

# Study of Laparoscopic Management of Urological Diseases at Tertiary Care Centre

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## ABSTRACT

**Introduction:** With the advent of laparoscopic surgery, urologists once again found it necessary to traverse the peritoneal cavity in order to provide their patients with the benefit of this less invasive type of surgery. In this study we studied the prevalence of laparoscopic urological surgeries, ergonomics involved, difficulties faced and complications related to laparoscopic procedures.

**Material and methods:** It was a prospective hospital based non-randomised study carried out among 36 indoor cases operated using various laparoscopic procedures viz laparoscopic pyeloplasty, laparoscopic pyelolithotomy, laparoscopic nephrectomy, laparoscopic ureterolithotomy etc. admitted under department of general surgery in a tertiary healthcare teaching institute

**Results:** In the present study, out of 31 cases, 20 cases presented with diagnosis of renal stone disease (Renal pelvic calculi, staghorn renal calculi and ureteric calculi). Total 5 cases i.e 16.12% cases were having diagnosis of chronic non-functioning kidney while 3 cases (9.67%) were presented with renal cell carcinoma. 3 cases (9.67%) presented with pelvi-ureteric junction obstruction.

**Conclusion:** Laparoscopic pyelolithotomy in extrarenal pelvis is a good procedure as pelvis can be reached easily especially if pelvis is dilated and Laparoscopic ureterolithotomy in abdominal ureter is a promising surgery as entire ureter can be visualized so stones are easily detected and surgeon has a better control of proximal ureter in case of slippage of calculas

**Keywords:** Laparoscopic Urological Surgeries, Laparoscopic Ureterolithotomy, Laparoscopic Pyelolithotomy, Laparoscopic Nephrolithotomy, Ergonomics

## INTRODUCTION

Laparoscopic urologic procedures can be performed either transperitoneally or retroperitoneally. In the transperitoneal approach, the anterior abdominal wall musculature is traversed by anterior ports and the line of Toldd is incised to reach the kidneys. To approach the kidney retroperitoneally, laparoscopic entry is via the superior or inferior lumbar triangle. The Urologic surgery is mostly retroperitoneal and extraperitoneal as these organs are located inherently in the retroperitoneum and extroperitoneally. However, with the advent of laparoscopic surgery, urologists once again found it necessary to traverse the peritoneal cavity in order to provide their patients with the benefit of this less invasive type of surgery. Creativity and perseverance led to use of laparoscopy via retroperitoneal approach. The concept of balloon dilatation of retroperitoneum was introduced by Gaur, which subsequently led to growth of retroperitoneoscopy.<sup>1,2</sup>

In this study we studied the prevalence of laparoscopic urological surgeries, ergonomics involved, difficulties faced and complications related to laparoscopic procedures.

The term ergonomics is derived from the greek words "ergon" meaning work and "nomos" meaning natural laws or arrangement. Ergonomics in simple words is the science of best suiting the worker to a job and make setting and surrounding favorable to a surgeon. Ergonomics is "the scientific study of people at work, in terms of equipment design, workplace layout, the working environment, safety, productivity, training". Ergonomics is based on anatomy, physiology, psychology and engineering, combined in systems approach. The importance of ergonomics in the setting of laparoscopy cannot be over-emphasised. Studies have shown that correct ergonomics can reduce suturing time. Pressure related chronic pain among surgeons has been shown to be relieved by the use of ergonomically designed product.<sup>3</sup> hence it is imperative to understand the applications of ergonomics for all surgeons practising laparoscopy. Hence one of the aim was to study the ergonomics related to laparoscopic urology.

## MATERIAL AND METHODS

It was a prospective hospital based non-randomised study carried out among 36 indoor cases operated using various laparoscopic procedures viz laparoscopic pyeloplasty, laparoscopic pyelolithotomy, laparoscopic nephrectomy, laparoscopic ureterolithotomy etc. admitted under department of general surgery in a tertiary healthcare teaching institute.

**Source of Data:** All the cases of urological disorders admitted under department of general surgery in a tertiary healthcare institute, who were planned for elective laparoscopic urological surgical procedures and fulfils the set inclusion criteria, who consented to participate in the study were included in the present study.

