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Comparative Analysis of Open versus Laparoscopic Radical Cystectomy: A Retrospective Study from Two Tertiary Urology Centers in the Balkans

Bashkim Shabani[1], Dr. Donat Çuni[2], Dr. Xhevdet Cuni[3], Dr. Flatra Fetahi[4]*, Edi Cuni[5]

[1]Faculty of Medicine, University, Ss. Cyril and Methodius, Skopje, North Macedonia
[2,3,4]University of Prishtina, Kosovo
[5]Alma Mater Europea Campus College "Rezonanca", Prishtina

ABSTRACT

Background: Radical cystectomy remains the gold standard treatment for muscle-invasive bladder cancer. Minimally invasive approaches such as laparoscopic radical cystectomy (LRC) have gained popularity; however, their comparative effectiveness with open radical cystectomy (ORC) remains debated.

Objective: To compare perioperative outcomes between ORC and LRC performed at two tertiary urology centers.

Methods: In this retrospective analysis, all patients who underwent open radical cystectomy (ORC) or laparoscopic radical cystectomy (LRC) at our clinics during a three-year period were evaluated. Thirty-two patients underwent ORC in Prishtina, while eleven underwent LRC in Skopje. Demographic data and perioperative outcomes were analyzed.

Results: The ORC group demonstrated shorter operative time (256 ± 30 min vs. 346.36 ± 24.60 min). LRC was associated with shorter hospital stay (5 vs. 8 days) and faster bowel recovery. Intraoperative blood loss was lower in ORC (300 ml vs. 472.72 ± 87.64 ml). No significant life-threatening complications were observed in either group.

Conclusion: ORC remains a reliable approach with shorter operative time, while LRC offers advantages in postoperative recovery. Outcomes largely depend on surgical expertise and adherence to enhanced recovery protocols.

Keywords: Radical Cystectomy; Laparoscopic Surgery; Bladder Cancer; Perioperative Outcomes, ERAS

Address for correspondence:
Flatra Fetahi,
University of Prishtina,
Kosovo,
E-mail: flatra.fetahu@hotmail.com

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INTRODUCTION

Bladder cancer is one of the most common malignancies of the urinary tract, and radical cystectomy represents the standard treatment for muscle-invasive disease and selected high-risk nonmuscle-invasive cases [1,2]. Despite its oncological effectiveness, the procedure is associated with considerable perioperative morbidity [3]. Open radical cystectomy (ORC) has long been regarded as the gold standard approach. However, advances in minimally invasive surgery have led to the increasing adoption of laparoscopic radical cystectomy (LRC), which may offer benefits such as reduced blood loss, shorter hospital stay, and faster recovery [4,5]. Nevertheless, LRC remains technically demanding and requires a significant learning curve [6]. The comparative outcomes between ORC and LRC continue to be debated, particularly in centers with different levels of surgical experience. This study aims to compare perioperative outcomes between ORC and LRC performed in two tertiary urology centers in the Balkan region.

MATERIAL AND METHODS

Study design: In this retrospective analysis, all patients who underwent open radical cystectomy (ORC) or laparoscopic radical cystectomy (LRC) at our clinics during a three-year period were evaluated.

Study Population

A total of 43 patients were included:

- **ORC group:** 32 patients treated in Prishtina
- **LRC group:** 11 patients treated in Skopje

Surgical Technique

- ORC was performed via infraumbilical laparotomy in all patients.
- LRC was performed using a standard laparoscopic transperitoneal approach.

Variables Analyzed

- Demographic characteristics (age, gender)

- Operative time
- Intraoperative blood loss
- Blood transfusion requirements
- Length of hospital stay
- Postoperative recovery.

Statistical analysis: Descriptive statistics were used. Continuous variables are expressed as mean ± standard deviation

RESULTS

Patient's Characteristics

The ORC group included predominantly male patients (25 males, 1 female), while the LRC group included 11 males and 1 female. Mean age was similar between groups (63.6 ± 8.3 vs. 64.4 ± 9.6 years).

