflux nephropathy, tuberculosis and chronic pyelonephritis. The age range was 12 to 55 years with mean age of $-27.75 + 12.29$ years. The blood loss was 50 to 500ml in benign cases with average of $203.44 + 117.5$ ml. Conversion rate was 12.5% noted. The hospital was ranging from 3 to 15 days with mean of $5.5 = 3.11$ days. Operative time was ranging from 100 to 350 minute with mean operative time of $195 + 78.65$ min. The surgical complications were port site wound infection in 2 cases, residual stone at specimen extraction site in one case and 2 had surgical emphysema of abdominal wall. Prolong ileus

Hayat K.¹

Assistant Professor, Department of Urology, PGMI / Lahore General Hospital, Lahore

Zaidi K.²

M.O., Department of Urology, PGMI / Lahore General Hospital, Lahore

Ahmed N.³

M.O., Department of Urology, PGMI / Lahore General Hospital, Lahore

Hameed A.⁴

M.O., Department of Urology, PGMI / Lahore General Hospital, Lahore

Waris A.S.⁵

was observed in 2 cases. Specimen extraction site incisional was noted in one patient which was repaired.

Conclusion: Transperitoneal Laparoscopic Nephrectomy is a procedure of choice for inflammatory conditions because of less morbidity short hospital stay reduced analgesia requirement and cosmesis as well as early return to work. The difficulties are dense adhesions in perinephric, hilar region that cause very slow progress, bleeding and conversion to open nephrectomy.

Introduction

The first transperitoneal laparoscopic nephrectomy was performed by Claymen in 1991 for a benign renal disease.¹ Subsequently with passage of time the laparoscopic renal surgery for various renal diseases like malignancy, live kidney donation, inflammatory diseases and congenital anomalies became procedure of choice.² The centers for various complex laparoscopic procedures rapidly developed all over the world. As well as the number of training centers for this new technique increased. The laparoscopic nephrectomy for benign condition like nonfunctioning kidney can be very simple or it can be very challenging as in pyonephrosis and inflammatory diseases.³ The reason for this difficulty is lot of adhesions in perinephric area and hilar region. This procedure has many advantages like short hospital stay, reduced analgesia requirement postoperatively, early return to work as well as cosmesis as compared to open surgery. At the same time this technique has many challenges like long learning curve, cost, complications and lack of training centers. We analyzed our data of transperitoneal laparoscopic nephrectomies for various benign renal conditions in terms of blood loss, operative time, conversion rate, postoperative pain, hospital stay and complications.

Material and Method

We started laparoscopic renal surgery in 2008. We performed 16 laparoscopic nephrectomies for non-functioning kidneys of different etiologies like stone disease, ureteropelvic junction obstruction, tuberculosis pyelonephritis, chronic pyelonephritis, and reflux nephropathy. All patients admitted through outpatient department. Their detailed history, physical examination, and required investigations were done. Every patient was briefed about the benefits and complications of procedure and possibility of conversion to open sur-

gery. Informed consent was taken. Under general anesthesia nasogastric tube and folly's catheter were passed. The patient was positioned in lateral decubitus position with table flexed and elevated kidney bar. The transperitoneal approach was used in all cases. Initially we used Hasson open technique for first port placement in iliac fossa region. The same technique was also used in cases having history of previous abdominal surgery. But later on pneumoperitoneum was created with Veress needle. It was placed at midclavicular line at the level of umbilicus. This was the site of first port. The other ports were placed under direct vision in subcostal area in mid clavicular line and periumbilical area. Fourth was placed in iliac fossa region about 3cm lateral and above the first one. Fifth one place in anterior axillary line if require. We used 3 to 5 ports. The harmonic scalpel was used to reflect the colon and for dissection of kidney. Renal pedicle identified and clipped. Specimen was delivered through extension of iliac fossa port. Drain was placed if required. We noted operative time, blood loss, conversion rate, post-operative hospital stay and post-operative analgesia requirement. We also noted complications both in short and long term basis.

