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Best Practices in Robot-assisted Radical Cystectomy and Urinary Reconstruction: Recommendations of the Pasadena Consensus Panel

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Abstract

Context: Robot-assisted surgery is increasingly used for radical cystectomy (RC) and urinary reconstruction. Sufficient data have accumulated to allow evidence-based consensus on key issues such as perioperative management, comparative effectiveness on surgical complications, and oncologic short- to midterm outcomes.
Objective: A 2-d conference of experts on RC and urinary reconstruction was organized in Pasadena, California, and the City of Hope Cancer Center in Duarte, California, to systematically review existing peer-reviewed literature on robot-assisted RC (RARC), extended lymphadenectomy, and urinary reconstruction. No commercial support was obtained for the conference.
Evidence acquisition: A systematic review of the literature was performed in agreement with the PRISMA statement.
Evidence synthesis: Systematic literature reviews and individual presentations were discussed, and consensus on all key issues was obtained. Most operative, intermediate-term oncologic, functional, and complication outcomes are similar between open RC (ORC) and RARC. RARC consistently results in less blood loss and a reduced need for transfusion during surgery. RARC generally requires longer operative time than ORC, particularly with intracorporeal reconstruction. Robotic assistance provides ergonomic value for surgeons. Surgeon experience and institutional volume strongly predict favorable outcomes for either open or robotic techniques.
Conclusions: RARC appears to be similar to ORC in terms of operative, pathologic, intermediate-term oncologic, complication, and most functional outcomes. RARC consistently results in less blood loss and a reduced need for transfusion during surgery. RARC

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can be more expensive than ORC, although high procedural volume may attenuate this difference.

Patient summary: Robot-assisted radical cystectomy (RARC) is an alternative to open surgery for patients with bladder cancer who require removal of their bladder and reconstruction of their urinary tract. RARC appears to be similar to open surgery for most important outcomes such as the rate of complications and intermediate-term cancer-specific survival. Although RARC has some ergonomic advantages for surgeons and may result in less blood loss during surgery, it is more time consuming and may be more expensive than open surgery.

1. Introduction

Bladder cancer is one of the most common [1] and expensive malignancies to manage [2]. Radical cystectomy (RC) with urinary reconstruction is a complex, time-consuming surgery associated with significant morbidity [3]. Approximately 7000 RCs were performed annually from 2001 to 2010 in the United States [4]. The number of these procedures performed with robotic assistance rose dramatically (0.6–12.8%) from 2004 to 2010 [5].

The expanding evidence base for robot-assisted RC (RARC) now allows preliminary conclusions to be drawn about the comparative effectiveness of RARC versus open RC (ORC). This consensus summarizes existing data using up-to-date systematic reviews of the literature (presented elsewhere in this issue of *European Urology* [6,7]) and best practices for cystectomy and urinary reconstruction as developed by an international panel of expert ORC and RARC surgeons who met in Pasadena, California, and at the City of Hope Cancer Center, Duarte, California, USA, in May 2014.

2. Evidence acquisition

A systematic review of published literature related to RARC was performed in September 2013 using Medline, Scopus, and Web of Science, with an update performed in April 2014. The keywords *robot-assisted radical cystectomy, da Vinci radical cystectomy*, and *robot* radical cystectomy* were used across these search fields: *surgical series* (prospective and retrospective) and *comparative studies* (prospective and retrospective, randomized and nonrandomized) evaluating RARC. Partial cystectomy, prostate-sparing cystectomy, salvage surgery, urachal cancer, cystectomy for benign condition, concomitant/combined procedures, and single-case reports were excluded from our review. Intraoperative and perioperative outcomes (including complications) as well as pathologic, intermediate-term oncologic, and functional results were evaluated. The development of the systematic reviews followed the PRISMA guidelines [8].

The systematic review and the personal experiences of expert surgeons provided context for the development of individual presentations by attendees of the Pasadena meeting. Over the course of the 2-d conference, the Pasadena Consensus Panel (PCP) developed best practice recommendations that were incorporated into a draft manuscript reviewed by all panelists.

3. Evidence synthesis

3.1. *Perioperative management*

Perioperative management of patients undergoing RARC is identical to that for patients undergoing ORC. The PCP considered systematic review data, recent high-quality studies, and existing guidelines of the European Association of Urology (EAU) [9], the International Consultation on Urological Diseases [10], and the Enhanced Recovery After Surgery (ERAS) Society [11]. The evidence-based guidelines for pre- and postoperative care after RC developed by ERAS, in particular, were judged to provide an excellent framework for the specifics of care before, during, and after RARC [11,12]. The use of ERAS protocols has been shown to reduce both length of stay (LOS; <30%) and postoperative complications (<50%) in colorectal surgeries [13]. Only limited studies exist in cystectomy patients, but they suggest that these protocols can shorten LOS without increased morbidity [11].

3.1.1. *Patient selection*

The indications for RARC are identical to ORC (Table 1). There are no absolute contraindications for RARC, although the PCP noted that certain cases should be performed only by experienced surgeons because of their complexity (Table 2). Although no accepted definition of *experienced surgeon* exists, the PCP noted that data on surgeon learning curves with RARC suggest that at least 20–30 procedures are needed to flatten the initial learning curve. Surgeons should strive to achieve the parameters established by existing surgical criteria, such as those in the 2014 EAU guidelines [9], before attempting higher risk cases.

RARC is feasible in patients who have had prior surgery or radiation, although the decision to proceed is determined primarily by surgeon experience. In cases of prior pelvic radiation, the posterior dissection can be very challenging, and care must be taken to avoid rectal injury. In patients with prior lower intra-abdominal surgery, extensive laparoscopic lysis of adhesions may be needed for port placement.

3.1.2. *Preoperative considerations*

Before surgery, patients should be counseled extensively about the risks and benefits of RARC including the possibility of conversion to an open approach.

3.1.2.1. Neoadjuvant chemotherapy. Given the relatively high risk of disease recurrence following RC, attempts have been made to improve survival with neoadjuvant chemotherapy

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