Laparoscopic nephrectomy: Primary results of two years experience in our center

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Abstract

Objective: To describe our initial experience with laparoscopic renal surgery (LRS) and to evaluate the efficacy and the safety of the procedures.

Methods: A retrospective review of our records revealed 19 patients (16 for nephrectomy and 3 for nephroureterectomy) who underwent LRS in our institution during the last 2 years. Transperitoneal approach was preferred using 3 trocars. Ages, gender, indications for surgery, operative time, conversion rates, blood loss, intraoperative and postoperative complications were analyzed and evaluated. Histological results and outpatient follow-up were also recorded.

Results: 11 patients were male and 8 patients female with median age of 64.5 (42-75). One procedure (nephroureterectomy) was converted to open surgery. In twelve patients histological examination revealed renal cell carcinoma (pT1-T2b), no functional kidneys in four patients and in T1G3-T3G3 disease in three patients. No major perioperative or postoperative complications were noticed. The mean (range) operative duration was 169 (128-247) minutes while the mean intraoperative blood loss was 136 (70-350) ml. The average hospital stay was 3.6 days while the mean follow up is 14 (2-21) months.

Conclusions: LRS may be currently considered safe and effective procedure associated with minimal morbidity. Due to faster recovery and improved cosmetic results, the laparoscopic approach has become the standard approach for the treatment of upper urinary tract diseases in our institution.

Key words: laparoscopic nephrectomy; radical nephrectomy; nephroureterectomy

Citation

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Introduction
First described from Clayman et al in 1991, laparoscopic nephrectomy (LN) raised tremendous interest as a new surgical approach for kidney diseases while the procedure has gained worldwide acceptance and popularity. Back in 1998, Rassweiler et al reported that in Germany, only 8% of the laparoscopic procedures were performed for malignancy. Since then, the indications have been extended from simple nephrectomy for benign disease to radical nephrectomy and nephroureterectomy due to malignancy. Laparoscopic renal surgery (LRS) has proven to be oncologically safe even to open nephrectomy, providing simultaneously significant benefits in terms of blood loss, postoperative pain, cosmetic results and faster recovery time. Considering that over the past decade technical developments have improved various aspects of the procedure, nowadays most of the urologic procedures especially for malignancy have been performed laparoscopically and this can be confirmed by the increasing number of articles published worldwide.

The aim of this study is to present our initial experience and patients’ outcome after nineteen laparoscopic procedures in our clinic during the last twenty months.

Materials and methods
We performed a retrospectively review of our medical records, between January 2014 and October 2015 seeking for patients who underwent laparoscopic procedures for diseases of the upper urinary tract either benign or malignant.

Exclusion criteria were patients with tumors greater than cT2a stage, and presence of renal abscess or severe perinephric inflammation. Patients eligible for partial nephrectomy (with tumors ≤ 4 cm) underwent open partial nephrectomy. Furthermore, lymphadenectomy was not carried out as a routine hence; patients with lymph node enlargement were excluded from the study. In order to determine the tumor size the renal vasculature all patients underwent contrast enhanced computed tomography and digital elective angiography at the same time.

Nineteen patients that underwent laparoscopic procedures for upper urinary tract diseases were identified. The first seventeen procedures were performed by one surgeon (K.S.), while the latter two from another (Z.CH.). Subjects were informed before the procedure about the possible complications and they signed an inform consent. All the procedures were performed under general anesthesia without regional anesthesia. Postoperative pain was treated with oral painkillers. Patients were placed in flank position, without modifications on the operating table and transperitoneal approach was followed using three trocars. Using the Hasson technique, the first trocar (10mm) was placed lateral to the umbilicus, while the second (Versaport plus RPF 5 - 10 - 15mm) and the third (5mm) working trocars were placed under direct visualization lateral to the rectus muscle at the level of umbilicus (near to the iliac crest) and below the costal margin in the midclavicular line respectively. For the ligation of the big renal vessels Hem - o - lock clips were used, while colon mobilization, laparoscopic dissection and hemostasis were accomplished using Harmonic energy. Specimens were removed intact and entrapped in a non-permeable self opening bag (Endocatch 15mm), through an incision in the left or right lower abdominal quadrant. We determined the time of the procedure from the first incision until the exit of the surgical preparation.