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**Method of collection of data**

**Type of study:** Prospective hospital based study

**Sample size:** It was a time bound study, for a period of 18 months

**Sampling Technique:** Universal Sampling.

**Method of data collection:** The data was collected from cases fulfilling inclusion criteria using pre-designed, semi-structured, pre-validated proforma, in which history, clinical findings, investigation reports, details about surgical procedures performed were incorporated. All cases were followed up for any development of surgical complications.

**Inclusion criteria**

1. Cases of both sexes between age group of 15-65 years.
2. All diagnosed cases of urolithiasis (renal, vesical, ureteric calculus) requiring surgery.
3. Cases of PUJ obstruction requiring surgery.
4. Cases of renal and ureteric malignancies.
5. Cases of pyonephrosis requiring surgery.
6. Cases of lower ureteric or vesical calculus that were unwilling for endoscopic retrieval procedures.

**Exclusion criteria**

1. Cases below the age of 15 and above the age of 65 years.
2. Cases of urinary bladder malignancy.
3. Cases of urolithiasis who don't require surgical interventions or who are likely to be operated by other procedures.
4. Cases who are unfit for surgery
5. Unwilling patients.
6. Immuno-compromised patients

**Indications**

1. Ureteric, renal, pelvic, bladder stones of size more than 9mm, staghorn calculas, impacted stones, stones with failed endoscopic procedures for laparoscopic uereterolithotomy, pyelolithotomy, nephrolithotomy.
2. Pelvi-ureteric junction obstruction primary or secondary for laparoscopic pyelolithotomy.
3. Non-functioning kidney, renal tumors, for laparoscopic nephrectomies

**Initial assesment of the patient**

Patients reported in opd or casualty with upper or lower urinary tract symptoms were either admitted or evaluated on OPD basis. These patients were having pain in loin and groin, heamturia, pyuria, burning micturition or lump.

All the patients with pain in loin or groin or radiating pain to back or scrotum and clinically diagnosed as acute renal pain, ureteric colic were initially treated with inj pentazocin to relieve the pain and once pain disappeared or relieved, screening investigations USG, XRAY KUBU done to ascertain the cause of pain. Patients who were diagnosed as urolithiasis. Renal, ureteric, vesical, with or without obstruction underwent basic investigation to know the status of the kidney-KFT and general condition of the patient-CBC, ECG and other necessary investigation as advised in pre-aneasthetic check up were done. Special

investigation like USG and CT scan was done whenever there was obstructive uropathy to ascertain the area and size of pathology and cause.

The patients whose condition were not good due to urosepsis or uremia secondary to obstructive uropathy underwent drainage procedure like PCN(percutaneous nephrostomy) or per urethral catheterisation in case of vascal calculas. Then thorough clinical assesment was done as per proforma. Stable and fit patients were planned for surgery; unstable or unfit patients were stabilised. Their general condition and performance status improved and then surgery was planned and performed.

**Investigations**

Following investigations were done

- Blood Investigations: CBC, KFT, SR Electrolytes, LFT, HIV, HBSAG, urine routine and microscopy.
- Radiological Investigations:

**Operative procedures**

Patients who were included in the study and fit for surgery were operated by minimal invasive approach. All patients were operated under general aneesthesia. Following operative procedures were done according to the disease of the patient and all the intra operative details were noted down in as per proforma.

**Ergonomics related to Laparoscopic Urology**

During every procedure the ergonomics principles were taken into the considerations and port positions were marked to reduce operating surgeons fatigue and operative time and operating surgeons comfort level was noted and also following angles were taken into considerations during every surgery

Following questions were asked to the operating surgeon during each procedure

1. Ease of handling the instruments.
2. difficulty faced in reaching to the target organ.
3. Need to change the port position and need to insert extra port.
4. Any fatigability and overall comfort during the surgery was noted.
5. Difficulty in placement of DJ stent.

**RESULTS**

The present study was conducted among 31 cases admitted under department of general surgery in tertiary care centre fulfilling inclusion criteria and who were selected for elective laparoscopic procedures. Out of 31 study participants, majority of study participants who underwent laparoscopic urological surgeries were females (61.21%) and (38.70%) were males.

