GLOBAL SCIENCE LIBRARY

EDITORIAL

Surgical Case Reports and Images

Open, laparoscopic or robotic radical cystectomy: which is the best surgical approach?

Raffale Baio*

Department of Urology, University of Salerno, Italy

Bladder cancer (BC) is the 7th most commonly diagnosed cancer in male population and the 11th when we consider both genders [1]. The worldwide age-standardised incidence rate (per 100,000 person/years) is 9 for men and 2,2 for women [1]. Approximately 30% of patients diagnosed with non-muscle invasive bladder cancer (NMIBC) progress to muscle invasive bladder cancer (MIBC), while in the further 25% of cases the disease presents itself from the beginning as MIBC [2]. Radical cystectomy is the standard treatment for localised MIBC [3,4], although the growing interest in patients' quality of life (QoL) has encouraged the choice of treatment modalities that preserve the bladder (such as radio- and/or chemotherapy). In choosing the treatment modality, as well as the type of urinary diversion, Performance status and life expectancy of patients play a fundamental role: so, according to these two clinical factors, radical cystectomy is reserved for patients with a longer life expectancy without concomitant disease and a better PS. In effect, an association between comorbidity and adverse pathological and survival outcomes following RC was found [5]. Traditionally, indications for RC are as follows:

- MIBC T2-T4a, N0-Nx, M0 [4];
- high risk and recurrent non-muscle-invasive tumours;
- BCG-refractory, BCG-relapsing and BCG-unresponsive, T1G3 tumours;
- extensive papillary disease that cannot be controlled with TURB and intravesical therapy alone.

Salvage cystectomy is also indicated in non-responders to conservative therapy, recurrence after bladder-sparing treatment and when the bladder disease is non-UC (considering that these cancers respond poorly to chemotherapy and RT). Finally, RC has purely palliative purposes when fistula formation, pain and recurrent visible haematuria affect the patient. Until recently, laparoscopic radical cystectomy (LRC) and robot-assisted radical cystectomy (RARC) were considered experimental procedures with no advantages over open surgery since most of the available studies suffered from patient selection bias (age, stage). However, now an increased number of reports investigate the impact of RARC not only on quality of life but also on peri-operative and oncological outcomes. According to the SR by Novara et al. [6], although the intracorporeal bladder reconstruction is the more demanding surgical step, the mean operative time of RARC (six to seven hours) decreased over time (most likely reflecting more experience with the procedure) but remained longer than for ORC. Similarly, comparative studies show that mean length of hospital stay for RARC decreases with time and experience, being 1 to 1,5 days shorter compared to open radical cystectomy (ORC). However, in the RCT's, considering operative time and length of hospital stay, no significant difference between the two procedures was found. Blood loss and transfusion rate are lower in RARC, encouraging the choice of this procedure. Intra-operative, 30-day complication rate and mortality show similar results for RARC and ORC. However, considering 90-day complication rates of any-grade and 90-day grade 3 complication rates, the RARC guarantees best results. Overall complication rates were reported as > 50%, indicating that radical cystectomy remains major surgery (regardless of the type of surgical approach chosen: open, laparoscopic or robotic). It is important to note that complication rates did not change with time or experience. A major limitation of this review is the low level of evidence of the included studies. The Pasadena Consensus Panel (a group of experts on RC, lymphadenectomy and urinary reconstruction) reached similar conclusions as the Novara review [7]. In effect, comparing RARC and ORC, similar outcomes were found for operative endpoints, pathological and intermediate oncological endpoints (positive surgical margins and Lymph Nodes yield), functional endpoints and complication outcomes. Additionally, if on one hand RARC guaranteed ergonomic advantages for the surgeon (compared to LRC), on the other hand it was associated with increased costs. For both techniques, surgeons' experience and institutional volume strongly predicted outcome. About this, according to the Pasadena Consensus Panel, 30 cases should be enough to achieve proficiency in RARC. However, challenging cases (high BMI, post chemotherapy or RT, pelvic surgery, T4 or bulky tumours or positive nodes) should be performed by experienced robotic surgeons only. Experience is defined as a high-volume center, > 30 RARCs/year and experience in ORC. The only sufficiently powered RCT compared ORC (n = 58) vs. RARC (n = 60) with open diversion, choosing as the primary endpoint an advantage in 90-day grade 2-5 complications for RARC [8]. The conclusion was that the complication rates were similar (62% for RARC vs. 66% for ORC). Robotic-assisted radical cystectomy showed less blood loss but longer operative time and higher costs. Length of hospital stay, pathologic outcome and QoL were similar. Limitations of this study were lack of long-term outcomes and limited experience in RARC (compared to ORC). An initial report of a prospective RCT, which compared ORC and RARC, concluded for similar health-related quality of life (HRQoL) [9]. Yuh et al. found similar functional and oncological outcomes with five years follow-up [10].

