

Original Research Article

A study of the complications among the patients undergoing retroperitoneal and transperitoneal laparoscopic nephrectomy for pyonephrosis

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Received: 10 September 2019

Revised: 20 September 2019

Accepted: 07 October 2019

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ABSTRACT

Background: Nowadays laparoscopy have gained wider acceptance in urology that leads to more reports on the potential complications. This study was conducted to evaluate the complications among the patients undergoing retroperitoneal and transperitoneal laparoscopic nephrectomy.

Methods: Analysis was done retrospectively through review of a maintained database of 219 consecutive laparoscopic simple nephrectomies done for pyonephrosis from July 2001 to February 2013 at the department of urology Civil Hospital and B J Medical College Ahmedabad.

Results: Total 219 simple nephrectomies performed between July 2001 to February 2013 for pyonephrosis. In 165 (75.3%) of patient's procedure was through trans peritoneal route while retroperitoneal access was used in 54(24.6%) patients. In our study there were major complications in 12 patients with laparoscopic transperitoneal group and in 4 patients in laparoscopic retro peritoneal group. The minor complication rate in present study was 13.3% (22/165) in laparoscopic transperitoneal group and 11.1% (6/54) in laparoscopic retroperitoneal group.

Conclusions: There were major complications in patients with laparoscopic transperitoneal group and in few patients in laparoscopic retro peritoneal group. In most other series it was seen that retroperitoneoscopic surgery may be associated with more complications, the findings are unfounded. Minor complications can be managed easily if there is low threshold for conversion to open surgery.

Keywords: Complications, Laparoscopic, Nephrectomies, Retroperitoneal, Transperitoneal

INTRODUCTION

Many studies have evaluated the complication rates associated with laparoscopic nephrectomy (LN) since few decades.¹The first laparoscopic nephrectomy in 1990s was realized by Clayman et al.²The technique has rapidly evolved and taken various forms. Outcomes reported by many centers have enabled to make comparisons between laparoscopic nephrectomy, and open surgery. Laparoscopic nephrectomy (LN) has been shown to result in lesser postoperative pain, better cosmetic outcomes, and shorter hospital stay, and time to recovery.^{3,4}

Before there was no standardized reporting system for post-operative complications in urology and other surgical specialties. Clavien et al, in 1992 proposed the Clavien classification system to grade post-operative complications.⁵ A modified version of system (Clavien-Dindo [CD]) was published in 2004 which looked the therapeutic consequences to rank complications.⁶ The modified version is divided into seven grades (Grade 1-5) with two subgroups for Grade 3 and 4 with Grade 5 representing the death of a patient. This system is simple, convenient, reproducible, comprehensive, and logical and has been used in numerous surgical fields.⁷⁻⁹ It has also

been used for many urological procedures and has been proposed as the current standard to assess post-operative complications. Gaur et al, realized the full scope of retroperitoneoscopy by retroperitoneal dissection using a balloon in 1993.¹⁰

The growing interest in retroperitoneoscopy, which now accounts for half of all laparoscopic urological procedures was highlighted by Gill et al.¹¹ Nowadays laparoscopy have gained wider acceptance in urology that leads to more reports on the potential complications.¹²⁻¹⁴ This study was conducted to evaluate the complications among the patients undergoing retroperitoneal and transperitoneal laparoscopic nephrectomy.

METHODS

Analysis was done retrospectively through review of a maintained database of 219 consecutive laparoscopic simple nephrectomies done for pyonephrosis from July 2001 to February 2013 at the department of urology Civil Hospital and B J Medical College Ahmedabad.

Inclusion criteria

All patients who went for laparoscopic simple nephrectomy for pyonephrosis.

Exclusion criteria

Laparoscopic simple nephrectomy performed for other than pyonephrosis that include

- Acquired renal cystic disease
- Multicystic dysplastic kidney
- Obstructive or reflux nephropathy
- Renal tuberculosis
- Symptomatic patients with autosomal dominant polycystic kidney disease.
- Reno vascular hypertension
- Nephrosclerosis

Patient evaluation and preparation

In the previous evening all the patients were given light diet and polyethylene glycol preparation for bowel wash out. At the time of induction I.V. antibiotic was regularly given. Informed consent must be obtained with discussion of possible complications including adjacent organ injury and unrecognized bowel injury the patient should be informed that conversion to open surgery might be necessary to safely complete the planned procedure.

Operative procedure

For laparoscopic nephrectomy, the patient is initially positioned supine for intra venous access, induction of general anesthesia and endotracheal intubation. A bladder catheter and nasogastric tube is placed for decompression

of the bladder and stomach prior to insufflation. The subsequent steps and positioning of the patient depends on the approach for the procedure.

