# Laparoscopic radical nephrectomy for large renal tumor – a case report and technical considerations

*Tomasz Szydełko, Krzysztof Tupikowski, Janusz Dembowski, Tadeusz Niezgoda, Adam Wojciechowski, Romuald Zdrojowy*

Department of Urology and Urological Oncology, Wrocław University of Medicine, Wrocław, Poland

KEY WORDS

large renal tumor ◗ laparoscopy

ABSTRACT

In comparison to an open procedure, the laparoscopic radical nephrectomy has demonstrated advantages in regard to perioperative morbidity, postoperative pain, time of hospitalization, and convalescence. However, most series of laparoscopic radical nephrectomy are confined to T1 tumors. The authors present a case of a large-volume-T2 renal tumor treated laparoscopically. The aim of the study is to present the operative technique and to discuss several unique problems that arise during the laparoscopic procedure in patients with large renal masses.

## INTRODUCTION

Laparoscopic radical nephrectomy is considered in many centers the standard of care for renal tumors in patients who are not candidates for nephron sparing surgery. In comparison to an open procedure, the laparoscopic technique has demonstrated advantages in regard to perioperative morbidity, postoperative pain, time of hospitalization and convalescence [1, 2, 3]. However, most studies concern tumors smaller than 7-cm and the role of laparoscopy for large primary tumors is not clearly established. The aim of our study is to present a single case of a large renal tumor treated laparoscopically, and to discuss the operative technique.

## MATERIAL AND METHODS

A 64-year-old man with no essential medical history was admitted to our center because of the left renal tumor, which was diagnosed by a primary urologist. The physical examination revealed a palpable mass in the left upper part of the abdomen. The diagnostic evaluation, i.e. ultrasound and CT showed a large volume tumor (11 cm in diameter) in the mid-lower part of the left kidney (Fig. 1). CT and chest X-ray were negative for metastatic disease. There were no abnormalities in routine laboratory examinations. The patient was then qualified for surgical treatment, i.e. left transperitoneal laparoscopic nephrectomy.

The patient was placed in a left 45° flank position. A Hasson 2-cm mini-laparotomy was used to create a pneumoperitoneum. The first 10-mm trocar was inserted above the umbilicus at the edge of the rectus muscle and the pneumoperitoneum was achieved in a standard manner. Three additional trocars (1 x 5 mm, 1 x 10 mm, 1 x 12 mm) were inserted under direct vision with a 5-mm trocar beneath the costal margin, 12-mm trocar below the umbilicus laterally to the rectus muscle and the fourth, 10-mm trocar in the midclavicular line below the costal margin. The left colonic flexure was fully mobilized to expose the upper pole of the kidney. Then medial mobilization of the left colon was performed and the aorta beneath the lower part of the kidney was localized. After the lower pole of the kidney with tumor was freed, the kidney was moved laterally and the renal vessels were identified. Because of the limited working space caused by the large tumor volume, an additional trocar for the fan retractor was introduced. The trocar was inserted between two of the trocars: the lower 12-mm and the upper 5-mm ones (Fig. 2). Using this trocar, the colon was moved medially and the anterior wall of the aorta was exposed. A second retractor introduced through a lateral 10-mm port moved the kidney laterally. Such a maneuver enabled the surgeon comfortable access to the renal vascular pedicle. Once