For LRC, a recent review showed similar conclusions as described for RARC [11]. In effect, compared to ORC, LRC had a significantly longer operative time but fewer overall complications, blood transfusions and analgesic use, less blood loss and a shorter length of hospital stay. However, this review was limited by the

inherent limitations of the included studies. The CORAL study was a a three arm RCT comparing open (n = 20) vs. robotic (n = 20) vs. laparoscopic (n = 19) cystectomy [12]. The 30-day complication rate was significantly higher in the open arm (70%) compared to the laparoscopic arm (26%). With over 5 years of follow-up, primary end points were recurrence free survival (RFS), cancer specific survival (CSS) and overall survival (OS). The conclusion was that robotic and laparoscopic radical cystectomy, compared to ORC, achieved equivalent oncological outcomes. In addition, when considering the 90-day Clavien-graded complication rates, no difference between the three study arms was found. This aspect is not negligible if we consider that open radical cystectomy is a morbid procedure with complication rates reported between 30% and 70%, even at high volume centers [13,14]. Opponents of robotic (and laparoscopic) cystectomy have questioned whether the quality of a minimally invasive approach can mirror that of open surgery. To find a valid answer to this problem, the state of the surgical margin and the lymph node yield were evaluated as surrogates of the surgical technique. No difference was observed in the positive margins between the CORAL groups. Similar results were found considering the mean lymph node yield, with a statistically significant difference between the open arm and the laparoscopic arm only. The RAZOR trial was another RCT which compared open versus robotic cystectomy, showing similar results between the two surgical approaches about the 2-year progression free survival (PFS) [15]. Bochner et al. [16] reported a greater number of tumor relapses in local/abdominal sites when the robotic approach was performed, raising many doubts about oncologic safety of intra-abdominal pneumoperitoneum and robotic surgery in general. Similar findings were found when urologic diseases other than bladder cancer were cured with robotic surgery [17, 18]. However, the CORAL trial (classifying the recurrences as local, distant or a combination of both) reported that recurrence, overall death, and bladder cancer-specific death were not affected by the surgical approach. It was the same for the RAZOR trial, in which no difference in recurrence patterns was found. However, both the CORAL and the RAZOR study showed important limitations. For example, in the first case, the study population was small (being the CORAL trial a single center study). Thus, in this trial, the surgery was performed by three surgeons with a high degree of experience in the minimally invasive approaches, outside their learning curve. For this reason, the CORAL trial results cannot be reproducible in non-high-volume centers. Another aspect to consider is the following: the reconstructive time of the radical cystectomy was performed extra-corporeally. Therefore, the oncological or quality of life outcomes may depend on this aspect. For this reason, these outcomes must be assessed when the reconstructive step of radical cystectomy is performed intra-corporeally. Furthermore, even if we wanted to omit the oncological outcomes, the reconstructive time is the one most responsible for the onset of adverse events. Therefore, the choice of an intra-corporeal or extra- reconstruction plays a fundamental role in the evaluation of the outcomes, whatever they are. Finally, in the CORAL trial, the quality of life and a cost analysis were not assessed. In particular, the evaluation of costs is a not negligible aspect when choosing the robotic approaches. In other words, expansive costs must be balanced against true benefits. Furthermore, we must consider that the RAZOR trial did not show different results between the three surgical approaches about the health-related quality of life at 3 or 6 months. In conclusion, a minimally invasive approach has not been shown to have a considerable impact on oncological outcomes, complication rates and quality of life outcomes compared to open cystectomy [19,20] while it guarantees benefits such as a reduction in blood transfusion rates and shorter length of stay (but in experienced hands). Therefore, minimally invasive techniques simply represent a surgical approach to an operation; therefore, it should not matter how a procedure is performed, as long as it is performed safely with acceptable oncological and functional results. Surgeons should perform radical cystectomy using the technique they are most comfortable with instead of focusing on an open or minimally invasive approach.

