The impact of laparoscopic fellowship programme on laparoscopic nephrectomy experience: a brief report

Laparoskopik nefrektomi deneyimi üzerine uzmanlık sonrası laparoskopi eğitim programının etkileri: Kısa bir rapor

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Abstract

Objective: To evaluate the impact of 3-month laparoscopic fellowship programme (LFP) on the laparoscopy experience mainly related to laparoscopic nephrectomies.

Materials and methods: Between September 2005 and June 2009, 131 patients underwent laparoscopic nephrectomy (LN). Groups 1 (n=87) and 2 (n=44) were defined as patients who underwent laparoscopic operation before and after LFP taken by the attending surgeon. All data were retrospectively reviewed.

Results: There was no statistically significant difference in age, body mass index or ASA (American Society of Anesthesiologists) score between the two groups. Group 2 yielded a significantly shorter mean operative time (134.82±63.69 min vs. 110.75±36.68 min, p=0.028), lower estimated blood loss (283.56±412.97 mL vs. 115.68±123.54 mL, p<0.005), lower hematocrit drop (4.10±2.69% vs. 2.59±3.28%, p=0.006), and shorter hospital stay (3.94±2.52 days vs. 3.11±2.67 days, p<0.002). The incidence of retroperitoneal approach was higher in Group 2 compared to Group 1 (90.9% vs. 29.9%, p<0.005). Additionally, the rate of performing LN by trainee's was significantly higher in Group 2 (3.4% vs. 20.5%, p=0.003).

Conclusion: Since a mentor transfers his/her experience to a trainee in LFP, perioperative outcomes improve eventually. Therefore, it is worth attending to a LFP even if a surgeon has a laparoscopy experience. Moreover, LFP is an indispensable step encouraging interventions for more complicated laparoscopic cases.

Key words: Laparoscopy; nephrectomy; specialty; training.

Özet

Amaç: Temel olarak nefrektomiyi içeren laparoskopi deneyimi üzerine, 3 aylık uzmanlık sonrası laparoskopi eğitim programının (USLEP) sonuçlarının değerlendirilmesi.

Gereç ve yöntem: Eylül 2005 ve Haziran 2009 tarihleri arasında 131 hastaya laparoskopik nefrektomi (LN) uygulandı. Grup 1 (n=87) ve 2 (n=44) cerrahların USLEP almasından önce ve sonra ameliyat olan hastalar olarak tanımlandı. Tüm veriler retrospektif olarak gözden geçirildi.

Bulgular: Her iki grup arasında yaş, vücut kitle indeksi ve ASA (Amerikan Anesteziyoloji Derneği) skoru açısından istatistiksel olarak anlamlı fark saptanmadı. Grup 2'deki hastalarda ortalama operasyon süresi daha az (134.82±63.69 dk ve 110.75±36.68 dk, p=0.028), tahmini kan kaybı daha düşük (283.56±412.97 mL ve 115.68±123.54 mL, p<0.005), hemotokrit düşüşü daha az (%4.10±2.69 ve %2.59±3.28, p=0.006) ve hastanede yatış süresi daha kısa (3.94±2.52 gün ve 3.11±2.67 gün, p<0.002) olarak bulundu. Retroperitoneal yaklaşım insidansı Grup 2'de Grup 1'e göre daha yüksekti (%90.9 vs. %29.9, p<0.005). Ayrıca, LN'nin eğitim alanlara yaptırılması oranı Grup 2'de daha fazla saptandı (%3.4 ve %20.5, p=0.003).

Sonuç: USLEP'de rehber cerrahın deneyimlerini eğitim alan kişiye aktarması ile perioperatif sonuçlar iyileşmektedir. Cerrahın laparoskopi deneyimi olsa bile USLEP alması değerlidir. Ayrıca, USLEP daha ileri laparoskopik girişimleri teşvik eden kaçınılmaz bir basamaktır.

Anahtar sözcükler: Eğitim; laparoskopi; nefrektomi; uzmanlık.

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Since the introduction of laparoscopy in the field of urology, the number of centers performing this approach has been increasing steadily. Minimally invasive surgery (MIS) provides surgical outcomes with efficacy equal to that of an open surgery.[1] For this reason, more clinics are adapting the trend of MIS. This trend necessitates training.

It is obvious that training for MIS differs according to the difficulty of the case. Steep learning curves of difficult cases necessitate training under an experienced mentor (fellowship training), while easy cases may be performed under supervision of a mentor without the need for fellowship training. Therefore, whether laparoscopic fellowship training after a significant laparoscopy experience such as a residency programme is required or not, is a question need to be answered. In this report, we evaluated the impact of 3-month laparoscopic fellowship programme (LFP) on laparoscopy experience including mainly laparoscopic renal surgeries.

Material and methods

Between September 2005 and June 2009, 131 patients underwent laparoscopic nephrectomy (LN) at our institution. Of these patients, 87 underwent LN between September 2005 and June 2008, which were performed or mentored by a single attending surgeon (Group 1). This surgeon (OS) received a 3-month LFP between August and October 2008 at SLK Klinikum Heilbronn, University of Heidelberg, Heilbronn, Germany. After completion of LFP, the same attending surgeon performed or mentored LN on 44 patients between November 2008 and June 2009 (Group 2).

