Readmission After Robot-assisted Radical Cystectomy: Outcomes and Predictors at 90-Day Follow-up

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OBJECTIVE To characterize the outcomes and predictors of readmission after robot-assisted radical cystectomy (RARC) during early (30-day) and late (31-90—day) postoperative periods.

METHODS We retrospectively evaluated our prospectively maintained RARC quality assurance database of 272 consecutive patients operated between 2005 and 2012. We evaluated the relationship of readmission with perioperative outcomes and examined possible predictors during the postoperative period.

RESULTS Overall 30- and 90-day mortality was 0.7% and 4.8%, respectively, with 25.5% patients readmitted within 90 days after RARC (61% of them were readmitted within 30 days and 39% were readmitted between 31—90 days postoperatively). Infection-related problems were the most common cause of readmission during early and late periods. Overall operative time and obesity were significantly associated with readmission ($P = .034$ and .033, respectively). Body mass index and female gender were independent predictors of 90-day readmission ($P = .004$ and .014, respectively). Having any type of complication correlated with 90-day readmission ($P = .0045$); meanwhile, when complications were graded on the basis of Clavien grading system, only grade 1-2 complications statistically correlated with readmission ($P = .046$). Four patients needed reoperation (2 patients in early "for appendicitis and adhesive small bowel obstruction" and 2 in late "for ureteroenteric stricture" readmission); meanwhile, 6 patients needed percutaneous procedures (4 patients in early "1 for anastomotic leak and 3 for pelvic collections" and 2 "for pelvic collections and ureterocutaneous fistula" in late readmission).

CONCLUSION The rate of readmission within 90 days after RARC is significant. Female gender and body mass index are independent predictors of readmission. Outcomes at 90 days provide more thorough results, essential to proper patient counseling. UROLOGY 83: 350—356, 2014. © 2014 Elsevier Inc.

In 2012, an estimated 73,510 new cases of bladder cancer were diagnosed.[1] Radical cystectomy (RC) and pelvic lymphadenectomy are considered the standard of care for clinically localized muscle-invasive bladder cancer and high-grade recurrent non—muscle-invasive bladder cancer.[2]

Despite refinements of surgical technique, open RC still carries significant morbidities.[3-6] In an attempt to accelerate return to baseline quality of life, incorporation of clinical care pathways and innovation of robot-assisted radical cystectomy (RARC) have both been used in recent years.[7,8] RARC has been reported to be associated with reduced blood loss, lower transfusion rate, and a reduced need for postoperative analgesia. Postoperative patients have recovered bowel function quite rapidly. Furthermore, length of hospital stay (LOS) has decreased despite associated morbidities.[6,9,10] Improvement in clinical care pathways, development of the minimally invasive approach, and the emphasis of insurance policies for early patient discharge have all been established to manage costs. Annual cost of readmissions to the Medicare program was estimated at $15 billion, which led to recommendations of reducing payments by 3% in the year 2015 for readmissions.[11]

Methods of reporting complications might affect the complications rates after RARC. Most reported complications are limited to immediate postoperative period. Encompassed within this period are surgery-related complications, health care utilization, economic impact of readmissions, and any further treatment provided beyond the immediate postoperative period. In our study, we

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Table 1. Description of preoperative, pathologic, and perioperative variables

Preoperative Characteristics	Readmission No.	Readmission Yes	Total	*P* Value
Overall	203 (74.5%)	69 (25.5%)	272 (100%)	
Age, y				
Mean/SE	69/0.7	69/1.3	69/0.6	.87
Median, range	69 (36-90)	71 (38-86)	70 (36-90)	
Sex, n (%)				
Male	157 (77%)	47 (68%)	204 (75%)	.15
BMI, kg/m^2				
Mean/SE	28.4/0.4	30.1/0.7	28.9/0.3	.03
Obese (>30), n (%)	69 (35%)	32 (46%)	101 (38%)	.09
ASA score ≥3, n (%)	93 (46%)	34 (49%)	126 (47%)	.68
Prior abdominal surgery, n (%)	112 (55%)	45 (65%)	157 (58%)	.16
Preoperative chemotherapy, n (%)	21 (10%)	3 (4%)	24 (9%)	.34
Preoperative radiation, n (%)	5 (3%)		5 (2%)	.56
Creatinine	1.2/0.0	1.1/0.1	1.2/0.0	.47
Smoking	159 (80%)	54 (81%)	213 (80%)	.000
Follow-up (mo)				
Mean/SE	20.7/1.3	15.3/1.8	19.4/1.1	.05
Median, range	15 (2-71.6)	11 (1.2-73)	14 (0.2-73)	
Pathologic outcomes				
Pathologic tumor stage ≤T2, n (%)	101 (52%)	35 (52%)	136 (52%)	1.000
Pathologic tumor stage >T2, n (%)	94 (48%)	32 (48%)	126 (48%)	
Soft tissue margin positive, n (%)	15 (7.4%)	3 (4%)	18 (7%)	.58
Lymph node yield				
Mean/SE	24/0.8	22/1.4	23/0.7	.28
Lymph node positive, n (%)	49 (24%)	18 (26%)	67 (25%)	.75
Perioperative outcomes				
Estimated blood loss (mL)				
Mean/SE	489/33.3	485/50.6	487/27.9	.89
Median, range	400,20-3900	350,0.0-2500	400,0.0-3900	
Overall operative time (min)				
Mean/SE	365.0/6.7	400.5/14.6	373.9/6.3	.052
Median (range)	361 (0.0-698)	391 (182-827)	369 (0.0-827)	
Intraoperative transfusion, n (%)	30 (15%)	7 (10%)	37 (14%)	.42
Diversion type, n (%)				
Ilea conduit	187 (92%)	61 (88%)	248 (91%)	.34
Others	16 (8%)	8 (12%)	24 (9%)	
Diversion location, n (%)				
Intracorporeal	88 (43%)	37 (54%)	125 (46%)	.46
Extracorporeal	112 (55.2%)	32 (46.4%)	144 (52.9%)	
ICU stay, d				
Mean/SE	1.5/0.2	1.9/0.3	1.6/0.2	.006
Median, range	1.0 (0.0-26)	1 (0.0-11)	1 (0.0-26)	
Hospital stay, d				
Mean/SE	11.0/0.6	11.2/1.0	11.0/0.5	.37
Median, range	8 (4-50)	9 (4-58)	8 (4-58)	
Complications (%)				
Clavien 1-2	53	70	58	<.001
Clavien 3-5	17	24	19	
Discharge				
Home	179 (90%)	59 (88%)	238 (90%)	.66
Health care facility	19 (10%)	8 (12%)	27 (10%)	
Death within 30 d	2 (1.0%)		2 (0.7%)	.326
Death within 90 d	8 (3.9%)	5 (7.2%)	13 (4.8%)	

ASA, American Society of Anesthesiologists; BMI, body mass; ICU, intensive care unit; SE, standard error.

sought to understand the reasons for readmission after RARC in early and late postoperative periods and examined variables to identify the predictors for readmission.

PATIENTS AND METHODS

We retrospectively evaluated our prospectively maintained RARC quality assurance database of 272 consecutive patients operated between 2005 and 2012 by a single surgeon (K.A.G.) at our institution. Data were analyzed for demographics (age, gender, body mass index [BMI], American Society of Anesthesiologists [ASA] score, and smoking), preoperative disease-specific characteristics (preoperative serum creatinine, neoadjuvant chemotherapy, prior abdominal surgery, and preoperative radiation), operative variables (estimated blood loss, LOS, intensive care unit [ICU] stay, and type and technique of diversion; intracorporeal vs extracorporeal), pathologic