Out of total 31 study participants, 13 (41.93%) were males and majority were females 18(56.25%). Majority of male cases [5 (16.12%)] lied between age group of 41 – 50 years and majority of female cases [7 (22.58%)] also occurred between 41 – 50 years.(Table 1)

In the present study, out of 31 cases, 20 cases presented with diagnosis of renal stone disease (Renal pelvic calculi,

Demographic features		Number of study subjects	Percentage
Sex	Males	12	38.70%
	Females	19	61.21%
	Total	31	100%
Age group	≤ 30	3 (9.67%)	4 (12.90%)
	31-40	2 (6.46%)	5 (16.12%)
	41-50	5 (16.12%)	7 (22.58%)
	>51	3 (9.67%)	2 (6.46%)
	Total	13 (41.93%)	18 (56.25%)

**Table-1:** Distribution of participants according to their demographic features

Operative details	Types	Frequency	Percentage
Operative procedure	Laparoscopic uretero-lithotomy	14	66.66%
	Laparoscopic pyelo-lithotomy	6	28.57%
Mean operative time	Laparoscopic uretero-lithotomy	52.6mins	
	Laparoscopic pyelo-lithotomy	60 mins	
Target organ reached immediately	Yes	17	80.95%
	No	3	19.04%
Surgeon comfort level	Good	20	100%
	Average	0	0
Difficulty in placing DJ stent	Yes	2	9.52%
	No	18	90.47%
Need to put more ports	Yes	3	14.28%
	No	18	85.71%
Percutaneous nephrostomy done		3	15%

**Table-2:** Distribution of participants presenting with stone disease according to their operative details

Operative details	Types	Frequency	Percentage
Operative procedure	Laparoscopic nephrectomy	8	25.80%
Mean operative time	Laparoscopic nephrectomy	100.625 mins	
Indication for nephrectomy	Non functioning kidney	5	62.5%
	RCC	3	37.5%
Need for extra port	YES	4	50%
	NO	4	50%
Side of the procedure	Rt	4	50%
	Lt	4	50%
Need to convert in open procedure	0	0	0

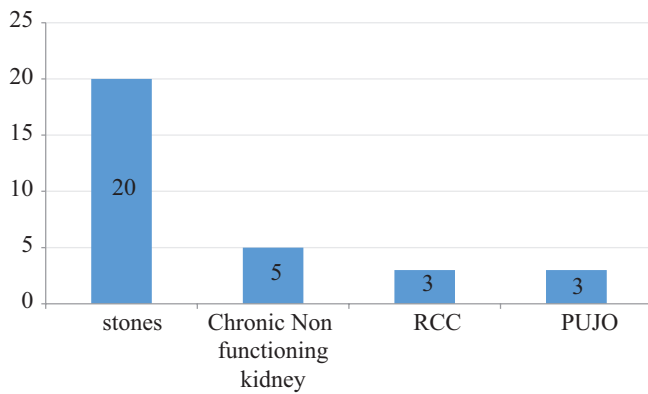
**Table-3:** Distribution of participants managed with laparoscopic nephrectomy according to their operative details

Operative details	Types	Frequency	Percentage
Operative procedure	Laparoscopic pyeloplasty	3	9.67%
Mean operative time	Laparoscopic pyeloplasty	80 mins	
Target organ reached immediately	Laparoscopic pyeloplasty	No-because of adhesions	
Surgeon comfort level	Good	yes	100%
	Average		
Difficulty in placing DJ stent	Yes	0	
	No	3	100%
Need to put more ports	Yes	0	
	No	3	100%
Need to convert in open procedure	0	0	

