



# Modified transperitoneal laparoscopic partial nephrectomy for posterior renal tumor

José Gaona <sup>\*</sup>, Santiago Gaona, Sebastián Ortiz

Universidad de Santander, Instituto Uromédica, 40 a street 25-42, Bucaramanga 680006, Colombia

## ARTICLE INFO

### Keywords:

Kidney  
Partial nephrectomy  
Posterior tumors  
Laparoscopy

## ABSTRACT

**Objectives:** To describe a modified laparoscopic partial nephrectomy combining the advantages of a transperitoneal approach with lumboscopic access for a posterolateral tumor.

**Materials and methods:** A patient with a 28-mm posterolateral left renal tumor underwent surgery. Three anterior transperitoneal trocars were used for mobilization of the bowel and Gerota fascia, dissection of the renal pedicle, and dissection of the retroperitoneal space. Two additional trocars, positioned above the iliac crest and on the posterior axillary line, respectively, were used to gain lumbar access and perform the tumor resection, followed by a two-layer renorrhaphy.

**Results:** The operative time was 150 min, the ischemia time was 17 min, and no complications were reported. The pathological report described a 27-mm clear cell carcinoma with negative surgical margins.

**Conclusion:** Our partial nephrectomy technique offers a straightforward approach to posterolateral tumors, integrating the advantages of both transperitoneal and lumboscopic access.

## Introduction and objectives

Posterior cT1a and cT1b renal tumors can be treated using either a transperitoneal or retroperitoneal endoscopic approach [1]. Although the retroperitoneal approach offers certain advantages, many surgeons prefer conventional transperitoneal access due to its more familiar anatomical landmarks and wider working space [1,2].

This study aimed to describe a modified laparoscopic partial nephrectomy technique combining the advantages of transperitoneal and retroperitoneal approaches.

## Materials and methods

We present the case of a 61-year-old female patient with a 28-mm tumor located on the posterolateral side of the left kidney. The laparoscopic approach was undertaken in the following sequential steps:

- The surgical team is positioned on the right side of the operating table
- Placement of three trocars lateral to the border of the rectus muscle, cranial to the umbilicus.
- Incision of Toldt's line and medial mobilization of the colon.

- Dissection of the renal artery.
- Incision of the retrorenal fascia and medial retraction of Gerota's fascia, with exposure of the retroperitoneal space.
- Placement of two additional trocars—one just superior to the iliac crest and another on the posterior axillary line.
- Repositioning of the camera through the trocar placed above the iliac crest.
- To enhance ergonomic access, the surgeon repositioned to the left side of the operating table, allowing for optimal utilization of the posterior axillary line trocar and the caudal trocar lateral to the border of the rectus muscle.
- Renal artery clamping using a bulldog clamp.
- Tumor dissection and resection through the lumbar access.
- Two-layer sliding-clip renorrhaphy using barbed sutures for the inner layer and polyglactin sutures for the outer layer. The clamp was removed after the barbed suture layer was completed.

## Results

The operative time was 150 min, the blood loss was 100 mL, and there were no immediate intraoperative or postoperative complications. The warm ischemia time was 17 min. The lumbar exposure and wide

\* Corresponding author.

E-mail address: [gaonapinilla@gmail.com](mailto:gaonapinilla@gmail.com) (J. Gaona).

<https://doi.org/10.1016/j.urolvj.2025.100338>

Received 29 January 2025; Accepted 30 March 2025

Available online 9 April 2025

2590-0897/© 2025 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

working space provided by our hybrid technique facilitated the tumor resection and the sliding-clip renorrhaphy.

The patient recovered satisfactorily and was discharged on the second day without a drain. The pathology report indicated a 29-mm clear cell carcinoma with negative surgical margins.

## Discussion

Retroperitoneal access for posterolateral renal tumors offers several advantages, including direct visualization of the lateral and posterior renal surfaces, expedited pedicle dissection, and avoidance of bowel mobilization [2]. A meta-analysis by Xu et al. demonstrated that this approach is superior to the transperitoneal technique in terms of operative time, reduced blood loss, and shorter hospital stays [2]. Despite these benefits, many surgeons prefer the conventional transperitoneal approach due to its larger working space and greater familiarity with its anatomical landmarks [1–3].

