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REVIEW ARTICLE

Systematic review of perioperative outcomes and complications after open, laparoscopic and robot-assisted radical cystectomy[☆]

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PALABRAS CLAVE

Cistectomía radical;
Robótica;
Laparoscopia;
Resultados perioperatorios;
Complicaciones

Abstract Radical cystectomy and regional lymph node dissection is the standard treatment for localized muscle-invasive and for high-risk non-muscle-invasive bladder cancer, and represents one of the main surgical urologic procedures. The open surgical approach is still widely adopted, even if in the last two decades efforts have been made in order to evaluate if minimally invasive procedures, either laparoscopic or robot-assisted, might show a benefit compared to the standard technique. Open radical cystectomy is associated with a high complication rate, but data from the laparoscopic and robotic surgical series failed to demonstrate a clear reduction in post-operative complication rates compared to the open surgical series. Laparoscopic and robotic radical cystectomy show a reduction in blood loss, in-hospital stay and transfusion rates but a longer operative time, while open radical cystectomy is typically associated with a shorter operative time but with a longer in-hospital admission and possibly a higher rate of high grade complications.

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Revisión sistemática de resultados perioperatorios y complicaciones después de cistectomía radical abierta, laparoscópica y asistida por robot

Resumen La cistectomía radical y disección de los ganglios linfáticos regionales es el tratamiento estándar para el cáncer vesical músculo invasivo localizado y no músculo-invasivo de alto riesgo, y representa uno de los principales procedimientos quirúrgicos urológicos. El abordaje quirúrgico abierto es todavía ampliamente adoptado, aunque en las últimas 2 décadas se han hecho esfuerzos con el fin de evaluar si los procedimientos mínimamente invasivos, ya

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sean laparoscópicos o asistidos por robot, podrían mostrar un beneficio en comparación con la técnica estándar. La cistectomía radical abierta se asocia con una alta tasa de complicaciones, pero los datos de la serie quirúrgica laparoscópica y robótica no lograron demostrar una clara reducción en las tasas de complicaciones postoperatorias en comparación con la serie quirúrgica abierta. La cistectomía radical laparoscópica y robótica muestran una reducción en la pérdida de sangre, las tasas de estancia hospitalaria y de transfusión, pero un mayor tiempo operatorio, mientras que la cistectomía radical abierta se asocia típicamente con un tiempo operatorio más corto, pero con un ingreso más largo en el hospital y, posiblemente, una mayor tasa de complicaciones de alto grado.

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Introduction

Radical cystectomy (RC) with regional lymph node dissection (LND) is the standard treatment for localized muscle-invasive and for high-risk non-muscle-invasive bladder cancer.¹ Concerning the surgical technique adopted, open radical cystectomy (ORC) is still the most commonly used surgical approach worldwide.² Nevertheless, in the last fifteen years, minimally invasive techniques such as laparoscopic RC (LRC) and robot-assisted RC (RARC) have gained popularity and have been widely performed in many international centers in order to possibly reduce the high percentage of complications that the procedure still harbors.^{3,4} To date, hundreds of single institutions surgical series evaluating peri-operative outcomes and complications of minimally invasive approaches are available. Their results are promising, and nowadays mid- and long-term oncologic results are becoming more and more available, allowing for a proper comparison between the three different surgical techniques.^{5,6} The retrospective nature of most papers published and the lack of randomized controlled trials and high level of evidence literature represent a main drawback. To date, only few RCTs are available.^{7,8} Among them, the Cystectomy Open Robotic and Laparoscopic (CORAL) trial is the only available comparing LRC to ORC and RARC in a single institution.

In this wide and continuously changing scenario, the aim of the present systematic review is to report on complications and peri-operative outcomes of ORC, LRC and RARC in order to clarify the role and the possible pros and cons of minimally invasive surgery applied to RC.

Methods

Evidence acquisition

A systematic search of the literature was performed in February 2016 using Medline database and according to current methodological recommendation for systematic reviews.⁹ The search included a free-text protocol using the terms *radical cystectomy* in all the fields of the records. Limits were applied to only English literature. Two authors (A.P. and R.S.S.) reviewed the results records selecting the studies that compared RARC to LRC or to ORC and

RARC, LRC and ORC case series. Other significant studies cited in the reference list of the selected papers were evaluated. Studies reporting on salvage cystectomy, partial cystectomy, prostate-sparing cystectomy, single-case reports, single-site laparoscopic case series, natural-orifice trans-luminal endoscopic surgery, congress abstracts, book chapters, review papers, editorials, comments, letters to the editors, experimental models, surgical technique-only papers or animal series were not included in the present review.

All papers reporting on peri-operative outcomes (operative time, blood loss, in-hospital stay, readmission rate, post-operative complication rate) of RARC, LRC and ORC were included in the qualitative analysis. All papers were categorized according to the 2011 LOEs for treatment benefits: LOE 1, systematic review of randomized trials or n-of-1 trials; LOE 2, randomized trials or observational study with dramatic effect; LOE 3, non-randomized controlled cohort/follow-up study; LOE 4, case-series, case-control studies, or historically controlled studies; LOE 5, mechanism-based reasoning.¹⁰ Methodological reporting of complications was evaluated according to the Martin criteria.¹¹

Results

Quality of the studies and level of evidence

The flowchart of the systematic review of the literature performed is shown in Fig. 1. In total, 5771 records were identified in the PubMed database. After excluding duplicate or triplicate publications and non-relevant records, a total of 52 studies have been included in the final qualitative analysis reporting on complications and perioperative outcomes. The majority of the surgical series included are retrospective, single-center studies with the exception of some prospective studies, and multicenter collaboration papers. All of them are categorized as LOE 4. There were only two randomized compared studies available (LOE 2b) representing the highest level of evidence published to date.

Table 1 describes the baseline characteristics of the patients included in the surgical series (median age, ASA score classification, pathologic stage distribution) of the three different techniques.

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