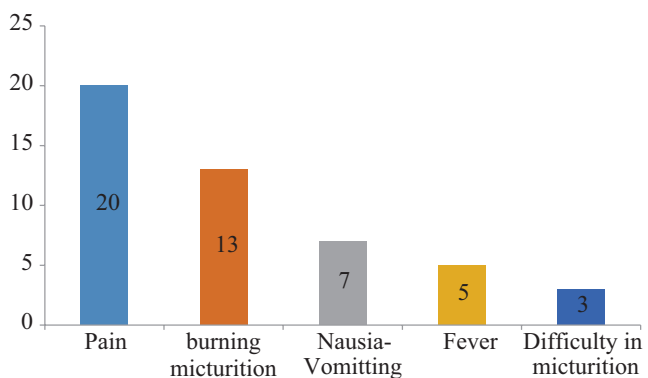
**Table-4:** Distribution of participants managed with laparoscopic pyeloplasty according to their operative details

staghorn renal calculi and ureteric calculi). Total 5 cases i.e 16.12% cases were having diagnosis of chronic non-functioning kidney while 3 cases (9.67%) were presented with renal cell carcinoma. 3 cases (9.67%) presented with pelvi-ureteric junction obstruction. (Figure 1)  
In the present study all of cases of renal stone disease

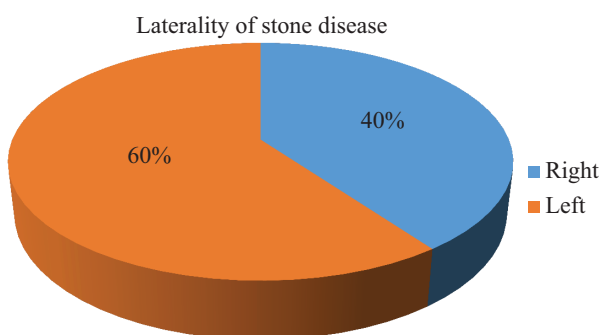
presented with pain with or without radiation to any other region, followed by burning micturition which are 13 cases.7 cases complained of Nausea-Vomiting while 5 cases complained of fever. 3 cases presented with difficulty in micturition. (Figure 2)  
Out of all cases presented with renal stone disease, majority



**Figure-1:** Distribution of participants according to their diagnosis



**Figure-2:** Distribution of participants presenting with stone disease according to their clinical features



**Figure-3:** Distribution of participants presenting with stone disease according to their laterality

of cases showed left sided laterality of stones (60%) while only 40% cases presented with right sided renal stones (Figure 3).

The present study was carried out to assess feasibility of laparoscopic procedures in urological surgeries. Total 31 cases of various urological conditions were operated.

20 cases of renal stone diseases were managed using laparoscopic lithotomy. The mean operative time reported for ureterolithotomy was 52 minutes and that for pyelolithotomy was 60 minutes. General anesthesia was administered in all the cases. And all the procedures was done by transperitoneal approach. In 17 cases (80.95%) out of 20 cases of renal stones, the target organ was reached immediately whereas in 3 cases where prior PCN or any other previous surgery was done, due to intraabdominal adhesions target organ was not reached easily. Surgeon comfort level was found to be good

in all the cases. DJ stent was placed in all the cases of renal stones however in 2 cases difficulty was faced in placing DJ stent because difficulty in maneuvering. In 3 cases extra port was taken for a liver retraction in right sided cases (Table 5). All the laparoscopic procedures were reported to be uneventful without any history of bleeding, need for open conversion, or other intra-operative complications. (Table 2, 3)

Among the 8 cases of laparoscopic nephrectomy, the mean operative time was observed to be 100 minutes. 5 out of 8 nephrectomies were done for a non functioning kidney and 3 were done for Renal cell carcinoma. Transperitoneal approach was used in all the cases of laparoscopic nephrectomy. 4 cases were of right sided and 4 were of left sided nephrectomies, in right sided procedures the extra 1 port was required for a liver retraction. No procedure was converted to open.

Similarly, among the 3 cases of PUJO, managed with laparoscopic pyeloplasty, the mean operative time was observed to be 80 minutes. The position of the patients in all cases was lateral with elevated kidney bridge. The overall procedure was recorded to be uneventful. Transperitoneal approach was used in all the cases of laparoscopic nephrectomy. In all three procedures there was adhesions because of percutaneous nephrostomy done prior. There was no need to put extra ports or need to convert into open procedure. (Table 4)

## DISCUSSION

This is a prospective non randomized study done in tertiary care centre. Total 31 patients fulfilled the inclusion criteria and underwent required laparoscopic urological operations. All the patients were operated by trained laparoscopic surgeon. The number of patients in our study is a bit less as urosurgery department started functioning independently in the different building and patients (urological) flow was diverted and many patients was lost in transit while being referred back to our tertiary care centre.