The data of the patients were prospectively recorded on a computer web application database and retrospectively reviewed. Before surgery, all patients underwent routine preoperative laboratory investigations including total blood count, kidney function tests and coagulation tests (such as prothrombin time, partial thromboplastin time, International Normalized Ratio). Patients were evaluated using ASA (American Society of Anesthesiologists) score preoperatively, while ASA Grade 1, 2, 3, and 4 represented healthy patients, and cases with mild, severe systemic, and life-threatening disease, respectively. Early withdrawal of drugs, which affect the platelet function such as acetylsalicylic acid or anticoagulant drugs, was ensured.

Both retroperitoneal and transperitoneal approaches were used. In the transperitoneal approaches, the patient was placed in a modified flank position. Veres needle was used to create a 15 mmHg pneumoperitoneum. A 10 mm trocar was placed through the umbilicus and the camera was introduced into the abdominal cavity. An 11 mm second port was placed at the midclavicular line 2 cm below the costal margin while the 5 mm third port was inserted between the anterosuperior iliac spine and the umbilicus. Dissection started with the incision of the white line of Toldt and the ascending colon was reflected medially clearly exposing the retroperitoneum. The ureter was identified and dissected, and hilar vessels were observed. Following the application of 3 Hem-o-lok® clips on each artery and vein, the vessels were transected. The specimen was released from the surrounding adhesions and removed. In the retroperitoneal approaches, the patient was placed in standard full flank position, 2 cm incision was made at Petit triangle and a dissector was inserted into the retroperitoneal space through thoracolumbar fascia. The retroperitoneal space was dilated with a balloon dilator; a 10 mm trocar was inserted at the tip of 12th rib and a 5 mm trocar 3 cm above the anterior superior iliac spine. Following the placement of an 11 mm trocar at Petit incision for camera, the operation continued similar to transperitoneal approaches approach such as identification of the renal hilum with the aid of ureter.

Baseline patient characteristics, intraoperative and postoperative parameters were evaluated from a prospectively collected database. Easy, difficult, and very difficult cases were determined according to European Scoring System. For comparison of parameters of both groups, statistical analyses using Mann-Whitney U test and Student t-test were carried out as appropriate. The statistical significance was defined as a p value less than 0.05.

Results

No statistically significant difference was found between two groups for age, body mass index, and ASA scores (Table 1). Group 2 yielded a significantly shorter mean operative time than Group 1 (110.75±36.68 min vs. 134.82±63.69 min, p=0.028).

The estimated mean blood loss was measured as 115.68±123.54 mL in Group 2 which was significantly lower than 283.56±412.97 mL in Group 1 (p<0.005, Table 2). In the meantime, the mean hematocrit drop was 2.59±3.28 in Group 2 while it was detected to be 4.10±2.69 in Group 1 (p=0.006). Group 1 had longer hospital stay (3.94±2.52 days vs. 3.11±2.67 days, p<0.002). The retroperitoneal approach rate was higher in Group 2 (90.9% vs. 29.9%, p<0.005). However, there was no statistical significance between groups in terms of transfusion, open conversion, and complication rates (Table 3).

In addition, the rate of performing LN by trainee's was significantly higher in Group 2 (3.4% vs. 20.5%, p=0.003). Overall, easy cases according to European Scoring System in Group 1 and Group 2 were 8.7% vs. 13.3%, difficult cases 77.1% vs. 52.2%, and very difficult cases 14.0% vs. 34.4%, respectively (Table 4).

Discussion

The rapid spread of MIS in the practice of urology created an educational challenge for surgeons who may have never experienced these techniques in their training. Since the benefit of these procedures becomes readily apparent, surgeons are seeking effective education programs. Laparoscopic training among residents has recently started to spread in an accelerated pace among many centers. One should

Table 1. Demograhic data of the study groups [mean±standard deviation (range) or n (%)]

	Group 1	Group 2	p value
Number of patients	87	44	-
Sex (female/male)	33/54	22/22	-
Mean age (years)	47.44±17.47 (6-81)	47.61±19.53 (2-82)	0.727
Body mass index (kg/m^2)	26.07±4.92 (13.25-44.44)	25.68±6.59 (13.74-42.97)	0.701
ASA score	1.59±0.71	1.55±0.76	0.606
Operation			
Simple nephrectomy	35 (40.1)	16 (36.4)	<0.005
Radical nephrectomy	34 (39)	16 (36.4)	
Nephroureterectomy	10 (11.4)	6 (13.6)	
Partial nephrectomy	5 (6.5)	6 (13.6)	
Heminephrouretertomy	2 (2.2)	-	
Ectopic pelvic nephrectomy	1 (1)	-	
Operative technique			
Transperitoneal	61 (70.1)	4 (10)	
Retroperitoneal	26 (29.9)	40 (90)	

Table 2. Operative data of the study groups [mean±standard deviation (range) or %]

	Group 1	Group 2	p value
Blood loss (mL)	283.56±412.97	115.68±123.54 (20-2500)	<0.005
Operative time (min)	134.82±63.69 (55-431)	110.75±36.68 (30-344)	0.028
Hematocrit drop	4.10±2.69 (1-7)	2.59±3.28 (-2.6-9.7)	0.006
Hospital stay (days)	3.94±2.52 (1-17)	3.11±2.67 (1-17)	<0.002
Resident performing rate (%)	3.4	20.5	0.003

wonder whether the current training would suffice the surgeon to meet all the demanding challenges of urology. Thus, the aim of the present study was to answer this question by evaluating the outcomes of a recognized fellowship programme after a significant LN experience.

