Retroperitoneoscopic Radical Nephrectomy: Initial Experience

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Abstract

Introduction and Objectives. Laparoscopic radical nephrectomy represents the standard of care for patients with T1-T2 tumors and localised masses not treatable by nephron-sparing surgery. In terms of the approach, retroperitoneoscopy offers better hilar control and a shorter operative time than transperitoneal approach, with similar results in terms of other patient outcomes (hospital stay, blood loss).

Materials and Methods. Between January 2010 and March 2017, 42 consecutive patients (p) underwent retroperitoneoscopic radical nephrectomy (RRN) at our center for clinically localized renal tumor (T1-T2, N0, M0). All patients had a normal contralateral kidney. For a better evaluation of our initial experience we divided the patients into 2 groups, first 21 patients in group 1 and the following 21 patients in group 2.

Results. The mean age of patients with laparoscopic radical nephrectomy was 54.1 ± 11.4 years, with 51.1 ± 9.7 years for group 1 and 57.2 ± 10.1 for open surgery. Sex ratio in the study was 1.8:1 (male:female). The mean tumor diameter evaluated on the CT scan was 5.8 cm. In our series we had an overall complication rate of 45.2%.

Conclusions. Laparoscopic radical nephrectomy using the retroperitoneal approach is a feasible technique, with acceptable complication rate, mostly grade I and II by Clavien-Dindo classiffication system, but with short hospital stay and good aesthetic outcomes.

Key-words: renal tumor, radical nephrectomy, laparoscopy, retroperitoneum

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Introduction And Objectives

First described in 1969 by Robson et al., open radical nephrectomy has been for almost half a century the gold standard treatment for renal cell carcinoma with curative intention[1]. The first succesfull laparoscopic nephrectomy was described by Clayman et al. in 1991[2]. According to European Association of Urology Guidelines – 2017 edition laparoscopic radical nephrectomy (trasperitoneal or retroperitoneoscopic) represents the standard of care for patients with T1-T2 tumors and localised masses not treatable by nephron-sparing surgery[3]. In terms of the approach, retroperitoneoscopy offers better hilar control and a shorter operative time than transperitoneal approach, with similar results in terms of other patient outcomes (hospital stay, blood loss)[4].

The purpose of the study is to evaluate the intraoperative and postoperative complications from our initial experience in laparoscopic radical nephrectomy by retroperitoneal approach.

Materials And Methods

Between January 2010 and March 2017, 42 consecutive patients (p) underwent retroperitoneoscopic radical nephrectomy (RRN) at our center for clinically localized renal tumor (T1-T2, N0, M0). All patients had a normal contralateral kidney. For a better evaluation of our initial experience we divided the patients into 2 groups, first 21 patients in group 1 and the following 21 patients in group 2.

A retrospective chart review was carried out, including age, sex, ASA (American Society of Anesthesiologists) score, BMI (body mass index) score, operative time, blood loss, hospital stay.

The perioperative complications were carefully graded using the Clavien-Dindo system.

Retroperitoneoscopic radical nephrectomy (RRN): With the patient placed in kidney position, we made an incision at the tip of the 12 rib, the retropenitoneal space was created using blunt finger dissection and the 4 trocars were put in place (photo1, 2).

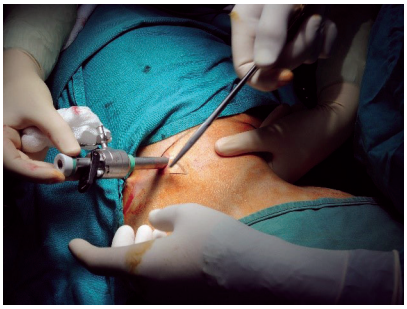

Photo 1.
Trocar placement under finger control

Photo 2.
Final position of the four trocars

After positioning the 4 trocars and creating the retroperitoneal work space, the Gerota fascia was opened and the renal artery was isolated, double clipped with a 15 mm Hem-o-lock clips and sectionated using the laparoscopic scissors (photo3,4). The same procedure is done for the renal vein. When needed we use titanium clips for central adrenal vein, spermatic/ovarian vein and lumbar veins.)