Perioperative outcomes

- **Operative time:**
  ORC: 256 ± 30 min
  LRC: 346.36 ± 24.60 min
- **Intraoperative blood loss:**
  ORC: 300 ml
  LRC: 472.72 ± 87.64 ml
- **Transfusion requirement:**
  ORC: 450 ml (400–800 ml)
  LRC: 600 ml (400–800 ml)
- **Hospital stay:**
  ORC: 8 days
  LRC: 5 days

Postoperative recovery: Patients in the LRC group resumed oral intake on postoperative day 1, while ORC patients resumed on day 2 due to routine use of nasogastric tubes. Faster bowel recovery was observed in the LRC group.

Complications: No significant early or late complications that threatened patient survival were recorded in either group.

DISCUSSION

Radical cystectomy remains one of the most complex procedures in urologic oncology, associated with considerable perioperative morbidity despite advances in surgical techniques and perioperative care [3]. The ongoing evolution toward minimally invasive approaches, including laparoscopic radical cystectomy (LRC), aims to reduce surgical trauma while maintaining oncological efficacy. In the present study, operative time was significantly shorter in the ORC group compared to the LRC group. This finding is consistent with multiple reports in the literature, which emphasize that laparoscopic approaches are associated with longer operative duration, particularly during the initial phases of the learning curve [6,7]. The increased operative time in LRC can be attributed to the technical complexity of intracorporeal dissection and urinary diversion, as well as the need for advanced laparoscopic skills. Interestingly, our results demonstrated lower intraoperative blood loss in the ORC group, which contrasts with the majority of published studies where minimally invasive approaches typically result in reduced bleeding [5,8]. This discrepancy may reflect institutional factors such as surgeon experience, patient selection, and perioperative management protocols. It is well recognized that outcomes in LRC are highly dependent on the surgeon's expertise and case volume, and early experience may not yet reflect the full advantages of the technique. Postoperative recovery parameters favored LRC in our cohort. Patients undergoing laparoscopic surgery experienced shorter hospital stays and earlier return of bowel function, which is in line with previously reported benefits of minimally invasive surgery [9]. The earlier resumption of oral intake in the LRC group may also be attributed to the avoidance of routine nasogastric tube placement, which was applied in ORC patients. These findings highlight the importance of perioperative care pathways, particularly enhanced recovery after surgery (ERAS) protocols, in optimizing patient outcomes. The absence of significant life-threatening complications in both groups suggests that both ORC and LRC are safe when performed in specialized centers. This observation aligns with contemporary studies indicating that perioperative morbidity is more closely related to patient factors and institutional experience than to the surgical approach itself. An important aspect to consider is that this study reflects real-world practice across two different institutions, which may introduce variability in surgical techniques and perioperative management. However, this also enhances the external validity of the findings, as it represents outcomes achievable in routine clinical settings rather than highly controlled environments. The study has several limitations. First, the retrospective design introduces potential selection bias. Second, the relatively small sample size, particularly in the LRC group, limits the statistical power of the analysis. Third, the lack of long-term oncological outcomes prevents conclusions regarding cancer control. Future prospective, multicenter studies with larger cohorts and long-term follow-up are needed to better define the comparative effectiveness of these surgical approaches.

CONCLUSION

This comparative study demonstrates that both open radical cystectomy (ORC) and laparoscopic radical cystectomy (LRC) are safe and effective surgical options for the management of bladder cancer when performed in experienced centers. ORC remains associated with shorter operative time and, in this cohort, lower intraoperative blood loss, reflecting its established role and technical familiarity. In contrast, LRC offers clear advantages in terms of postoperative recovery, including shorter hospital stay, faster return of bowel function, and earlier resumption of oral intake. Importantly, the outcomes observed in this study emphasize that the success of either surgical modality is strongly influenced by surgeon experience, institutional expertise, and adherence to enhanced recovery protocols rather than the choice of technique alone. Given the limitations of the present study, including its retrospective nature and limited sample size, further large-scale prospective studies are warranted. Future research

should focus not only on perioperative outcomes but also on long-term oncological results and quality of life measures to provide a more comprehensive comparison between ORC and LRC. In contemporary urologic practice, both approaches should be considered complementary rather than competitive, with the choice of technique tailored to patient characteristics, surgeon expertise, and available institutional resources.

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