Results

Laparoscopic nephrectomy was performed in 16 patients for inflammatory and other benign renal diseases. Male to female ratio was 1; 2.2. Age range was 12 to 55 years. Mean age was 27.75 ± 12.28 years. Median and mode age was 25 years. Among these 16 patients, nine (n = 9) had non-functioning kidney due to stone disease, four (n = 4) had pelviureteric junction obstruction and one each had chronic pyelonephritis tuberculosis pyelonephritis and reflux nephropathy. In our series average blood loss was 203.44 ± 117.5 ml ranging from 50 to 500 ml. The mean operative time was 178.5 ± 95 min ranging from 100 to 350 minutes. Post-operative hospital stay was ranging from 3 to 15 days with average of 5.5 ± 3.11 days. Procedure was successfully completed in 14 cases and only two patients (12.5%) required conversion to open surgery. Among those who were converted to open procedure one patient had stone disease and dissection was not possible laparoscopically due to dense adhesions. In other patient bleeding was the reason for conversion. The analgesia requirement was fulfilled in first 24 hours by oral drugs in only one patient. While intravenous analgesia was used in remaining patients. But on

second post-operative day requirement of intravenous analgesic markedly reduced and only three patients

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	16	12 years	55 years	27.75 years	12.288
Blood Loss	16	50 ml	500 ml	203.44 ml	117.512
Hospital stay	16	3.00 days	15.00 days	5.50 days	3.11983
Operative Time hospital	16	100 mins.	350 mins.	195.00 mins.	78.655

Gender distribution of the Subject under study

	Frequency	Percent
Female	11	68.8
Male	5	31.3
Total	16	100.0

required intravenous drugs. Post-operative complications like prolong ileus in two cases. Specimen extraction site wound infection in two patients. Residual stone at site of specimen extraction was noted in one case. One patient developed postoperative ascities whose histopathology came out to be tuberculous pyelonephritis. She resolved when anti tuberculus treatment was given. This patient subsequently devolved incisional hernia at specimen extraction site which was repaired.

Discussion

The use of laparoscopy in urological surgery is relatively new practice. Only few institutions in Pakistan are doing laparoscopic procedures. More so the variety of procedures is also limited. The reason for this limited use is because the urological procedure are complex like nephrectomies, as compared to general surgical procedure like laparoscopic cholecystectomy. The other reason is that like endourology, laparoscopic urology has long learning curve. Vallanciena et al⁴ suggested in their study that a minimum of 50 difficult cases are needed to acquire adequate laparoscopic skill. Majority of urologist do not receive any training and even exposure during their residency. This defici-

ency can be covered by doing training in center of excellence or by taking help of general surgery colleagues.⁵ As the patients are being benefited by this technique the laparoscopic practice in every field of surgery had increased rapidly.

In beginning there are many challenges in laparoscopy and among these one of the major challenges is conversion to open surgery or hand assisted technique. Realistic preoperative patient education and informed consent regarding open conversion and other complication decreases the anxiety of patient and surgeon.⁶ The main reasons for these conversions are failure to progress in the presence of dense adhesions, injury to surrounding viscera's and bleeding. Rasweller et al⁷ from Germany performed 482 nephrectomies for benign renal diseases and noted a conversion rate of 10.3 / in his study. Similarly the conversion rate of 16.5% was experienced by Bijan and Shekarriz.³ Our study shows the conversion rate of 12.5%. These results are comparable with other studies. These conversions in our study were due to dense adhesions and difficulty to progress in one case. The second case was converted because of bleeding. However the conversion rate in xanthogranulomatous pyelonephritis has been reported up to 26% by Arvind et al.⁸ According to Telly and Kelly multiple factors play important role in the conversion. The most important among them are pyonephrosisxanthogranulomatous pyelonephritis, staghorn stone and history of previous abdominal surgery. The conversion in laparoscopic donor nephrectomy to open surgery ranges from 0 to 20%. The reasons for these conversions are also adhesion and bleeding.⁹ The difficulties in dissection and longer operative time do not affect the hospital stay and postoperative convalescence which was observed by BijanShekarriz et al.³ We have come across the similar experience. Previously laparoscopy was considered to be relatively con-