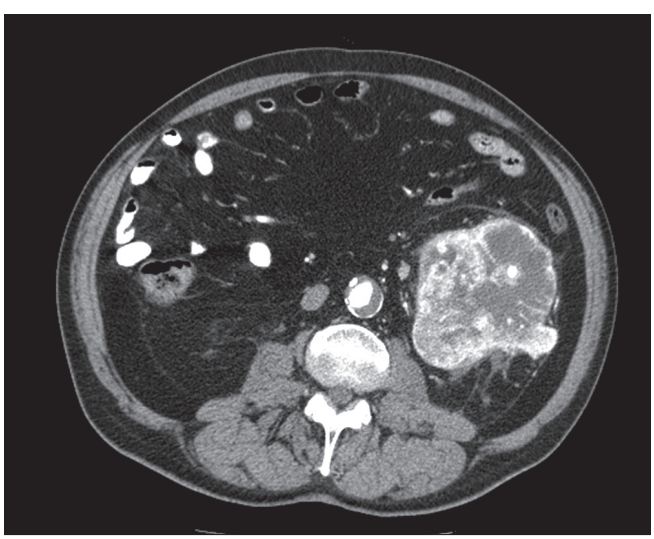

**Fig. 1.** CT – large volume tumor in the left kidney.

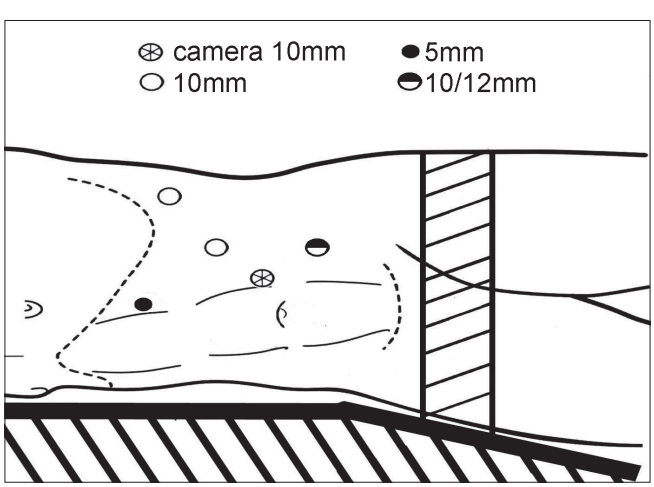


**Fig. 2.** Port placement.

**Fig. 3.** Incision of the abdominal wall for specimen removal.

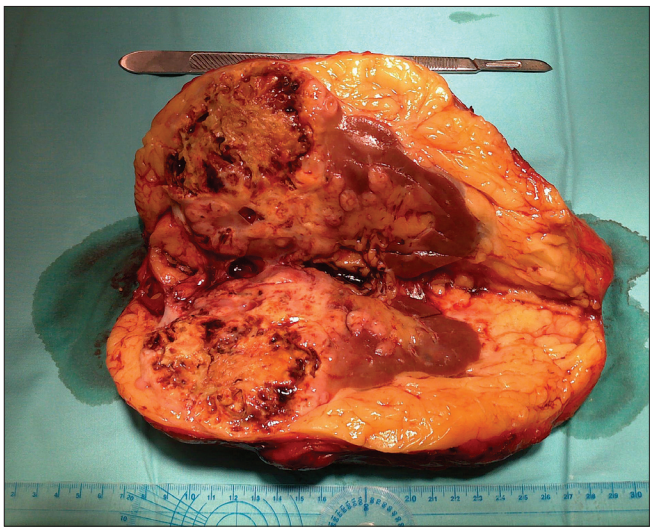

**Fig. 4.** The renal specimen.

freely dissected, the renal artery was clipped and transected using titanium clips (TFX Medical Ltd., High Wycombe, UK). The renal vein was secured by means of an Endo-GIA (Tyco Healthcare Group LP, Norwalk, Connecticut, USA) stapling device. In order to mobilize the upper pole of the kidney the working instruments were moved to two upper ports (medial and lateral). At this stage of the operation a Liga-Sure device (Tyco Healthcare UK Ltd., Gosport, UK) was used. The lateral attachments were dissected to completely free up the kidney. The ureter was clipped and dissected. The renal specimen was entrapped in an Endocatch bag (Tyco Healthcare UK Ltd., Gosport, UK). A 5-mm closed suction drain was inserted through the port left by the lateral 10-mm trocar and positioned in the left retroperitoneal space. The renal specimen was removed through the 10-cm lateral incision of the abdominal wall (Fig. 3, Fig. 4).

The operative time was 180 minutes. The blood lost during the operation was negligible. There were no postoperative complications. The time for resumption to oral intake was 2-days. The suction drain was removed on the 3rd day after the surgery. The patient was discharged from hospital on the 4th day after the operation.

Pathological findings are listed below:

Left kidney: Renal cell carcinoma pT3b, Fuhrman: G3

Tumor diameter – 11cm

Three-cm deep perirenal fatty tissue infiltration and microscopic renal vein invasion

## DISCUSSION

Most series of laparoscopic radical nephrectomy (LRN) are confined to T1-tumors. However, there are few publications that address the role of LRN for large renal tumors [4-6]. Progress in laparoscopy makes it possible to treat tumors greater than 7-cm, which form the T2 category of primary tumors. According to 2010 Guidelines of European Association of Urology, laparoscopic nephrectomy is recommended in T2 and smaller tumors not suitable for nephron sparing surgery [7]. Yet, as tumor volume increases, several unique technical problems arise during the laparoscopic procedure. The operation is usually more difficult because of: strong limitation of working space, greater likelihood of nodal involvement, and renal vein thrombus; and the presence of parasitic vessels and problems with the operator's orientation caused by displacement of the surrounding organs.

The authors are familiar with retroperitoneoscopic access in laparoscopic nephrectomy or adrenalectomy but they believe that in large renal tumors, when there is limited working space, the transperitoneal procedure is safer for the patient and more comfortable for the surgeon. It also seems that transperitoneal access makes it much easier to entrap the large specimen in the ENDO CATCH bag.

