Understanding Simple Cystectomy for Benign Disease: A Unique Patient Cohort With Significant Risks

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OBJECTIVE To explore patient characteristics and complications of simple cystectomy for benign disease. A secondary objective was to compare these parameters to those in radical cystectomy.

METHODS Current Procedural Terminology codes were used to identify patients within the National Surgical Quality Improvement Program who underwent cystectomy (2005-2014). International Classification of Disease, Ninth Revision, codes were used to classify patients with benign or malignant diagnoses. Perioperative complications (30 days) were identified and logistic regression analysis was used to identify factors associated with morbidity.

RESULTS We identified 389 patients who had a cystectomy for benign diagnosis. A total of 235 patients (60.4%) had complications. The most frequently reported complication was bleeding (requiring a transfusion within 72 hours) in 150 patients (38.6%). Other complications were wound infection (63, 16.2%), respiratory complication (29, 7.5%), wound dehiscence (8, 2.1%), renal complication (9, 2.3%), cardiovascular complication (6, 1.5%), and postoperative deep vein thrombosis (8; 2.1). On multivariate analysis, diabetes (odds ratio 1.9, $P = .04$) and smoking (odds ratio 1.8, $P = .03$) were associated with increased odds of any complication. Compared with those with cystectomy for malignancy, this cohort was younger, with higher American Society of Anesthesiologists scores, and chronic kidney disease stages, and the complication risk was similar (60.4% vs 57.7%, $P = .3$).

CONCLUSION Our data suggest that the benign and radical cystectomy patients are different patient populations, with benign patients being younger with a higher American Society of Anesthesiologists class. Even in benign disease, cystectomy is not without risk, and patients should be counseled accordingly. UROLOGY 110: 239–243, 2017.

Cystectomy with urinary diversion is most commonly performed for invasive bladder cancer. It is viewed as a complex procedure with a high morbidity and mortality rate of 25%-45% and 3%, respectively.[1] Another indication is simple cystectomy for severe refractory voiding dysfunction. Due to the relative rarity of this procedure, there are limited data on this cohort, mostly limited to small case series.[2-7] Furthermore, there are few studies comparing outcomes of cystectomy for benign and malignant conditions. Understanding postoperative outcomes is essential in preoperative planning and counseling. The objective was to explore patient characteristics and complications of simple cystectomy for benign disease. A secondary objective was to compare these parameters to those in radical cystectomy.

MATERIALS AND METHODS

Current Procedural Terminology (CPT) codes were used to identify patients within the National Surgical Quality Improvement Program who underwent a complete cystectomy (2005-2014). We included the CPT code for cystectomy complete, cystectomy complete with bilateral pelvic lymph node dissection, cystectomy complete with ureterosigmoidostomy or ureterocutaneous transplantations with bilateral pelvic lymphadenectomy, cystectomy complete with ureteroileal conduit or sigmoid bladder, cystectomy complete with ureteroileal conduit or sigmoid bladder with bilateral pelvic lymphadenectomy, and cystectomy complete with continent diversion. The American College of Surgeons National Surgical Quality Improvement Program Participant Use File (ACS-NSQIP PUF) is a multi-institutional, Health Insurance Portability and Accountability Act-compliant data source of perioperative surgical data. The data are collected on randomly assigned patients on a rotating schedule to allow equal representation of operative days. A trained surgical clinical reviewer at each site validates the data before submission. The data are audited through site visits to ensure interinstitutional reliability. The data are available to all participating sites.[8,9]

International Classification of Disease, Ninth Revision, codes were used to classify patients with a benign or malignant diagnosis. Diagnoses that were unclear or relating to malignancies outside

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the genitourinary (GU) tract were excluded. Comorbidities included diabetes mellitus, obesity status (body mass index >30), chronic obstructive pulmonary disease (COPD), American Society of Anesthesiologists (ASA) classification, smoking status, cardiovascular disease (congestive heart failure, myocardial infarction, percutaneous coronary intervention, angina, and peripheral vascular disease), hypertension (HTN), chronic kidney disease (CKD) stage, neurologic impairment (hemiplegic, paraplegic, and quadriplegic), wound infection, steroid use, bleeding disorder, or preoperative transfusion. Perioperative complications (30-day) were identified and categories include wound infection, other infection, wound dehiscence, respiratory complication, renal complication, neurologic complication, cardiovascular complication, bleeding complication, postoperative deep vein thrombosis (DVT), and reoperation. Logistic regression analysis was used to identify factors associated with morbidity. Differences in patient characteristics and complications between simple and radical cystectomy groups were assessed using chi-squared test for categorical variables and the Mann-Whitney *U* test for continuous variables. All data analyses were done using IBM SPSS software, Version 23 (IBM Corporation, Armonk, NY).