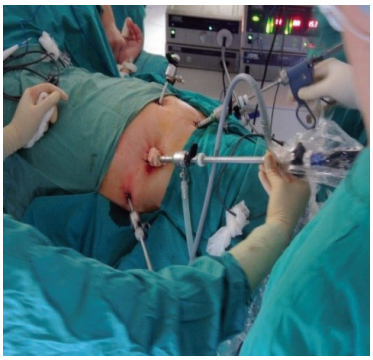

Photo 3.
Intraoperative aspect

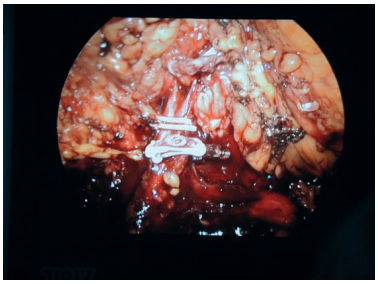

Photo 4.
Hem-o-lock clips on renal pedicle

Photo 5.
Extraction of the anatomic specimen

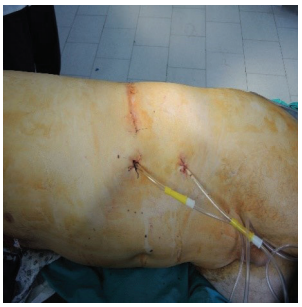

Photo 6.
Final aspect of postoperative scar

After the pedicle is sectionated, the kidney, ipsilateral adrenal gland and retroperitoneal fat are dissected and removed en-bloc through a lumbar incision (photo 5,6).

The statistical analysis of this paper was done by using chi-square test, the Fischer exact test and the Mann-Whitney U test for parametric variables. A p value <0.05 was considered statistically significant.

Results

The mean age of patients with laparoscopic radical nephrectomy was 54.1 ± 11.4 years, with 51.1 ± 9.7 years for group 1 and 57.2 ± 10.1 for group 2. Sex ratio in the study was 1.8:1 (male:female), with 2.5:1 in the first group and 1.33:1 in the second group. Regarding tumor location the results are comparable between the two groups.

The BMI was comparable between the two groups, with a slightly higher value in the seconde group (23.4 vs. 25.1).

The mean tumor diameter evaluated on the CT scan was 5.8 cm, with greater mean diameter of tumor in the second group 5.2 cm vs. 6.1 cm.

The preoperative comparative characteristics of patients are presented in Table 1.

In our study the mean operative time was shorter in the second group comparative with the first group, with 130.19 min vs. 170.23 min, but with similar results in terms of other patients outcome. The intraoperative and postoperative characteristics are presented in Table 2.

Discussions

All patients in the study benefit from laparoscopic radical nephrectomy by retroperitoneoscopic approach. This technique is superior to open radical nephrectomy in terms of less postoperative pain, low rate of wound infection, low incidence of herniation and faster socio-professional reintegration[5,6].

The laparoscopic techniques were introduced in our center form January 2014 and we present the first 42 cases operated by retroperitoneal approach. We evaluated cumulative results of postoperative outcomes, intraoperative and postoperative complications of our initial experience.

Table 1

	RRN	Group 1	Group 2
Patients	42	21	21
Mean age (yr)±SD (range)	54.1± 11.4 (29-79)	51.1±9.7 (29-63)	57.2±10.1(31-79)
Sex			
Male	27 (64.2 %)	15 (71.4 %)	12 (57.1 %)
Female	15 (35.8 %)	6 (28.6 %)	9 (42.9 %)
Mean BMI (kg/m2) ±SD	24.1±2.4	23.4±2.6	25.1±3.1
Tumor side			
Right	19 (45.3 %)	9 (42.9 %)	10 (47.6 %)
Left	23 (54.7 %)	12 (57.1 %)	11(52.4 %)
ASA score			
1	29 (69.0 %)	17 (80.9 %)	12 (57.1 %)
2	11 (26.1%)	4 (19.1 %)	7 (33.3 %)
3	2 (4.9 %)	-	2 (9.6 %)
Mean CT tumor diameter(cm) (range)	5.8 ± 1.7 (3.1-7.9)	5.2±1.9 (3.1-6.6)	6.1±1.8(4.3-7.9)