Retroperitoneoscopic nephrectomy

Patient is placed in the lateral flank position with elevation of the kidney bridge. Further, the table may be tilted anteriorly to allow the peritoneum and bowel to fall away from the proposed port site. The primary port is placed using a 1.5 cm incision, 2 cm below and posterior to the tip of the 12th rib in the posterior axillary line, deepened down to the thoracolumbar fascia. A balloon dilator was constructed as described by Gaur.¹⁰ This consists of a glove finger stall tied by silk over the end of a suction catheter.

The balloon dilator was then inserted into the opening. Distension of the balloon with air rapidly and a traumatically displaces the adjacent fat and peritoneum, thereby creating an adequate working space for retroperitoneoscopic surgery within that area. A 10mm port was then placed in this opening and used as the camera port. The 2nd and 3rd ports were inserted under direct vision. An automatic insufflator was used to maintain the CO₂ pressure at 14 mmHg. The psoas muscle acts as a landmark and was sought immediately on entry with the laparoscope. The hilar vessels are dissected first and divided. The ureter is dissected and divided. The kidney is mobilized all round and delivered intact by extending a port or by joining two ports. An 18F ryles tube drain is left behind in the retroperitoneal space through the 5 mm port site at the discretion of the surgeon.

Transperitoneal laparoscopic nephrectomy

The patient positioned in a modified lateral decubitus position and the umbilicus is placed over the break in the operating table. The table can be flexed as needed. An axillary roll is placed, and padding used to support the buttocks and flank. The patient is taped in position with multiple strips of wide cloth tape so that the patient will remain securely in place while the table is rolled toward the surgeon to assist with retraction of the bowel. Before trocars are placed, the abdomen is insufflated using a Veress needle. Trocars are usually inserted near the umbilicus, midway between the iliac crest and umbilicus, just below the costal margin in the midclavicular line, and 4th port at the anterior axillary line midway between the twelfth rib and the iliac crest. In general, 10/12 mm ports are used at the umbilicus and lower quadrant, whereas 5 mm ports are used at the costal and lateral margins.

For a left nephrectomy, the white line of told is incised from the level of the iliac vessels to above the spleen including the lienocolic ligament. During a right-sided nephrectomy, the peritoneal incision is carried cephalad, above the hepatic flexure including the right triangular and right anterior coronary ligaments. Medial traction on

the colon reveals Colo renal attachments that must be divided to complete the colon dissection. Adequate mobilization of the colon reveals the psoas muscle followed by the gonadal vessels and the ureter.

The ureter is elevated and followed proximally to the lower pole and hilum of the kidney. The ureter is not divided at this time because it can be used to help elevate the kidney and identify the hilar vessels which are clipped and divided individually after a meticulous hilar dissection.

Once the hilar vessels have been divided, the dissection continues posteriorly and superiorly to the upper pole and the adrenal gland is preserved. The ureter is divided, and the kidney is removed intact by extending a 10mm port. The muscle layer of the 10mm trocar sites is closed with 2-0 vicryl sutures.

Post-operative care

The nasogastric tube is removed at the completion of the procedure. The patient can begin oral diet as tolerated after the bowel sounds return or next day morning. The foley catheter is removed within 24 hour the patient is ambulating and a drain be removed within 24 hour or when the output is less than 50 ml in 24 hrs. The patient is discharged when tolerating a diet.

Statistical methods

The information collected was entered in Excel sheet. All data was expressed in terms of numbers and percentages. Data analysis was done in Microsoft word and Excel to generate graphs, tables etc.

RESULTS

Total 219 simple nephrectomies performed between July 2001 to February 2013 for pyonephrosis. In 165(75.3%) of patient's procedure was through trans peritoneal route while retroperitoneal access was used in 54(24.6%) patients (Table 1).

Table 1: Number of patients.

Procedure	No.
Lap transperitoneal nephrectomy	165
Lap retroperitoneal nephrectomy	54
Total	219

The mean age at surgery was 55 years (range 3-77 years). Most of the patients undergoing transperitoneal nephrectomy were >45 years of age. Most of the patients undergoing retroperitoneal nephrectomy were between 31- 45 years age group (Table 2). The indication for surgery was Renal stone/Pelviuretric junction stone in 98(44.75%), Ureteric stone 87(39.72%), Pelviuretric junction obstruction in 23(10.5%), Ureteric stricture in 9 (4.1%), vesicoureteric reflux in 2(0.9%).

Table 2: Age of patients.