Results
Between January 2014 and October 2015 nineteen laparoscopic procedures for upper urinary tract diseases were performed in our clinic. Among the nineteen cases sixteen patients underwent LN, four due to non functional kidneys and twelve due to renal tumor, and three patients underwent laparoscopic nephroureterectomy (LNU), due to tumor in the renal pelvis or the ureter. Table 1 shows patients and tumor characteristics.

One LNU was converted to open procedure because of the poor progression of the laparoscopic procedure. In the other two nephroureterectomies, bladder cuff excision was accomplished in the first one extravesically with a Gibson incision because the tumor was in the ureter, while in the other one, a transurethral resection of the orifice and intramural ureteral was performed prior to the LNU.

There were no major postoperative complications and no perioperative or postoperative mortality. In the fourth case we tried to use a vascular stapler...
but this was malfunctioning thus we used again Hem - o - lock clips. There are no absorbable, single loads, multiple use clips and we found that are a cheap solution easy to use. In patients with renal tumors surgical margins were negative. The mean (range) operative duration was 169 (128 - 247) minutes while the mean intraoperative blood loss was 136 (70 - 350) ml. No patient required blood transfusion postoperatively and no wound related complications were recorded in any patient. The average hospital stay was 3.6 days while the mean follow up is 14 (2 - 21) months.

Discussion

For several years the standards of care for the treatment of renal tumors was open nephrectomy or open nephroureterectomy. Since the first report of the laparoscopic nephrectomy, renal surgery has undergone significant changes over the past fifteen years. Solid evidence, supporting oncological efficacy comparable to open procedures, is available nowadays and the laparoscopic approach has become, gradually, the standard of care in upper urinary tract diseases. Considering that the number of publishing papers worldwide for laparoscopic procedures is enormous, seems that during the last decade laparoscopic renal surgery has become the most frequent procedure performed by urologists.

Laparoscopic procedures especially LN can be performed by the transperitoneal or retroperitoneal approach. Both methods gained popularity and they have advantages and disadvantages. In our clinic we started with transperitoneal approach and we are still continuing because we believe that we have the possibility to perform more maneuvers or to use more trocars if that is needed. Considering that no studies have shown clear advantage of one approach over the other, we strongly believe that it depends from the surgeon what approach is going to use and this is advantageous for the surgeon and the patient. In addition, the safety of LNU has been demonstrated and many retrospective studies reported that open and laparoscopic access has equivalent efficacy in T1 - T2/N0 tumours. Unfortunately, because urothelial carcinomas of the upper urinary tract are rare, there is lack of prospective trials and to the best of our knowledge only one prospective randomized study has shown that LNU is not inferior to open for non - invasive upper tract urothelial carcinoma.

Furthermore, there is no consensus as to the optimal technique to excise bladder cuff and several techniques for bladder cuff excision are acceptable. One of the most utilized approaches is the open method which allows to the surgeon to control the distal ureter and bladder cuff. We used this method for a patient with a tumor in distal ureter and we believe that the disadvantage of this method is the time consuming while the advantage is that the same Gibson incision is used for simultaneous intact extraction of the en - bloc specimen. Furthermore, because the ureter is clipped at the beginning of the procedure we minimize the risk of tumor spillage. On the other hand, we used transurethral resection of the bladder cuff in a patient with tumor located in the renal pelvis. We found this method easy, save and bloodless. Abou El Fettouh et al., in a large multicenter American and European study, reported that the local recurrence rates and the development of metastases depended on pathologic tumor stage and was irrespective of bladder cuff approach.

In the present study, we evaluated the outcome of our first cases of laparoscopic renal surgery. One of the limitations is that the study extended in a short time of period while the distribution of cases was somehow uneven. At the beginning of our series we performed LN only for benign diseases and gradually more dif-
Difficult cases such as LNU were performed. This probably might be explained from the progression of our experience. Hence nowadays, the laparoscopic approach for LN or LNU is routinely discussed with all patients’ regardless obesity and previous abdominal or renal operations excluding those having tumors larger than 10 cm, severe renal inflammatory disease and tumor thrombi in renal vein. Furthermore, all the laparoscopic procedures were initially entirely performed by one surgeon with previous laparoscopic training, whereas in our later patients, another surgeon with no previous laparoscopic experience was able to perform the procedure as a part of a teaching program.

