

Laparoscopy in Urology Practice at a Tertiary Care Centre

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ABSTRACT

Objective: To describe the results of laparoscopic procedures at a Urology - Nephrology tertiary care centre.

Study Design: Case series / observational study.

Place and Duration of Study: The Kidney Centre Postgraduate Training Institute, Karachi, from August 2007 to March 2012.

Methodology: Medical records of all planned laparoscopic surgery conducted during the study period were reviewed. Those cases which to open surgery were excluded. All were performed by a single surgeon, initially as supervised and later independently. Data was maintained for demographic data, procedure details, length of hospital stay, and complications including conversion to open surgeries. Data was analyzed through SPSS 17.0.

Results: There were 36 planned laparoscopic surgeries in the specified period. Out of 36 cases, 8 were converted to open surgery. Those who underwent laparoscopic surgery include two diagnostic procedures and renal cyst deroofing each, four ureterolithotomy, nineteen simple nephrectomy and one radical nephrectomy. So in total 28 cases were performed on 15 females and 13 males with mean age of 33.01 ± 10.9 years. The mean operative time was 216 ± 100 minutes and mean length of hospital stay was as 2.7 ± 1.04 days. There were 10 complications in 28 cases, majority being Clavien Grade II including 7% (2/28) blood transfusion.

Conclusion: There are technical challenges in learning laparoscopy for practicing urologists. Following some learning model in a systematic manner will help surmounting the technical challenges in learning laparoscopy.

Key Words: Learning curve. Laparoscopy. Urology.

INTRODUCTION

History reveals significant resistance and difficulty both in the United States and Europe including United Kingdom, in the transformation from open to key hole urologic surgery till more than a decade after the first laparoscopic nephrectomy was reported in 1991.¹⁻⁵ In fact as late as 2007, Keeley and colleague thought inappropriate training for slower development of laparoscopy in urology at UK.⁶ Here in Pakistan, even after more than a quarter of a century since the first laparoscopic nephrectomy, only a handful of Urologists are practicing laparoscopic surgery and that even with predominantly simpler procedures. So there is an immense need to transform a generation to new skill which is not so new in the context of contemporary world. Besides technical and economic challenges, the mindset that "the transformation is not necessary or is not doable" is another deterrent.

The aim of this study was to address the technical issues and emphasize the transformation from open to keyhole surgery.

METHODOLOGY

The current study is an observational study. Medical records of all planned laparoscopic surgery were

reviewed at The Kidney Centre Postgraduate Training Institute, from August 2007 to March 2012. All were performed by a single surgeon initially as supervised and later as independent. Data was maintained for demographic data, procedure details, length of hospital stay, and complications including conversion to open procedure. The data of nephrectomies were analyzed separately as well.

British Association of Urological Surgeons (BAUS) guidelines for training in laparoscopy was adopted to learn laparoscopy.⁶

All procedures were done in modified supine position except the diagnostic laparoscopic surgery which was done in supine position for absent testis. All procedures were performed under general anaesthesia and through transperitoneal approach. A zero degree 10 mm lens was used in all cases. Harmonic system was used in some of the cases. However, majority of the cases were performed with traditional Bovie for homeostasis and dissection. Carbon dioxide (CO₂) gas was used to insufflate peritoneal cavity. The insufflations pressure was maintained around 16 mmHg. Carbon dioxide gas (CO₂) was insufflated at room temperature.

Descriptive statistics for data were calculated through SPSS 17.0.

RESULTS

There were 36 planned laparoscopic surgeries in specified period. Out of 36 cases, 8 were converted to open. Those who underwent laparoscopic surgery include 2 procedures each of diagnostics and renal

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cyst deroofing, 4 ureterolithotomy, 19 of simple nephrectomy and one of radical nephrectomy. In total, 28 cases were performed on 15 females and 13 males with mean age of 33.01 ± 10.9 years. The mean operative time was 216 ± 100 minutes (ranging from 45 to 360 minutes) and mean length of hospital stay was 2.7 ± 1.04 days (range: 1 - 5 days). There were 10 complications out of 28 cases, majority being Clavien Grade II including 7% (2/28) blood transfusion (Table I). All cases except three were done with camera port along the lateral border of the rectus muscle at the reverse Mc Burney's point which is the junction of medial $\frac{1}{3}^{\text{rd}}$ and lateral $\frac{2}{3}^{\text{rd}}$ along line drawn from the umbilicus to the anterior superior Iliac spine (Figure 1).

In the nephrectomy arm, there were 25 planned cases out of which 5 required open conversion. Two cases required conversion because of non-progression and 3 because of bleeding; though one required transfusion but had major complication (reopen for control of bleeding). The mean operating time was 234 ± 72 minutes (ranging from 90 to 360 minutes) and the mean length of hospital stay was 2.9 ± 0.8 days (ranging from 2 to 5 days). In majority (14/20) of the nephrectomies, only three ports were required. However, five required four and one required five ports. There were 8 complications out of 20 cases, majority being Clavien Grade II including 10% (2/20) blood transfusion (Table II).

Table I: Complications in all urologic laparoscopic surgeries (n = 28).

Complications	Count	Clavien grade
Postoperative Nausea Vomiting (PONV) or nonspecific gastritis	5	I
Blood transfusion	2	II
Port wound infection	0	-
Port wound dehiscence	1	II
Port wound hernia	2	I (1) III (1)
Port wound tumour implant	0	
Bowel injury	0	
Solid organ injury	0	
ICU admission	0	
Re-exploration	0	
Death	0	

Table II: Complications in the nephrectomy arm (n = 20).

