

Short Communication

Location beats pedicle in laparoscopic partial nephrectomy

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Abstract

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Laparoscopic partial nephrectomy can be performed either by transperitoneal or retroperitoneal approach, both with specific advantages and drawbacks in terms of working space and peri-operative outcomes. The choice for the surgical approach is determined by the experience of the surgeon, the renal pedicle and tumor location – anterior tumors with single renal artery being thought to be more suitable for transperitoneal approach, and posterior tumors with multiple renal arteries for retroperitoneal approach. We analyzed 40 patients with anterior renal tumors and multiple arteries, which were randomly assigned to transperitoneal or retroperitoneal approach. We observed that transperitoneal approach associates a longer time for pedicle dissection in comparison with retroperitoneal approach, but a shorter tumor excision and renorrhaphy times. In conclusion, we consider that the transperitoneal approach ensures improved ergonomics for performing the excision and reconstruction steps of the partial nephrectomy, which impact the warm ischaemia time, thus the choice for the surgical approach should be based mainly on tumor location.

Key words: Partial nephrectomy, Renal tumor, Retroperitoneal, Transperitoneal, Warm ischaemia

INTRODUCTION

Laparoscopic partial nephrectomy has emerged as a minimally-invasive alternative to the open approach for T1a tumors, ensuring shorter recovery time, shorter hospital length-of-stay and similar long-term oncological and functional outcomes (Song et al., 2017).

The majority of the laparoscopic partial nephrectomies are performed by transperitoneal approach, but retroperitoneal approach can offer some advantages (Marszalek et al., 2011). Transperitoneal approach is preferred for the larger working space, reduced instrument collision and more familiar anatomy. On the other hand, retroperitoneal approach offers direct access to the renal pedicle, a shorter operative time, does not need bowel mobilization, reduces the rate of post-operative ileus, limits any possible complication to the retroperitoneal space and ensures a decreased hospital

length of stay (Maurice et al., 2017). The drawbacks of this type of approach are a higher rate of conflict between the instruments and disorientation for inexperienced surgeons.

The three most important factors that dictate the choice for the approach are the experience of the surgeon, the characteristics of the renal pedicle and tumor location – anterior tumors being thought to be more suitable for transperitoneal approach, and posterior tumors for retroperitoneal approach.

DISCUSSION

Due to the advantages of the retroperitoneal approach, it was also studied for anterior renal tumors. Song et al.

(2015) analyzed the feasibility of retroperitoneal approach for ventral renal tumors in 14 patients and developed the "Renal Pedicle Rotation" technique that ensures better exposure of anterior tumors by rotating the kidney on the vascular axis, after separating the renal artery and vein. The authors reported a warm ischemia time of 15.9 minutes (± 9.8), a median blood loss of 89.3 ml (± 102.2 ml) and oncological and functional outcomes similar to the ones previously published. No patient required conversion to the open technique. Another group confirmed the feasibility of this technique also in moderately complex ventral tumors (R.E.N.A.L score of 8)(Liu et al., 2016). Although the results of this technique are encouraging, it can be limited by the presence of anatomic renal vascular variations.

In our department, the choice for the surgical approach is determined by tumor location (anterior tumors – transperitoneal, posterior tumor – retroperitoneal) and renal pedicle (single artery –either transperitoneal, or retroperitoneal, multiple arteries – retroperitoneal). A special category of patients are the ones with anterior renal tumors and multiple renal arteries, for whom the choice for the approach is unclear. We analyzed a number of 40 patients with cT1a anterior kidney tumors, with at least 2 renal arteries, who underwent laparoscopic partial nephrectomy in our department. The patients were randomized into two groups – transperitoneal (TPN) and retroperitoneal approach (RPN). We observed that the time for pedicle dissection was significantly longer for the TPN (20 minutes, 95% CI: 15-32 minutes vs 7 minutes, 95% CI: 5 -10 minutes for RPN, $p < 0.001$), but this approach ensured a shorter tumor excision time (3 minutes, 95% CI: 2-5 minutes for TPN vs 6 minutes for RPN, 95% CI: 5-9 minutes, $p < 0.05$) and shorter renorrhaphy time (10 minutes, 95% CI: 9-12 minutes for TPN vs 13 minutes for RPN, 95% CI: 10-14 minutes, $p = 0.002$), due to improved ergonomics. The blood loss (80 ml \pm 45 ml for TPN vs 100 ml \pm 50 ml for RPN) and positive surgical margins rate (0 for TPN vs 10% for RPN) were higher in the retroperitoneal approach, although not statistically significant ($p = 0.2$ and $p = 0.1$, respectively).

CONCLUSION

In conclusion, we consider that although the transperitoneal approach does not offer direct access to the renal pedicle and the dissection of more than one renal artery increases the operative difficulty, it ensures improved ergonomics for performing partial nephrectomy. The choice for the surgical approach should be based mainly on tumor location.

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