### Ergonomics in laparoscopic procedures

As we know that Ergonomics is "the scientific study of people at work, in terms of equipment design, workplace layout, the working environment, safety, productivity, and training". Ergonomics is based on anatomy, physiology, psychology, and engineering, combined in a systems approach. The importance of ergonomics in the setting of laparoscopy cannot be over-emphasised. Studies have shown that correct ergonomics can reduce human efforts, struggle, injury to organ, suturing time and thereby operating time and complications.

In the present study, We have followed the ergonomics principle and operated 31 patients. Ergonomics parameters such as surgeons comfort level, reaching to target organ, port positioning, OT environment and difficulties faced while suturing and placing of DJ stent were closely monitored .

Total 31 patients were operated out of which in 24 patients we had no difficulty reaching the target organ but in 6 patients i.e 3 of nephrectomies and 3 of pyeloplasties difficulty was

faced in reaching target organ. The primary reason being the port positioning. In spite proper port position marking was done according to pathology the abdominal distension achieved after creating pneumoperitoneum was variable in different patient because of condition of abdominal wall i.e in older patient abdominal wall was lax so distension achieved was more while as in young patient abdominal wall was tight so distension was less. And because of large size of kidney due to hydronephrosis obliquity of ports was more so more torque was generated in axis of dissection. The secondary reason was intrabdominal adhesion due to prior percutaneous nephrostomy done.

The second thing was comfort level of the surgeon. In 4 out of 31 cases, surgeons comfort level was moderate and not good. The reason was duration of surgery as some procedures took longer time and a manipulation angle which is an angle between telescope and working instrument and that ideally should be 45-60 degrees which was not so in 4 surgeries so surgeon experienced pain in flexor and extensor group of muscles of dominant hand.

In 9 out of 31 patients extra port was taken. All 9 were right sided procedures 1 extra port was needed for liver retraction. In 9 out of 31 patients we faced difficulty in placement of dj stent due to maneuvering of the both coiled ends of DJ stent into the ureter. To overcome this difficulty we inserted the metallic guide wire into the stent to straighten the coiled end and stent aligned in direction of ureter and pushed one end at once of stent into ureter and then removed the guidewire. In 1 patient of pyelolithotomy because of intrarenal pelvis there was less space in pelvis to accommodate coiled end of stent so we had to cut down the stent and then placed it in renal pelvis but because of peristalsis the DJ stent accidentally came out. Same patient had a urinary leak till postoperative day 4 which was managed conservatively and leak stopped on its own as renal pelvis was sutured properly as in open surgery

#### Demographical characteristics

In the present study majority of patients admitted under our department were females (58%). Majority of Female and male cases lied between the age group of 41-50 years i.e 38.70%.

#### A. Laparoscopic lithotomy group

The mean age of laparoscopic lithotomy group study cases reported by the present study was found to be 43.9 years. Similar findings were reported by Agrawal G et al.<sup>4</sup> They carried out study among 18 patients with large renal pelvic calculi. The mean patient age was found to be 40 years and 41.2 years in the LPL and PNL groups, respectively ( $p \leq 0.2934$ ) (10). Also Al-Sayyad et al<sup>5</sup> included twelve patients (mean age =  $52.9 \pm 12$  years) with large upper ureteric stones (mean stone diameter =  $39 \pm 13$  mm) were included .

#### B. Laparoscopic nephrectomy group

The mean age of laparoscopic nephrectomy cases reported by the present study was found to be 45.8 years. Machado MT et al<sup>6</sup>, did Seventeen patients with mean age of 41 years (25-78 years) were treated during the period from 1998 to 2003.