Given the challenges associated with a lumboscopic approach, some authors have proposed a hybrid technique comparable to ours [4,5]. Timsit et al. described a robotic-assisted transperitoneal posterior technique, which involves medial mobilization of the colon and the creation of a retroperitoneal space via traditional transperitoneal access. Then, they place four additional trocars: three along the posterior, anterior, and mid-axillary lines, and one above the iliac crest [4]. In contrast, our approach utilizes only two additional access sites for posterior dissection: one above the iliac crest for the camera and another along the posterior axillary line.

Hua et al. described a laparoscopic trans-retroperitoneal technique that begins with a conventional extraperitoneal lumboscopic approach for renal pedicle dissection [5]. This is followed by a transperitoneal approach, where Toldt's fascia is incised to facilitate medial mobilization of the kidney. Subsequent tumor dissection is performed via lumbar access. Our technique differs in that we do not perform an initial lumboscopic dissection. We believe direct access to the retroperitoneal space via a transperitoneal approach is more efficient.

Our technique combines the benefits of both retroperitoneal and transperitoneal approaches. Bowel and Gerota fascia mobilization, renal pedicle dissection, and retroperitoneal space dissection are performed via the transperitoneal route, followed by tumor dissection using trocars positioned for lumbar access. We have found this method to be significantly more straightforward than the conventional transperitoneal technique for posterolateral tumors, where tumor access and renorrhaphy can be particularly challenging, even with renal rotation maneuvers. Additionally, our modified access allows for a broader working space than traditional retroperitoneal partial nephrectomy.

In conclusion, we propose a practical, modified transperitoneal technique for posterior renal tumors that is easy to implement and highly recommended for surgeons unfamiliar with the conventional retroperitoneal approach. Our method combines the benefits of both

transperitoneal and retroperitoneal approaches, including initial dissection using well-known transperitoneal anatomical landmarks, a wide working space, direct visualization of the posterior surface of the kidney, and expedited renorrhaphy through lumbar ports.

The video related to this article can be found online at: [doi:10.1016/j.urolvj.2025.100338](https://doi.org/10.1016/j.urolvj.2025.100338).

The video related to this article can be found online at: [doi:10.1016/j.urolvj.2025.100338](https://doi.org/10.1016/j.urolvj.2025.100338).

## Funding statement

There was no funding for this work.

## Consent statement

Written informed consent was obtained from the patient to publish the patient's case.

## CRediT authorship contribution statement

**José Gaona:** Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Santiago Gaona:** Data curation, Resources, Validation, Writing – review & editing. **Sebastián Ortiz:** Data curation, Resources, Software, Writing – review & editing.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## References

- [1] L. Marconi, B. Challacombe, Robotic partial nephrectomy for posterior renal tumours: retro or transperitoneal approach? *Eur. Urol. Focus* 4 (5) (2018) 632–635, <https://doi.org/10.1016/j.euf.2018.08.003>.
- [2] P. Xu, J. Luo, H. Shuai, et al., Comparison of the perioperative outcomes of robot-assisted laparoscopic transperitoneal versus retroperitoneal partial nephrectomy for posterior-lateral renal tumors: a systematic review and meta-analysis, *J. Robot. Surg.* 18 (1) (2024) 1–10, <https://doi.org/10.1007/s11701-024-01963-1>.
- [3] F.F. Thomsen, R.D. Petersson, K.S. Schou, J. Badal, S.R. Malene, Transperitoneal robot - assisted partial nephrectomy: a comparison of operative and oncological outcomes between posterior and anterolateral tumours, *Int. Urol. Nephrol.* (2025) 0123456789, <https://doi.org/10.1007/s11255-025-04372-x>.
- [4] M.O. Timsit, N. Terrier, T. Toinet, et al., Posterior transperitoneal robot-assisted partial nephrectomy in the treatment of renal tumors: feasibility of a hybrid approach, *Prog. en Urol.* 32 (3) (2022) 217–225, <https://doi.org/10.1016/j.purol.2022.01.002>.
- [5] M. Hua, W. Liu, C. Wang, et al., Trans-retro-peritoneal laparoscopic partial nephrectomy for posterior hilar tumor: technical feasibility and preliminary results, *Transl. Androl. Urol.* 12 (11) (2023) 1638–1644, <https://doi.org/10.21037/tau-23-399>.