RESULTS

We identified 5195 patients who underwent cystectomy by the CPT code. Of these patients, 147 were excluded for diagnoses that were unclear or related to malignancies outside of the GU tract. The remaining 5048 patients who underwent cystectomy were included, 4659 (92%) for GU malignancy and 389 (8%) for benign diagnosis.

Patient characteristics of the radical and simple cystectomy subjects are presented in Table 1. Compared with those with cystectomy for malignancy, this cohort was younger, with higher ASA scores and CKD stages. In the benign cohort, fewer had COPD, HTN, or smoking history. Far more patients had preoperative wound infections (Table 1). The operative time was shorter for simple cystectomy (327 + 125 vs 353 + 124 minutes, P <.001), and there was no difference in postoperative hospital stay with a median of 8 days for both groups with an interquartile range of 6-11 for benign and 6-10 for malignant.

In the benign subset, 235 patients (60.4%) had their complications recorded. The most frequently reported complication was bleeding (requiring a transfusion within 72 hours) in 150 patients (38.6%). Other complications were wound infection (63, 16.2%), respiratory complication (29, 7.5%), wound dehiscence (8, 2.1%), renal complication (9, 2.3%), cardiovascular complication (6, 1.5%), and postoperative DVT (8, 2.1%). The reoperation rate was 5.7%. Five patients (1.3%) had a recorded death in the database (Table 2).

Risk factors for complications were analyzed including the variables age, diabetes, obesity, cardiovascular disease, COPD, smoking status, ASA class, HTN, CKD stage, preoperative wound infection, steroid use, and bleeding disorder. On multivariate analysis, diabetes (odds ratio [OR] 1.9, P = .04) and smoking (OR 1.8, P = .03) were associated with increased odds of any complication (Table 3). Steroid use was significantly associated with risk of wound dehiscence (OR 6.7, P = .025). Smoking status neared significance for complication of wound infection (OR 1.8, P = .051). There were no patient characteristics that were associated with increased odds of other infectious complications, respiratory complications, renal complications, cardiovascular complications, bleeding, postoperative DVT, or reoperation.

Table 1. Characteristics of simple and radical cystectomy cohorts

	Simple	Radical	*P* Value*
Age (y)			
Median (IQR)	62 (48-72)	68 (62-76)	<.001
BMI (kg/m^2)			
Median (IQR)	28 (24.0-33.8)	28.0 (24.7-31.6)	.83
Median ASA score	3 (3-3)	3 (2-3)	.003
ASA score, n (%)			.02
1	2 (0.5)	24 (0.5)	
2	69 (18)	1163 (25)	
3	291 (75)	3197 (68)	
4	26 (7)	275 (6)	
Diabetes mellitus, n (%)	66 (17)	940 (20)	.13
Cardiovascular disease, n (%)	10 (3)	218 (5)	.06
COPD, n (%)	18 (5)	397 (9)	.007
Smoker, n (%)	76 (20)	1139 (24)	.03
Hypertension, n (%)	201 (51)	2853 (61)	<.001
CKD stage, n (%)			<.001
1	124 (34)	779 (17)	
2	122 (33)	2056 (45)	
3	84 (23)	1514 (33)	
4	23 (6)	140 (3)	
5	17 (5)	33 (1)	
Wound infection, n (%)	49 (13)	34 (1)	<.001

ASA, American Society of Anesthesiologists; BMI, body mass index; CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease; IQR, interquartile range.
* Calculated by chi-squared tests for categorical and the Mann-Whitney *U* test for continuous variables.