#### C. Laparoscopic pyeloplasty group

The mean age of laparoscopic pyeloplasty group study cases reported by the present study was found to be 17 years. Song SH et al<sup>7</sup>, compared open, laparoscopic and robot assisted pyeloplasty. Mean age of the study subjects was 10.5 (2-16) years. Out of total 30 subjects who undergone Laparoscopic pyeloplasty, 20 were males and 10 were females.

#### Distribution of cases according to their Diagnosis

In the present study, majority of cases were of renal stone diseases, among which cases of ureteric calculi (43.75%) and renal pelvic / PUJ calculi (19.35%). Lesser number of cases was of chronic non-functioning kidney (16.12%), renal cell carcinoma (9.67%) and PUJ obstruction (9.67%).

#### Renal stone disease clinical features and management

The present prospective study assessed various modes of presentations of urological diseases admitted under our department. Out of all the urological diseases, most common modes of presentations of renal stone disease as reported by our study were: Abdominal pain (100%), Burning micturition (65%), nausea-vomiting (35%), fever (16.12%) and difficulty in micturition among 9.67% cases of renal stone diseases. Majority of renal stones as observed in the present study were left sided (60%).

We also assessed study participants according to their stone sizes; we found that majority (61.9%) of renal stone cases presented with stone size between ranges of 1 – 1.5 cm. However, Agrawal G<sup>4</sup>, found that the mean stone size was  $3.7+0.55$  cm<sup>2</sup> (range: 2-4cm) and  $3.90 \pm 0.60$  cm<sup>2</sup> (range: 2-4.5cm) in the LPL and PNL groups, respectively ( $p \leq 0.333$ ). Lee JW et al<sup>8</sup>, in their study found that, Stone sizes showed significant differences, with 20.7 – 7.4 mm in Group I, 25.2 – 13.0 mm in Group II, 41.1 – 18.4 mm in Group III, and 86.2 – 42.3 mm in Group IV, respectively ( $p < 0.001$ ).

All the 20 cases of renal stone disease were managed using laparoscopic procedures, 14 cases of ureteric calculi were operated by laparoscopic uretero-lithotomy, while 6 cases renal pelvic / PUJ calculi were operated by laparoscopic pyelo-lithotomy. The mean operative time as observed in the present study was found comparatively less for laparoscopic uretero-lithotomy (52.6 minutes) than laparoscopic pyelo-lithotomy (60 minutes). However, Agrawal G<sup>4</sup>, found the mean operation time was significantly prolonged in the LPL group than in the PNL group,  $145.88 \pm 35.54$  minutes (range: 90-200 min) versus  $76.2 \pm 9.21$  minutes (range: 60-90 min). Al-Sayyad A<sup>5</sup> in their study found mean operative time was  $107 \pm 49.5$  min with mean blood loss of  $60.5 \pm 19.2$  cc. Khalil M et al<sup>9</sup> found that the mean operative time of the LTU group was significantly shorter than that of the LRU group ( $116.2 \pm 21.8$  min vs.  $137.3 \pm 17.9$  min, respectively  $p=0.02$ ). There were no significant differences between the LTU and LRU groups regarding mean blood loss ( $71.5 \pm 44.5$  mL vs.  $60 \pm 19.5$  mL, respectively,  $p=0.43$ ), need for blood transfusion (15.4% vs. 9.1%, respectively,  $p=0.82$ ). According to Hu Q et al<sup>10</sup>, The average of operating time and estimated blood loss was 87 min and 64 mL.

In our study, General anesthesia was administered in all the

cases. And all the procedures were done by transperitoneal approach. There was no need to put more ports during the procedures in 22 cases, in 9 cases extra port was taken for a liver retraction in right-sided cases.