Complications	Count	Clavien grade
Postoperative Nausea Vomiting (PONV) or nonspecific gastritis	3	I
Blood transfusion	2	II
Port wound infection	0	-
Port wound dehiscence	1	II
Port wound hernia	2	I (1) III (1)
Port wound tumour implant	0	
Bowel injury	0	
Solid organ injury	0	
ICU admission	0	
Re-exploration	0	
Death	0	



Figure 1: Camera port placement and reverse Mc Burney's point.

DISCUSSION

Laparoscopy is known to have a long learning curve. Different technical experience as against open surgery is one of the challenges in learning laparoscopy. Loss of depth perception, hand-eye coordination, and small working space with limited instrument maneuverability and precise port planning are some of the skills that are gradually acquired and adapted.^{1,7} There are certain models described in literature to follow in order to overcome technical challenges in learning laparoscopy for practicing urologist. The British Association of Urological Surgeons (BAUS) Guidelines for learning laparoscopy,⁶ Indiana Mini-fellowship model,¹ Step-ladder approach by Jawaharlal Institute India² and Mutual-mentoring model⁵ are few such models. BAUS Guideline. suggests initial training and exercising in Dry and Wet Labs, visiting high laparoscopy volume centres, identifying mentor locally, assisting mentor and performing under supervision initially before independent cases and finally keep auditing the cases for complication and progress which were followed in this report.

Indiana Mini-fellowship model is another model which is easily adaptable and can facilitate learning laparoscopy by practicing urologists. This model consisted three phases. In the first phase the trainee is required to complete 2 – 3 days hands on course in laparoscopy, including pelvi-trainers and an animal model. In phase 2, the learner (practicing urologist learning laparoscopy) should observe a clinical mentor perform 6 or more major renal laparoscopic cases and in the final phase the practicing urologist learning laparoscopy should perform 6 or more major renal procedures under mentor direct guidance in the learner's patients at the mentor or trainee hospital after obtaining necessary clinical privileges. The authors concluded this model to be safe and time conserving to disseminate laparoscopic urological surgery to community urologists.¹ In the current scenario of limited trained laparoscopic urologists as mentor, mutual mentoring model is another approach to follow. Thus, surmounting the problem of

ready availability of experienced mentors and at the same time having experienced assistance disallowing early fatigability, excessive prolongation of operation and reducing complication rate.⁵

Among all the laparoscopic procedures performed, nephrectomies were separately analyzed since they are the most commonly studied procedure evaluating expertise and learning of laparoscopic skills in urology as suggested by Davenport *et al.*⁸ There were 36 planned laparoscopic procedures over a period of five years in the study centre, which makes 7 cases in a year. This is showing a setup in development having single laparoscopic urologist involved. In the present nephrectomy series, 5 (20%) out of 25 planned procedures were converted to open as shown in Table II. Keeley *et al.* in their series of first hundred laparoscopic nephrectomy reported conversion rate of 5%.⁹ Early part of learning curve appears to underlie the high conversion rate at our centre. There were 10 cases which had complications as shown in Table I and majority being Clavien Grade II including 2 patients requiring blood transfusion. In contrast to transperitoneal approach adapted by the author, Zaidi *et al.* reported a complication rate of 3% with retroperitoneal approach,¹⁰ and a conversion rate of 11.6%. Although retroperitoneal approach appears to be more suitable for upper urinary tract access, transperitoneal technique provides more working space with familiar anatomy. Fahlenkamp reported 8.3% complication rate and 10.3% conversion to open surgery in a German multi-institutional experience of 2407 procedures.¹¹ The relatively long-operating time in this series as well as reported by some investigators show the early part of the learning curve which has been criticized for laparoscopic nephrectomy and argued against the widespread adoption of this technique.^{12,13}

This study had its main limitation in being a retrospective review with limited number of laparoscopic cases as part of the early learning experience. The BAUS laparoscopy nephrectomy audit reported that centres undertaking more than 12 cases per year have better outcome in terms of conversion, transfusion and complication rates than those with fewer cases.⁶ In this context, starting with a small number and gradually reaching critical safe number is achievable. Thus, this study reflects and emphasizes that learning laparoscopy be technically demanding with a steep learning curve but it is certainly possible at any stage of learning and practice through systematic approach by following some model as mentioned earlier and assuring patient's safety.

The evolution process of laparoscopic transformation reveals challenges no different than for any change. In fact, the magnitude and intensity faced here might be even higher as it is calling for a 'Paradigm Shift' from bigger incisions to 'key hole' or 'minimally invasive'

approach.¹⁴⁻¹⁶ Future is likely to unveil the growing demand of patients for laparoscopic urologic procedure with increasing concerns regarding body image, early convalescence, reducing loss of labour and thus being cost-effective. The advent of robotics has increased the use of minimally invasive surgery among laparoscopically naïve surgeons and expanded the repertoire of experienced surgeons to include more advanced and complex reconstructions.^{17,18}

Looking at the current status of laparoscopy in Pakistan in general and urology in particular, it is certainly extremely concerning. Urologists lag behind in laparoscopic skilled resource.¹⁹ Therefore, now the need of the hour is to encourage learning laparoscopy among practicing urologists and to create an environment suitable for training, so that laparoscopic transformation of urologists is deemed 'do-able' in regions of the world where laparoscopic urology is in infancy and struggling for growth. This seems achievable only by priority setting and utilizing concepts like capacity building through defined strategies.^{19,20}

CONCLUSION

There are technical challenges in learning laparoscopy for practicing urologists. Following some learning model in a systematic manner will help surmounting the technical challenges in learning laparoscopy. Patients' safety is of prime importance be it at the cost of time, patience and money of the learner and not the patient becoming experimental animals losing life and/ or having higher grades of complications.

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