No major postoperative complications were observed in our patients. Considering that most of the patients undergoing open surgery develop late complications due to incision (paresthesias, hernia in scar, bulging related to abdominal wall weakness) we strongly believe that one of the main advantages of the laparoscopic approach is to avoid these late complications. One of the main problems during the laparoscopic procedures is the operative time. In our series the operative time was constantly decreased not similar to the operating time required for open procedure but quite enough to encourage us to continue. The significant shortening in operating time was due to our progression on the learning curve and to the standardization of the procedure.

In conclusion, despite our small number of patients we believe that laparoscopic procedures are the present and at the moment the future in urology. Nowadays, with the existing data in the literature we strongly believe that especially LN can be considered as a routine procedure associated with minimal morbidity and significant advantages for the patient. Short hospitalization and equivalent ontological outcomes makes the laparoscopic approach the standard approach for nephrectomy at our institution.

**Conflicts of interest**
The authors declared no conflicts of interest.

**Περίληψη**

**Σκοπός:** Να περιγράψουμε την αρχική μας εμπειρία και να αξιολογήσουμε την αποτελεσματικότητα και την ασφάλεια της λαπαροσκοπικής νεφρεκτομής.

**Μέθοδος:** Αναδρομική μελέτη των αρχείων μας απεκάλυψε 19 ασθενείς (16 με νεφρεκτομή και 3 με νεφρουρητηρεκτομή) που υποβλήθηκαν σε λαπαροσκοπική επέμβαση στην κλινική μας κατά τη διάρκεια των τελευταίων 2 ετών. Η διαπεριτοναϊκή προσπέλαση προτιμήθηκε χρησιμοποιώντας 3 τροκάρ. Η ηλικία, το φύλο, οι ενδείξεις για την επέμβαση, ο χειρουργικός χρόνος, η απώλεια αίματος, οι διεγχειρητικές και μετεγχειρητικές επιπλοκές αναλύθηκαν και αξιολογήθηκαν. Τα ιστολογικά αποτελέσματα και η μετεγχειρητική παρακολούθηση των ασθενών καταγράφηκαν επίσης.

**Αποτελέσματα:** 11 ασθενείς ήταν άνδρες και 8 γυναίκες με μέση ηλικία 64,5 (42 - 75). Μια επέμβαση (νεφρουρητηρεκτομή) μετατράπηκε σε ανοικτή. Σε δώδεκα ασθενείς η ιστολογική εξέταση αποκάλυψε καρκίνωμα νεφρικών κυττάρων (ρT1-T2b), μη λειτουργικούς νεφρούς σε τέσσερις ασθενείς και T1G3 - T3G3 νόσο σε τρεις ασθενείς. Δεν παρατηρήθηκαν σημαντικές περιεγχειρητικές και μετεγχειρητικές επιπλοκές. Η μέση διάρκεια της επέμβασης ήταν 169 (128 - 247) λεπτά, ενώ η μέση διεγχειρητική απώλεια αίματος ήταν 136 (70 - 350) ml. Η μέση διάρκεια παραμονής στο νοσοκομείο ήταν 3,6 ημέρες, ενώ ο μέσος όρος παρακολούθησης είναι 14 (2 - 21) μήνες.

**Συμπέρασμα:** Η λαπαροσκοπική επέμβαση για την εκτομή νεφρικών όγκων, μπορεί να θεωρείται ημέρα μιας ασφαλής και αποτελεσματική διαδικασία που σχετίζεται με ελάχιστη νοσηρότητα. Κάθε ταχύτερης ανάρρωσης και βελτιωμένου αισθητικού αποτελέσματος, η λαπαροσκοπική προσπέλαση για νεφρικούς όγκους, έχει γίνει η καθιερωμένη προσέγγιση για τη θεραπεία του ανώτερου ουροποιητικού ουστήματος στην κλινική μας.
References