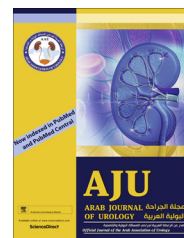




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PELVIC SURGERY
REVIEW

Robot-assisted radical cystectomy with intracorporeal urinary diversion – The new ‘gold standard’? Evidence from a systematic review



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KEYWORDS

Radical cystectomy;
Intracorporeal urinary diversion;
Extracorporeal urinary diversion;
Robotics;
Bladder cancer

ABBREVIATIONS

EORTC, European Organisation for the Research and Treatment of Cancer;
HR, hazard ratio;
HRQOL, health-related quality of life;

Abstract Objective: To investigate whether a totally intracorporeally radical cystectomy (RC) can be considered the new ‘gold standard’ in bladder cancer, as open RC (ORC) is the current ‘gold standard’ for surgical treatment of muscle-invasive and high-grade non-muscle-invasive bladder cancer. However, robot-assisted radical cystectomy (RARC) is becoming the preferred surgical approach in many centres as it seems to maintain the oncological control of open surgery whilst offering improved perioperative benefits.

Materials and methods: A review of the literature was conducted using the Pubmed/MEDLINE, ISI Web of Knowledge and Cochrane Databases to identify studies that included both ORC and RARC with intracorporeal and extracorporeal urinary diversion (UD) published up to July 2017.

Results: Evidence from four single-centre randomised controlled trials and now the multicentre Randomized Trial of Open versus Robotic Cystectomy (RAZOR) trial demonstrate the oncological equivalence of RARC to ORC. The only convincing evidence for the superiority of RARC is in the area of blood loss and transfusion rates. However, the UD procedure in these trials was performed extracorporeally and, to realise the full benefits of RARC, a totally intracorporeal approach is needed. Intracorporeal UDs (ICUDs) have been shown to be technically feasible

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(EC)(IC)UD, (extra-corporeal) (intracorporeal) urinary diversion;
 LOS, length of stay;
 (N)MIBC, (non-) muscle-invasive bladder cancer;
 RAZOR, Randomized Trial of Open versus Robotic Cystectomy;
 (O)(RA)RC, (open) (robot-assisted) radical cystectomy;
 RCT, randomised controlled trial

by a few expert centres and have demonstrated some improved short-term perioperative outcomes compared to extracorporeal UD.

Conclusions: Although initial outcomes appear promising, RARC with ICUD is far from gaining ‘gold standard’ status. Further studies are needed to confirm that outcomes are reproducible widely. Furthermore, the benefits of a totally intracorporeal approach must be confirmed in randomised controlled trials.

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Introduction

Open radical cystectomy (ORC) with extended pelvic lymph node dissection and urinary diversion (UD) is the current ‘gold standard’ management for muscle-invasive (MIBC) and high-grade non-muscle-invasive bladder cancer (NMIBC). However, the procedure is associated with considerable morbidity, with complication rates in the region of 30–70% [1]. As a result, there has been growing interest in the use of the robot to reduce the morbidity of the procedure. The last decade has seen an increase in the use of robot-assisted RC (RARC), which is now the standard of care in many institutions including our own. In the USA, it is estimated that the use of this approach has increased from 0.7% in 2002 to 18.5% in 2012 [2]. However, RARC is far from gaining widespread adoption due to concerns regarding cost-effectiveness, increased operative times, and the lack of long-term oncological and functional outcomes [3]. Short-term data from prospective randomised controlled trials (RCTs) have shown that RARC achieves similar oncological and functional outcomes as ORC and offers some improved perioperative outcomes but at a higher cost. Most of the morbidity of RC stems from the UD rather than the removal of the bladder itself; yet in the majority of RARCs, the UD is performed extracorporeally through a mini-laparotomy. Several institutions have demonstrated the feasibility of a totally intracorporeal UD (ICUD), which spares the patient a mini-laparotomy and thus offers the advantages of reduced intraoperative blood loss, bowel exposure, and postoperative pain [4]. In this invited review, we summarise the current evidence for RARC and ICUD with respect to oncological, perioperative and functional outcomes.

Material and methods

A review of the literature was conducted using the Pubmed/MEDLINE, ISI Web of Knowledge and

Cochrane Databases to identify studies that included both ORC and RARC with ICUD and extracorporeal UD (ECUD) published up to July 2017. Only publications in English were considered. The following keywords were used in the databases: ‘open radical cystectomy’, ‘robot-assisted radical cystectomy’, ‘intracorporeal’, ‘extracorporeal’ and ‘urinary diversion’. The list of generated articles was screened by title and abstract by N.L. and then relevant full papers were scrutinised (Fig. 1).

RARC

Oncological outcomes

The long-term oncological outcomes of ORC for MIBC are well established [5]. In contrast, despite almost two decades of robotic surgery, 5-year survival rates following RARC have only become available relatively recently. In the largest multi-institutional study to date, the International Robotic Cystectomy Consortium reported 5-year recurrence-free, cancer-specific and overall survival rates of 67%, 75% and 50%, respectively [6], which are comparable to ORC series [5,7,8].

To date, four single-centre RCTs have compared ORC and RARC [9–12]. Oncological outcomes from these trials have been reported using surrogate markers, namely surgical margin status and lymph node yield. None of these trials have shown a significant difference in the rate of positive surgical margins between modalities, which range from 0% to 15% for RARC and 0–10% for ORC [9–12]. Furthermore, although lymph node yields vary from trial to trial, there was no statistically significant difference in lymph node yield between RARC and ORC. Until recently, these studies provided the only evidence demonstrating the oncological equivalence of RARC to ORC. However, we now have preliminary results from the highly anticipated Randomized Trial of Open versus Robotic Cystectomy (RAZOR)

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