### Complications

All the laparoscopic procedures were reported to be uneventful without any history of bleeding, need for open conversion, or other intra-operative complications. In the postoperative period we encountered 1 patient with high-grade fever and 4 patients with postoperative pain, in one patient of pyelolithotomy we had a difficulty while placing the DJ stent in pelvis because of intrarenal pelvis so we had to cut upper end of DJ stent and in this patient we encountered postoperative urine leak which we managed conservatively and his DJ stent accidentally got removed on post-operative day 4. We compared to various studies as follows:

Agrawal G<sup>4</sup> observed that in the LPL group, the complication rate was 33.33%; three patients had high-grade fever (16.66%) and one patient (5.5%) had urinary leakage and one patient had minor bleeding which managed conservatively. The mean blood loss was 180.5 ± 63.28 mL (150-300) in the LPL group as compared to in the PNL 150.5 ± 34.06 mL (75-200) group and were not statistically significant. Hu Q et al<sup>10</sup>, found complications in their study like migration back to pelvis of calculi (%) 3 (1.5) Urine leak (%) 5 (2.5) Ureteral stricture (%) 2 (1.0). Khalil M et al<sup>9</sup> in their study found that postoperative fever occurred in 15.4% cases in LTU group vs. 18.2% cases in LRU group respectively.

### Management using Laparoscopic nephrectomy

In the present study total 8 cases (5 cases of non-functioning kidney and 3 cases of renal mass) were managed with laparoscopic nephrectomy. The mean operative time observed in the present study was 100.6 minutes. Transperitoneal approach was used in all the cases of laparoscopic nephrectomy. 4 cases were of right-sided and 4 were of left-sided nephrectomies, in right-sided procedures the extra 1 port was required for a liver retraction. No procedure was converted to open.

Nadler RB et al<sup>11</sup>, enrolled total 33 cases for nephrectomy, out of them total 11 cases were operated using laparoscopic procedure.

### Management using Laparoscopic pyeloplasty

In this study 3 cases of PUJO were managed using laparoscopic pyeloplasty, the mean operative time was observed to be 80 minutes. The position of the patients in all cases was lateral with elevated kidney bridge. The overall procedure was recorded to be uneventful. Transperitoneal approach was used in all the cases of laparoscopic nephrectomy. In all three procedures there were adhesions because of percutaneous nephrostomy done prior. There was no need to put extra ports or need to convert into open procedure as similar to above laparoscopic urological procedures.

Song SH et al<sup>7</sup>, observed that the mean operation time for laparoscopic pyeloplasty was 197.4 ± 38.9 minutes, while DJ stent was used in 73.3% cases. While mean postoperative length of stay in hospital was 5.8 ± 1.4 days. Memon MA et

al<sup>13</sup>, Mean operative time in group 2 was 153±45 min and 178±60 min in group 1. Mean blood loss in group 1 was 54±17 ml compared to 110±78 ml in group 2 (p=0.059). Mean length of stay was 2.7±0.5 days in group 1 compared to 4.5±0.9 days in group 2 (p<0.000)

### Post-operative complications

All the laparoscopic procedures were reported to be uneventful without any history of bleeding, need for open conversion, or other intra-operative complications as compared to various studies as follows:

Song SH et al<sup>7</sup>, while studying complications of laparoscopic pyeloplasty, they found that 3.3% cases developed ileus, 6.6% cases developed UPJO, 27 cases developed hydronephrosis of various grades and 3.3% cases developed UTI.

Piaggio et al<sup>14</sup>, found that there were four complications in the LP group: febrile UTI (two), double J stent disruption and meatal stenosis (one each); and three in the OP group: febrile UTI, flank pain due to stent displacement, and persistent gross hematuria (one each). There was no need for transfusions in any group. Two patients in the LP group and one in the OP group needed additional procedures (p > 0.05): meatoplasty and ureteroscopy for stent removal (LP) and stent repositioning (OP).

### CONCLUSION

Laparoscopic pyelolithotomy in extrarenal pelvis is a good procedure as pelvis can be reached easily especially if pelvis is dilated. Laparoscopic ureterolithotomy in abdominal ureter is a promising surgery as entire ureter can be visualized so stones are easily detected and surgeon has a better control of proximal ureter in case of slippage of calculus.

Laparoscopic pyeloplasty is also a good procedure with less morbidity in expert hands as it requires advanced skill of suturing. In laparoscopic nephrectomy surgeon should not hesitate in putting additional port whenever needed and can be done safely in expert hands. Laparoscopic urological surgeries are safe and feasible in expert's hands.

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