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EDITORIAL

Does laparoscopy still have a role in the era of robotic surgery?

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Since its first application in Urology in 1991, laparoscopy has revolutionized the surgical approach to benign and malignant urological disease. Since then, the laparoscopic approach spread rapidly worldwide, and actually, EAU guidelines suggest that radical nephrectomy should be performed by a laparoscopic approach, considering its lower morbidity [1]. Laparoscopy is still considered technically demanding and characterized by a steep learning curve of 30–40 cases, during which there is an increased risk of complications and operative time [2]. However, in experienced hands, laparoscopic surgery can reply to the oncologic and functional results of open surgery, by significantly reducing surgical trauma for the patients [3].

The success and safety of laparoscopy could be suggested also for malignancies with a high risk for port-site metastases such as urothelial cancer, and technically complex procedures as partial nephrectomy. Greco *et al*. investigated 140 patients who underwent laparoscopic and open radical nephroureterectomy for upper urinary tract urothelial carcinoma. There was no tumor seeding of port sites after laparoscopic surgery and the 5-year disease-free survival (DFS) was 75% in the LNU group and 73% in the ONU group ($P = 0.037$) [4]. The same group investigated the surgical outcomes of laparoscopic radical cystectomy with extracorporeal orthotopic ileal neobladder in patients with muscle-invasive urothelial carcinoma of the bladder. Even in this study, laparoscopy was a challenging procedure but technically feasible, allowing low morbidity and oncological safety [5].

Some urologists sustain that, even if laparoscopy presents a lower trauma for the patients, it could represent a risk factor for complications if applied to complex procedures such as partial nephrectomy, with an increased risk for longer warm ischemia time and renal damage. Springer *et al*. evaluated the long-term oncological and functional outcomes of laparoscopic partial nephrectomy (LPN) compared with open partial nephrectomy (OPN) in 340 consecutive patients affected by pT1 renal tumors. The median operating time for LPN and OPN was 145.3 (45.4) min and 155.2 (35.6) min, respectively ($P = 0.07$) and the median warm ischemia time was 11.7 (2.2) min in the LPN and 14.4 (1.9) min in the OPN group ($P = 0.03$). During follow-up, the biochemical markers of glomerular filtration were completely normalized, showing the absence of renal injury and there was no significant difference in glomerular filtration rate between the groups, with median rates of 79.8 (3.0) mL/min/1.72 m^2 for the LPN and 80.2 (2.7) mL/min/1.72 m^2 for the OPN group at 5-year follow-up. The 5-year overall survival and cancer-specific survival rates, calculated using the Kaplan-Meier method, were 94% and 91% in the LPN group, and 92% and 88% in the OPN group. Finally, the authors could suggest that LPN and OPN provided similar long-term oncological outcomes in the therapy of T1 renal cancer. Concerning renal function, no damage to the kidney was found after LPN and OPN, with complete normalization of renal function at the 5-year follow-up in both groups [6].

In the early 2000s, the first experiences with robot-assisted laparoscopic surgery were reported. The idea to develop a robotic interface was to significantly shorten the learning curve in minimal-invasive surgery for an experienced open yet naïve laparoscopic surgeon, which was estimated in 100 cases. The use of a robotic platform reduced the learning curve of an experienced open yet naïve laparoscopic surgeon to 8-12 cases, without major complications [7]. The shortened learning curve compared to conventional laparoscopy has surely contributed to the widespread diffusion of robotic surgery in Urology, with more than 7,500 robotic platforms installed worldwide and more than 2 million procedures performed robotically. In this issue of *Uro-Technology Journal*, we present several experiences with robotic surgery for urological diseases. But the question still remains: robot-assisted surgery vs. laparoscopy surgery: which is better? Macek and Cathelineau [8] tried to answer, assessing that technological advances, mechanical dexterity, standard 3D vision, possible magnification, and the number of arms favor robot-assisted surgery over laparoscopic ones.

The highest benefit of robotic surgery is in complex, reconstructive of multi-quadrant procedures (radical cystectomy, prostatectomy, nephroureterectomy or partial ne-

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phrectomy or other complex reconstructions) as it enhances easier and faster training of junior surgeons, which can therefore become independent more rapidly. Furthermore, robotic surgery requires lower physical and mental impact for the surgeon than conventional laparoscopic procedures. Finally, the arrival of multiple new robotic platforms has reduced the costs, which represented a limitation of robotic surgery, and that are now equivalent to the costs of laparoscopy. We can slowly archive laparoscopy in the annals of surgery, with respect we must demonstrate a technique that has changed the course of the history of surgery.

Declarations

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