Age (years)	<30 yrs.	31-45 yrs.	>45 yrs.
Lap transperitoneal nephrectomy	7	26	21
Lap retroperitoneal nephrectomy	48	57	60

In this study there were major complications (Table 3) in 12 patients with laparoscopic transperitoneal group and in 4 patients in laparoscopic retro peritoneal group. These complications including a, bowel injury in 2(1.2%) requiring open conversion and primary repair, inferior vena cava injury in 2(1.2%) patients requiring open conversion and manage successfully intra operative repair of inferior vena cava. Acute renal failure in 2(1.2%) patients manage with post-operative hemodialysis, major intra-op bleeding in 5(3.3%) requiring open conversion. 1 patient (0.6%) died due to post op bleeding before taking into operation theatre for exploration. In this study in retroperitoneal group major bleeding occur in 2(3.7%) patient manage by blood transfusion and conversion to open. Inferior vena cava injury in 1(1.8 %) patients requiring open conversion and manage successfully intra operatively. Acute renal failure in (1.8%) patient manage with post-operative hemodialysis. Post operatively, creatinine significantly not alter in laparoscopic group.

Table 3: Major complications.

Major complications	Intra OP bleeding	Post OP bleeding	Bowel injury	Acute renal failure	Inferior vena cava injury	Total
Lap trans peritoneal group	5(3.0%)	1(0.6%)	2(1.2%)	2(1.2%)	2(1.2%)	12
Lap retro peritoneal group	2(3.7%)	0	0	1(1.8%)	1(1.8%)	04

The minor complication rate in present study was 13.3% (22/165) in laparoscopic transperitoneal group and 11.1% (6/54) in laparoscopic retroperitoneal group. Overall complication rate was 12.7% (28/219) with common

complication bleeding, paralytic ileus, fever, pneumonia, hematoma formation. Paralytic ileus was successfully treated with prolonged ryles tube insertion and nil by mouth, hematoma was successfully treated conservatively (Table 4).

Table 4: Minor complications.

Minor complications	Fever	Hematoma formation	Port site infection	Paralytic ileas	Chest infection
Lap trans peritoneal group	5(3.3%)	1(0.6%)	4(2.4%)	9(5.4%)	3(1.8%)
Lap retro peritoneal group	2(3.7%)	2(3.7%)	1(1.8%)	0	1(1.8%)

DISCUSSION

Laparoscopic urological surgery has developed rapidly and now includes a wide range of procedures. There are inherent advantages in retroperitoneoscopy over transperitoneal laparoscopy.¹⁵⁻¹⁷ The direct approach to the retroperitoneum avoids peritoneal transgression; this minimizes the risk of intraperitoneal injury during colonic mobilization, postoperative adhesions and peritonitis if there is spillage of infected renal contents.

In a review of 2,407 laparoscopic cases in urology, fahlenkamp and colleagues demonstrated a 0.2% incidence of adjacent organ perforation. Fahlenkamp and colleagues demonstrated a 0.8% incidence of adjacent organ perforation. They also noted a 3:1 ratio for the incidence of visceral injury during the transperitoneal versus the retroperitoneal approach, respectively.¹⁸ In this study there were major complications in 12 patients with laparoscopic transperitoneal group and in 4 patients in laparoscopic retro peritoneal group. These complications including a, bowel injury in 2(1.2%) requiring open conversion and primary repair, inferior vena cava injury in 2(1.2%) patients requiring open conversion and manage successfully intra operative repair of inferior vena cava. Acute renal failure in 2(1.2%) patients manage with post-operative hemodialysis, major intra OP bleeding in 5(3.3%) requiring open conversion. 1 patient (0.6%) died due to post op bleeding before taking into operation theatre for exploration. In this study in retroperitoneal group major bleeding occur in 2(3.7%) patient manage by blood transfusion and conversion to open. Inferior vena cava injury in 1(1.8 %) patients requiring open conversion and manage successfully intra operatively. Acute renal failure in 1(1.8%) patient manage with post-operative hemodialysis. Post operatively s. creates. significantly not alter in laparoscopic group.

In a study conducted by Keeley FX et al, the overall complication rate was 18%, of which 3% were major and 15% minor complications.¹⁷ The major complication rate in present study was 7.2% (12/165) in laparoscopic transperitoneal group and 5.5% (3/54) in laparoscopic retroperitoneal group. Overall major complication rate was 6.8% (15/219).

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Patil M, Baria M, Parmar A. A study of the complications among the patients undergoing retroperitoneal and transperitoneal laparoscopic nephrectomy for pyonephrosis. *Int J Res Med Sci* 2019;7:4287-91.