traindicated in renal tuberculosis. But with passage of time both transperitoneal and retroperitoneal approaches are being used for this pathology.^{10,11} In tuberculosis the conversion rate of 8% to 22% has been reported.¹² In our study one patient had renal tuberculosis which was diagnosed on histopathology. She developed postoperative ascities and abdominal distension. When anti tuberculus therapy was started she improved quickly. This patient also developed incisional hernia at specimen extraction site in iliac fossa region. This was subsequently repaired by placing mesh with the help of general surgeon.

In the beginning we used Hanson open technique for pneumoperitoneum. However subsequently Veress needle was used for initial access. In patients with previous history of abdominal surgery we used open method. According to Scott D, et al¹³ factors which should be kept under consideration in selection of initial access are weight of the patient and history of previous abdominal surgery. We did not come across port site visceral injury.

The major advantage of laparoscopy is relatively low blood loss. In our series of 16 cases the mean blood loss was 203.44 ml + 117.5 ml and ranging from 50 to 500 ml. The similar amount of blood loss preoperatively in the inflammatory disease of kidney was noted by BijanShekarriz et al.³ However in other series of xanthogranulomatouspyelonephritis the mean blood loss was 140 + 92.08 ml.¹⁴ This low blood loss in their series is because this center is one of the best centers for endourology and laparoscopic urological surgery. Arvind NK, et al⁷ has reported the mean blood loss of 220 ml ranging from 90 to 500 ml in inflammatory condition.

There are various factors which determine the cost of surgery. Among them post-operative hospital stay is one of the major factor. The main benefits of laparoscopic surgery are short post-operative hospital stay, quick recovery and early return to work.¹⁵ In our study the average hospital stay was 5.5 + 3.11 day ranging from 3 to 15 days. The post-operative hospital stay is directly related to the experience of the center this observation noted by Azawi NH.¹⁶ In this study the hospital stay decreased significantly as well as the number of cases increased gradually from 7.3 to 30.8% with experience. A mean hospital stay of 4.1 + 2 days in the inflammatory condition was noted by BijanShekarriz et al.³ In our study extra hospital stay can be explained by the fact that we are beginner in this technique.

The operative time for any sort of surgery has great value. This directly affects the total cost of treatment and early post-operative of recovery. In our study the mean operative time was 195 + 78.65 minutes ranging from 100 to 350 minutes. The results of inflammatory conditions regarding time for laparoscopic nephrectomy range from 148 to 540 minutes with mean operative time of 284 + 126 minute.³ In other 2 case report study for infected nonfunctioning kidney due to PUJ obstruction it was 262 minutes and 140 minutes by Imao, et al.¹⁷ Our results in this regard are comparable in this regard.

We noted other complications like port site wound infection in two patients. One patient with non-functioning kidney due to stone disease had residual stone at specimen extraction site. Prolong ileus were noted in the two cases. In one patient who had tuberculus kidney developed incisional hernia at the specimen extraction site. This was repaired successfully with mesh technique with the help of general surgeon.

In our series we have not come across any injury related to port placement. The other major injuries like injury to colon, spleen, liver, pedicle and other surrounding viscera were not encountered.

The most common difficulties we come across during laparoscopic nephrectomy were dense adhesion in perihilar area, and the oozing / bleeding from the field. To our come these difficulties we had slow careful meticulous dissection and early conversion in the Patient's interest.

Conclusion

The use laparoscopy in urology practice is growing slowly in Pakistan. Although laparoscopic renal surgery is a procedure of choice for every renal pathology all over the world. As with any other procedure complications are there in laparoscopic renal surgery. These complications can be reduced with repetition and experience.

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