

# Outcomes of Intracorporeal Urinary Diversion after Robot-Assisted Radical Cystectomy: Results from the International Robotic Cystectomy Consortium



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## Abbreviations and Acronyms

ASA® = American Society of Anesthesiologists®

BMI = body mass index

DSS = disease specific survival

ECUD = extracorporeal urinary diversion

ICUD = intracorporeal urinary diversion

IRCC = International Robotic Cystectomy Consortium

LND = lymph node dissection

OS = overall survival

RARC = robot-assisted radical cystectomy

RFS = recurrence-free survival

**Purpose:** This study aimed to provide an update and compare perioperative outcomes and complications of intracorporeal and extracorporeal urinary diversion following robot-assisted radical cystectomy using data from the multi-institutional, prospectively maintained International Robotic Cystectomy Consortium database.

**Materials and Methods:** We retrospectively reviewed the records of 2,125 patients from a total of 26 institutions. Intracorporeal urinary diversion was compared with extracorporeal urinary diversion. Multivariate logistic regression models using stepwise variable selection were fit to evaluate preoperative, operative and postoperative predictors of intracorporeal urinary diversion, operative time, high grade complications and 90-day hospital readmissions after robot-assisted radical cystectomy.

**Results:** In our cohort 1,094 patients (51%) underwent intracorporeal urinary diversion. These patients demonstrated shorter operative time (357 vs 400 minutes), less blood loss (300 vs 350 ml) and fewer blood transfusions (4% vs 19%, all  $p < 0.001$ ). They experienced more high grade complications (13% vs 10%,  $p = 0.02$ ). Intracorporeal urinary diversion use increased from 9% of all urinary diversions in 2005 to 97% in 2015. Complications after this procedure decreased significantly with time ( $p < 0.001$ ). On multivariable analysis higher annual cystectomy volume (OR 1.02, 95% CI 1.01–1.03,  $p < 0.002$ ), year of robot-assisted radical cystectomy (2013–2016 OR 68, 95% CI 44–105,  $p < 0.001$ ) and American Society of Anesthesiologists® score less than 3 (OR 1.75, 95% CI

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1.38–2.22,  $p < 0.001$ ) were associated with undergoing intracorporeal urinary diversion. The procedure was associated with a shorter operative time of 27 minutes ( $p = 0.001$ ).

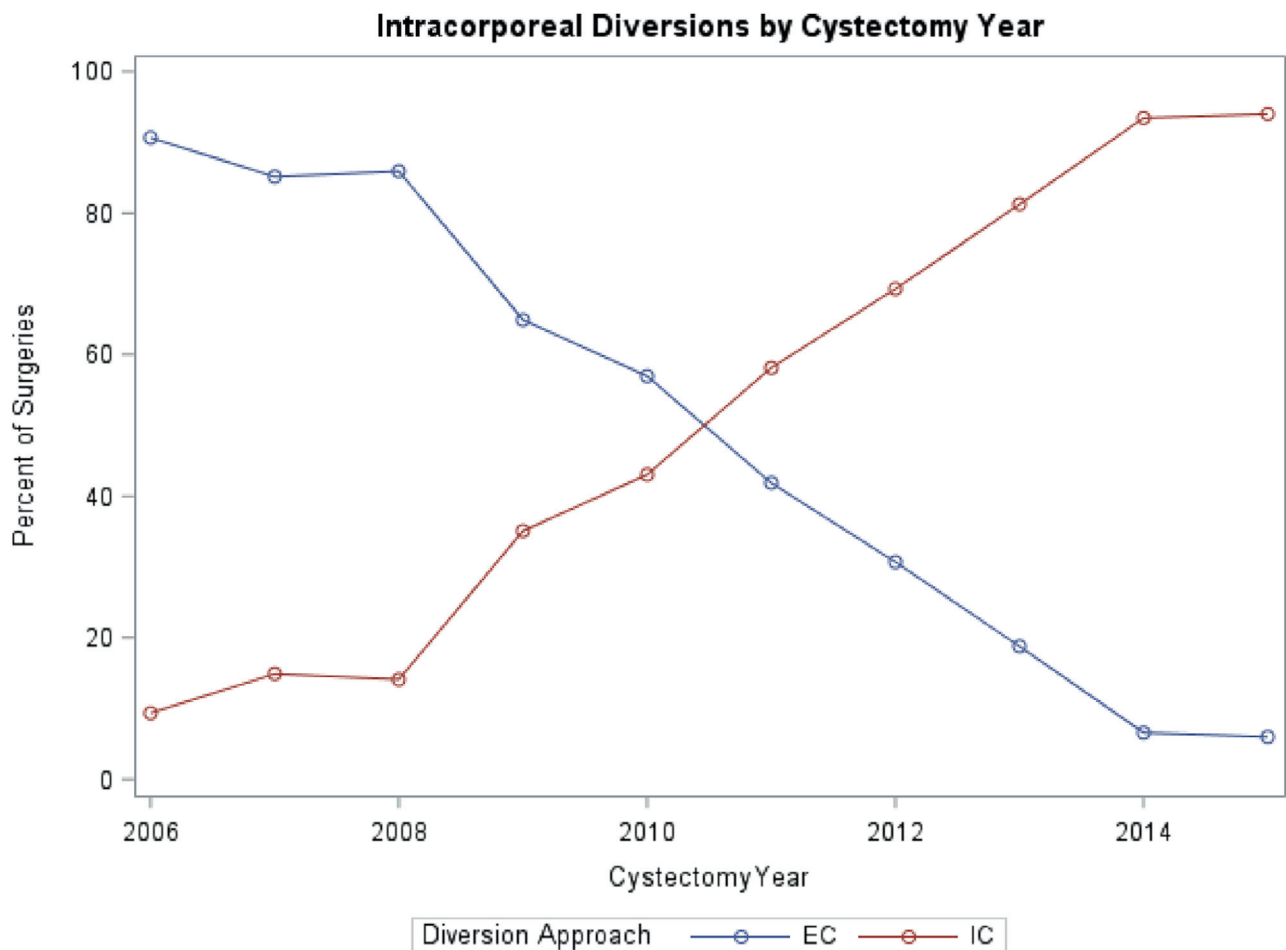
**Conclusions:** The use of intracorporeal urinary diversion has increased in the last decade. A higher annual institutional volume of robot-assisted radical cystectomy was associated with intracorporeal urinary diversion as well as with shorter operative time. Although intracorporeal urinary diversion was associated with higher grade complications than extracorporeal urinary diversion, they decreased with time.

**Key Words:** urinary bladder, urinary diversion, robotic surgical procedures, cystectomy, outcome and process assessment (health care)

THE use of RARC has witnessed a paramount increase in the last decade.<sup>1</sup> While RARC has been associated with improved perioperative outcomes such as blood loss, hospital stay and improved convalescence, much of the criticism has been attributable to the lack of tactile feedback and the longer operative time, especially with the intracorporeal approach to urinary diversion and also with construction of a continent reservoir. Consequently most surgeons have performed a hybrid

approach with extracorporeal construction of urinary diversion.

Expertise and continuous refinement of the technique has decreased operative time and cost.<sup>2</sup> Consequently operative time has been identified as a quality measure for the surgical performance of RARC.<sup>3,4</sup> In a recent study RARC and an intracorporeal ileal conduit were shown to be technically feasible without jeopardizing outcomes.<sup>3,5</sup> On the other hand, intracorporeal neobladders are more



**Figure 1.** Diversion approach by year. ICUD (IC) increased from 9% in 2005 to 97% in 2015 for 11% increase per year ( $p < 0.001$ ). EC, ECUD.

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