The present retrospective analysis showed that, such a programme improves perioperative parameters. Decreased blood loss, operative time, hospital stay and drop in hematocrit levels display a clear advantage of LFP. Since a mentor transfers his/her experience to a trainee in LFP, perioperative outcomes improve eventually. Therefore, it is worth attending to a LFP even if a surgeon has a laparoscopy experience. Moreover, LFP is an indispensable step encouraging interventions for more complicated laparoscopic cases. Indeed, the outcomes of the present study revealed that the percentage of "very difficult" cases increased from 14% to 34.4% after receiving LFP.

The issue of whether tranperitoneal or retroperitoneal approach is better in terms of improved perioperative parameters, and complications has always been a matter of debate in the field of laparoscopic urology. Retroperitoneal approach is generally said to be a associated with lower morbidity.[2] A similar outcome was obtained in our recent retrospective analysis including 131 patients who underwent transperitoneal (n=65) and retroperitoneal approach (n=66), respectively.[3] In this analysis, retroperitoneal approach was associated with shorter total operative time (147±64.9 min v.s 107±39.2 min, p<0.005),

Table 3. Clavien classification of complications in study groups

Clavien classification	Complications	Number of patients in Group 1	Number of patients in Group 2
Grade I	Elevation of body temperature	8	2
Grade II	Infection of the incision site	1	-
	Blood transfusion	5	4
	Incisional hernia	-	-
	Urinary tract infection	4	1
Grade IIIa	Urinary leakage requiring catheterization	1	-
Grade IIIb	Closure of dehiscent noninfected wound in the OR under local anesthesia	1	-
	Renal venous bleeding	3	1
Grade IVa	Vena cava injury	1	-
Grade IVb	Colonic injury	-	-
Total (%)		24 (27)	8 (18)

Table 4. Difficulty of cases acording to European Scoring System

Degree of difficulty	Operations	Number of patients before LFP	Numberof patients after LFP
Easy	Renal cyst resection	3	6
	Simple nephrectomy	35	16
	Total	38 (8.7%)	24 (13.3%)
Difficult	Radical nephrectomy	34	16
	Nephroureterectomy	10	6
	Ectopic pelvic nephrectomy	1	-
	Total	45 (77.1%)	24 (52.2%)
Very difficult	Partial nephrectomy	5	6
	Heminephroureterectomy	1	-
	Total	6 (14%)	6 (34.4%)

LFP: Laparoscopic fellowship programme.

lower estimated blood loss (303.2±404.0 mL vs. 152.2±276.1 mL, p<0.005), lower number (4.46±0.53 vs. 3.42±0.84, p<0.005) and size of trocars used and shorter hospital stay (3.97±2.63 days vs. 3.36±2.53 days, p<0.005). Consequently, one of the important consequences of the received LFP was adopting retroperitoneal approach to our clinical practice, which is probably associated with lower morbidity.

We are in the same opinion with guidelines published by BAUS (British Association of Urological Surgeons) stating that before teaching a procedure, a mentor should have performed at least 50 nephrectomies independently as a consultant.[4] Similarly, Valencien et al.[5] reported that the achievement of at least 50 difficult operative procedures, such as nephrectomies and prostatectomies, was necessary to acquire adequate skills in laparoscopic surgery. It is very likely that the number of cases as "50" was determined by the experience of these authors to gain self-confidence in terms of laparoscopic surgery. However, we believe that LFP significantly contributes to building up self-confidence, as the percentage of residents performing laparoscopic interventions with mentoring increased from 3.4% to 20.5% after LFP.

The present study has some limitations that merit mentioning. Firstly, this study comprises different operations such as simple nephrectomy, radical nephrectomy, and nephroureterectomy under the title of LN. Although this methodological approach may complicate the comparison of perioperative data for both groups, we believe that perioperative outcomes of these operations are not much different from each other considering that the number of partial nephrectomies was similar in both groups. Secondly, it is worth mentioning that Group 1 represents the actual learning curve of urological laparoscopy by a novice surgeon, whereas Group 2 represents the practice of a well-trained urological laparoscopist. For this reason, improvements in some perioperative parameters in favor of Group 2 such as blood loss and decrease in hematocrit levels as well as operative time may be attributed to a steep learning curve of a novice surgeon in laparoscopy in Group 1.

In conclusion, even if a surgeon has a laparoscopy experience, it is valuable to attend to a LFP. Moreover, LFP is an indispensable step encouraging interventions for more complicated laparoscopic cases.

Conflict of interest

No conflict of interest was declared by the authors.

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