References

1. Ferlay J, Steliarova-Foucher E, Lortet-Tieulent J, Rosso S, Coebergh JWW, et al. Cancer incidence and mortality patterns in Europe: estimates for 40 countries in 2012. Eur J Cancer. 2013; 49: 1374-403.
2. Antoni S, Ferlay J, Soerjomataram I, Znaor A, Jemal A, et al. Bladder Cancer Incidence and Mortality: A Global Overview and Recent Trends. Eur Urol. 2017; 71: 96-108.
3. Stein JP, Lieskovsky G, Cote R, Groshen S, Feng AC, et al. Radical cystectomy in the treatment of invasive bladder cancer: long-term results in 1,054 patients. J Clin Oncol. 2001; 19: 666-75.
4. Hautmann RE, Abol-Enein H, Hafez K, Haro I, Mansson W, et al. Urinary diversion. Urology. 2007; 69: 17-49.
5. Miller DC, Taub DA, Dunn RL, Montie JE, Wei JT. The impact of co-morbid disease on cancer control and survival following radical cystectomy. J Urol. 2003; 169: 105-9.
6. Novara G, Catto JWF, Wilson T, Annerstedt M, Chan K, et al. Systematic review and cumulative analysis of perioperative outcomes and complications after robot-assisted radical cystectomy. Eur Urol. 2015; 67: 376.
7. Wilson TG, Guru K, Rosen RC, Wiklund P, Annerstedt M, et al. Best practices in robot-assisted radical cystectomy and urinary reconstruction: recommendations of the Pasadena Consensus Panel. Eur Urol. 2015; 67: 363-75.
8. Bochner BH, Dalbagni G, Sjoberg DD, Silberstein J, Keren Paz GE, et al. Comparing Open Radical Cystectomy and Robot-assisted Laparoscopic Radical Cystectomy: A Randomized Clinical Trial. Eur Urol. 2015; 67: 1042-1050.
9. Fahmy O, Asri K, Schwentner C, Stenzl A, Gakis G. Current status of robotic assisted radical cystectomy with intracorporeal ileal neobladder for bladder cancer. J Surg Oncol. 2015; 112: 427-9.
10. Yuh B, Wilson T, Bochner B, Chan K, Palou J, et al. Systematic review and cumulative analysis of oncologic and functional outcomes after robot-assisted radical cystectomy. Eur Urol. 2015; 67: 402-22.
11. Tang K, Li H, Xia D, Hu Z, Zhuang Q, et al. Laparoscopic versus open radical cystectomy in bladder cancer: a systematic review and meta-analysis of comparative studies. PLoS One. 2014; 9: e95667.
12. Khan MS, Gan C, Ahmed K, Ismail AF, Watkins J, et al. A Single-centre Early Phase Randomised Controlled Three-arm Trial of Open, Robotic, and Laparoscopic Radical Cystectomy (CORAL). Eur Urol. 2016; 69: 613-621.
13. Shabsigh A, Korets R, Vora KC, Brooks CM, Cronin AM, et al. Defining early morbidity of radical cystectomy for patients with bladder cancer using a standardized reporting methodology. Eur Urol. 2009; 55: 164-74.
14. Hautmann RE, de Petriconi RC, Volkmer BG. Lessons learned from 1,000 neobladders: the 90-day complication rate. J Urol. 2010; 184: 990-4.
15. Parekh DJ, Reis IM, Castle EP, Gonzalgo ML, Woods ME, et al. Robot-assisted radical cystectomy versus open radical cystectomy in patients with bladder cancer (RAZOR): an open-label, randomised, phase 3, non-inferiority trial. Lancet. 2018; 391: 2525-36.
16. Bochner BH, Dalbagni G, Marzouk KH, Sjoberg DD, Lee J, et al. Randomized Trial Comparing Open Radical Cystectomy and Robot-assisted Laparoscopic Radical Cystectomy: Oncologic Outcomes. Eur Urol. 2018; 74: 465-71.

17. Calaway AC, Einhorn LH, Masterson TA, Foster RS, Cary C. Adverse Surgical Outcomes Associated with Robotic Retroperitoneal Lymph Node Dissection Among Patients with Testicular Cancer. Eur Urol. 2019; 76: 607-9.

18. Song J, Kim E, Mobley J, Vemana G, Tanagho Y, et al. Port site metastasis after surgery for renal cell carcinoma: harbinger of future metastasis. J Urol. 2014; 192: 364-8.

19. Satkunasivam R, Tallman CT, Taylor JM, Miles BJ, Klaassen Z, et al. Robot-assisted Radical Cystectomy Versus Open Radical Cystectomy: A Meta-analysis of Oncologic, Perioperative, and Complication-related outcomes. Eur Urol Oncol. 2019; 2: 443-7.

20. Sathianathen NJ, Kalapara A, Frydenberg M, Lawrentschuk N, Weight CJ, et al. Robotic Assisted Radical Cystectomy vs Open Radical Cystectomy: Systematic Review and Meta-Analysis. J Urol. 2019; 201: 715-20.

*Correspondence: Raffale Baio, Department of Urology, University of Salerno, Italy, E-mail: raffy.baio@yahoo.it

Rec: 3 Aug 2021; **Acc**: 20 Aug 2021; **Pub**: 30 Aug 2021

Surg Case Rep Image. 2021;1(1):101
DOI: 10.36879/SCRI.2021.000101