Table 2

	All patients	Group 1	Group 2	P value
Patients	42	21	21	
Operative time(min)±SD (range)	157.2 ±42.1(100-245)	170.23±28.39 (130-245)	130.19±19.38 (100-175)	0.042
Blood loss (ml) ±SD (range)	177.5±42.9(100-350)	179.5±38.1 (100-280)	180.7±48.4 (120-350)	0.87
Transfusion rate	7.1 % (3/42)	2 (9.5 %)	1 (4.8 %)	0.74
Open conversion	4.7 % (2/42)	2 (9.5 %)	0	n/a
Hospital stay	6.1 ±1.38(4-10)	6.33±1.39 (4-9)	5.9±1.37(4-10)	0.23

SD-standard deviation, n/a – not applicable

Table 3

Complications	All patients	Group 1	Group 2	P value
Clavien-Dindo grade I	17 (40.4 %)	10 (47.6 %)	7 (33.3 %)	0.62
Subcutaneous emphysema	13 (30.9 %)	7 (33.3 %)	6 (28.5 %)	0.58
Hematoma	4 (9.5 %)	3 (14.3 %)	1 (4.8 %)	0.59
Clavien-Dindo grade II	12 (28.5 %)	6 (28.5 %)	6 (28.5 %)	0.86
Clostridium difficile infection	3 (7.1 %)	1 (4.8 %)	2 (9.5 %)	0.63
Bleeding requiring transfusion	4 (9.5 %)	3(14.3 %)	1 (4.8 %)	0.81
Urinary tract infection	5 (11.9 %)	2 (9.5 %)	3 (14.3 %)	0.66
Clavien-Dindo grade III	2 (4.8 %)	2 (9.5 %)	-	n/a
Conversion to open surgery	2 (4.8 %)	2 (9.5 %)	-	n/a

n/a – not applicable

The complications were assessed according to Clavein-Dindo clasiffication system and are presented in Table 3. The rate of complications between the 2 groups were 47.6% vs. 33.3% for grade I, 28.5% vs. 28.5% for grade II and 9.5% vs. 0 % for grade III. There was no statistically significant difference in terms of grade I and grade II complications between the two groups. (Table 3).

Vallancien G. et al suggested that it is required 50 cases of medium to high difficulty of laparoscopic surgery in order to obtain adequate laparoscopic skills and to reduce the rate of complications.[7]

Mean BMI and mean tumor diameter were lower in the first group because we intended to selectionate our first cases to begin the retroperitoneal approach.

The mean operative time was higher in the first 21 cases (170.23 min) than the second group (130.19 min) which was statistically significant with a p value of 0.042.

The rest of the intraoperative and postoperative outcomes were comparable between the two goups, with estimated blood loss of 179.5 ml vs. 180.7 ml and a hospital stay of 6.3 days vs. 5.9 days.

Complications during the laparoscopic surgery are depending on the experience of the surgeon[8]. In our series we had an overall complication rate of 45.2%. When evaluating the two group separately, the complication rate was higher in the first group (57.1%) than the second group (38%). In terms of complications there was no statistically significance between the two group when comparing subcutaneous emphysema (33.3% vs 28.5%), postoperative retroperitoneal hematoma (14.3% vs. 4.8%), Clostridium difficile infection (4.8% vs. 9.5%), bleeding requiring transfusion (14.3% vs. 4.8%) or urinary tract infection (9.5% vs 14.3%).

In our series were 2 cases of conversion to open

surgery due to bleeding that made the dissection impossible, both in first group. In retroperitoneoscopic approach we usually use a CO2 pressure of 15 mmHg. After the 2 cases we chose to increase the CO2 pressure from 15 mmHg to 20 mmHg for short periode of time which stoped the bleeding and allowed the surgeon to continue without the necessity to convert to open surgery.

By using the retroperitoneal approach we avoided complications such as intraperitoneal organ injury (liver, spleen or intestin) and ileus.

The limitations of our study are its retrospective nature and the lack of long term postoperative evaluation. Another limitation is the reduce number of cases over time, since LPN is practice in our department from January 2014.

Conclusions

Laparoscopic radical nephrectomy using the retroperitoneal approach is a feasible technique, with acceptable complication rate, mostly grade I and II by Clavien-Dindo classiffication system, but with short hospital stay and good aesthetic outcomes.

In terms of learning curve we had observed improvements even after the first 20 cases, especially in avoiding serious complications (grade III by Clavien-Dindo) and lowering the overall complications rate.

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