LRN in large renal tumors may result in the increase of the operative time but such increase usually does not result in any adverse patient outcome [6]. Our operation time was 180 min and was slightly longer than the mean operative time for LRN, which is 150 min at our institution. Blood loss during the operation was negligible, however, in the literature a trend can be noted toward a greater EBL for patients with large tumors [5, 8, 9].

We did not observe any complications in the postoperative period in our patient. Our data are confirmed by other author's observations. Gong et al. demonstrated that the postoperative complication rate and length of stay after LRP were similar in patients with clinical Stage T1 and T2 tumors [8]. Steinberg et al. reported that patients with T2 tumors had perioperative parameters comparable to patients with Stage T1. The patients also showed decreased perioperative morbidity and shorter convalescence than those having an open radical nephrectomy performed [5].

The most important parameters of laparoscopic oncological surgery are 5-year survival rate, local recurrence, and port-site recurrence. The data on the above parameters available in the literature are rather scarce, however, Hemal et al. who compared the results of laparoscopic radical nephrectomy for large renal tumors (T2N0M0) with the results of open radical nephrectomy reported that there was no difference in 5-year survival data between the compared groups. There were also no local or port site recurrences after laparoscopy [6]. The oncological results were similar to those presented by other authors for T2 tumors [10].

We do believe that laparoscopic radical nephrectomy can be performed in almost all cases. Although there are articles in the literature presenting laparoscopic nephrectomy in patients with vena cava involvement, in such cases the authors perform open procedures [11].

In centers, like ours, where laparoscopic nephrectomy has been for over 10-years a standard procedure in patients who are not candidates for NSS (more than 400 procedures performed), the results of the technique equal the results of open surgery. Laparoscopy in large tumors has some advantages comparing to open surgery, such as a smaller scar (standard incision for radical nephrectomy is approximately thrice the size of ours) and better visualization of the hilar vessels. Furthermore, the blood loss is usually negligible and the operating time in skilled hands is comparable to open nephre-

ctomy. It seems to us that laparoscopic nephrectomy in large renal tumors can be safely performed in high volume centers, but because of several unique technical problems mentioned above it should not be a standard of care at the beginning of the learning curve.

## CONCLUSION

It seems, that the advantages that laparoscopy offers in terms of analgesic requirement, hospital stay, blood loss, ambulation, and return to normal activity persist for larger tumors with no additional complications. However, one has to remember that LRN in large volume tumors is a technically demanding procedure with several unique technical problems and should be performed by expert laparoscopists.

## REFERENCES


1. Portis AJ, Yan Y, Landman J et al: *Long-term follow up after laparoscopic radical nephrectomy.* J Urol 2002; 167: 1257-1262.
2. Dunn MD, Portis AJ, Shalhav AL et al: *Laparoscopic versus open radical nephrectomy: a 9-year experience.* J Urol 2000; 164: 1153-1159.
3. Gill IS, Schweizer D, Hobart MG et al: *Retroperitoneal laparoscopic radical nephrectomy: the Cleveland Clinic experience.* J Urol 2000; 163: 1665-1670
4. Fenn NJ, Gill IS: *The expanding indications for laparoscopic radical nephrectomy.* BJU Int 2004; 94: 761-765.
5. Steinberg AP, Finelli A, Desai MM et al: *Laparoscopic radical nephrectomy for large (greater than 7 cm, T2) renal tumors.* J Urol; 2004; 172: 2172-2176.
6. Hemal AK, Kumar A, Kumar R et al: *Laparoscopic Versus Open Radical Nephrectomy for Large Renal Tumors: A Long-Term Prospective Comparison.* J Urol 2007; 177: 862-866.
7. Ljungberg B, Cowan N, Hanbury DC et al: Guidelines on renal cell carcinoma, in *EAU Guidelines, 2010*, European Association of Urology, Chapter 6.2.1.2: *Renal Cell Carcinoma.*
8. Gong EM, Lyon MB, Orvieto MA et al: *Laparoscopic radical nephrectomy: comparison of clinical stage T1 and T2 renal tumors.* Urology 2006; 68; 1183-1187.
9. Berger AD, Kanofsky JA, O'Malley RL et al: *Transperitoneal laparoscopic radical nephrectomy for large (more than 7 cm) renal masses.* Urology 2008; 71: 421-424
10. Permpongkosol S, Chan DY, Link RE et al: *Long-term survival analysis after laparoscopic radical nephrectomy.* J Urol 2005; 174: 1222-1225.
11. Słojewski M, Gołab A, Petrasz P, Sikorski A: *Laparoscopic radical nephrectomy for T3b tumor.* J Laparoendosc Adv Surg Tech A 2010; 20: 47-49.



**Correspondence**

Tomasz Szydełko
146, Nenckiego Street
52-212 Wrocław, Poland
phone: +48 71 733 10 10
szydelko@urol.am.wroc.pl