Cystectomy With Urinary Diversion for Benign Disease: Indications and Outcomes

David James Osborn, Roger R. Dmochowski, Melissa R. Kaufman, Douglas F. Milam, Stephen Mock, and W. Stuart Reynolds

OBJECTIVE To analyze what factors contribute to a worse outcome after cystectomy and urinary diversion for benign disease as measured by the frequency of severe complications.

METHODS A retrospective review was performed of consecutive patients who underwent a cystectomy for benign disease. The primary outcome was the type and severity of complications, according to Clavien-Dindo scale.

RESULTS A total of 139 patients underwent cystectomy with diversion for benign diseases over the study period. The most common indications for surgery were spinal cord injury (32%) and radiation damage to the bladder (18%). The average preoperative age-adjusted Charlson comorbidity index was 4.6. Seventy-four patients (53%) underwent supratrigonal cystectomy. Mean surgery duration was 344 ± 103 minutes, and the mean estimated blood loss was 476 ± 379 mL. The most common complications were perioperative blood transfusion, prolonged ileus, and pyelonephritis. Seventy-nine patients (57%) had a complication grade ≥II on the Clavien-Dindo scale. This did not differ based on indication for surgery, age, gender, body mass index, age-adjusted Charlson comorbidity index, estimated blood loss, or type of cystectomy. After adjustment, only duration of surgery in 10-minute increments (odds ratio, 1.07; 95% confidence interval, 1.02-1.12; $P = .007$) was associated with an increased incidence of serious complication.

CONCLUSION Most of the patients experience some complication after cystectomy and urinary diversion for benign indications. Duration of surgery is an important variable that can affect outcome. UROLOGY 83: 1433–1437, 2014. Published by Elsevier Inc.

Cystectomy for benign disease is typically the last treatment option for patients with severe lower urinary tract symptoms that have not responded to less invasive forms of treatment. The American Urologic Association guideline for the diagnosis and treatment of overactive bladder lists urinary diversion as a treatment option for rare patients with severe refractory symptoms after first-, second-, and third-line treatment options have failed.[1] There are 3 general methods of cystectomy for benign disease: a cystoprostatectomy (males only), in which the bladder and the prostate are removed to the level of the proximal urethra; a simple cystectomy (also known as a subtrigonal cystectomy), in which the entire bladder is removed to the level of the bladder neck; and the supratrigonal cystectomy, in which the bladder just superior to the trigone is removed. This last method is theorized to decrease operative time and morbidity.[2]

Some authors have used a urinary diversion without a cystectomy to treat pain and lower urinary tract symptoms in patients with benign disease.[3-5] However, when just a urinary diversion is performed, complications related to the retained bladder commonly occur.[4,5]

Although the literature covering this topic is sparse, the most common benign indications for a cystectomy and urinary diversion described are a neurogenic bladder (from spinal cord injury, multiple sclerosis, and spina bifida), radiation damage to the bladder, interstitial cystitis (chronic pain), and severe incontinence.[2,6-9] As the primary goal of a cystectomy for benign disease is to improve quality of life, minimizing patient complications is of paramount importance. The primary purpose of this study was to analyze the incidence of complications and investigate which factors contribute to a worse outcome after surgery as measured by the frequency of moderate (Clavien-Dindo grade II) and severe complications (Clavien-Dindo grade III-V).

MATERIALS AND METHODS

After obtaining institutional review board approval (IRB number 130290), electronic medical records were queried for the following current procedural terminology (CPT) codes over the 10-year study period of 2003-2012: 51590 (cystectomy complete with ureteroileal conduit), 51596 (cystectomy complete

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From the Department of Urology, Vanderbilt University Medical Center, Nashville, TN

Reprint requests: David James Osborn, M.D., Department of Urology, Vanderbilt University Medical Center, A1302 Medical Center North, Nashville, TN 37232-2765. E-mail: david.osborn@vanderbilt.edu

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Table 1. Preoperative characteristics, comorbid medical conditions, and indications for surgery

Preoperative Variables	Study Population	Clavien-Dindo Grade <2	Clavien-Dindo Grade ≥2	*P* Value
Patients	139	60	79	
Age (y)	52.2 ± 16.4	50.5 ± 17.4	53.5 ± 15.7	.29
BMI (kg/m^2)	27.7 ± 6.7	26.5 ± 5.5	28.7 ± 7.5	.05
AACCI	4.6 ± 3.7	3.7 ± 3.1	5.2 ± 4.0	.01
Female	82 (59)	35 (43)	47 (57)	.89
Diabetes	38 (27)	12 (32)	26 (68)	.09
Renal disease	17 (12)	7 (41)	10 (59)	.86
Prior myocardial infarction	7 (5)	3 (43)	4 (57)	.99
History of congestive heart failure	6 (4)	2 (33)	4 (67)	.62
Liver disease	5 (4)	1 (20)	4 (80)	.29
Anticoagulation*	8 (6)	1 (12)	7 (88)	.08
Primary indication for surgery				
Neurogenic bladder from spinal cord injury	45 (32)	24 (53)	21 (47)	.09
Radiation damage to bladder	25 (18)	7 (28)	18 (72)	.09
Severe incontinence	17 (12)	8 (47)	9 (53)	.73
Neurogenic bladder from multiple sclerosis	14 (10)	4 (29)	10 (71)	.24
Neurogenic bladder from spina bifida	10 (7)	4 (40)	6 (60)	.83
Vesicovaginal fistula	8 (6)	3 (37)	5 (63)	.74
Interstitial cystitis (chronic bladder pain)	7 (5)	3 (43)	4 (57)	.99
Impaired contractility	5 (4)	2 (40)	3 (60)	.88
Neurogenic bladder from stroke (brain tumor)	4 (3)	4 (100)	0 (0)	.02
Urethral stricture disease	4 (3)	1 (25)	3 (75)	.46

AACCI, age-adjusted Charlson comorbidity index; BMI, body mass index.
Data represented as mean ± standard deviation, n (%).
* Anticoagulation was defined as a heparin window for patients on warfarin or clopidogrel bisulfate.

with continent diversion), 51570 (cystectomy complete), 51550 (cystectomy partial, simple), and 51555 (cystectomy partial, complicated). The query was limited to the 5 attending surgeons in the female pelvic medicine and reconstructive surgery department (thus eliminating surgeries performed by oncologic urologists). A secure database was created with all patients identified by the CPT search.

The demographic information collected included age at the time of surgery and gender. In addition to body mass index, information was gathered for comorbid medical conditions such as pelvic radiation, diabetes, neurologic disease, stroke, malignancy, heart disease, and renal disease. Data were also collected on related symptoms, such as urinary incontinence and chronic bladder pain. Data for the entire operative course and follow-up visits were available in the electronic medical record of our institution. Outside medical records were available only if they were scanned into the electronic medical record. Outcome measures were focused on the patients' operative course, hospital stay, and complications. A prolonged ileus was defined as the absence of bowel function (negative flatus) for >5 days after surgery.

The age-adjusted Charlson comorbidity index (AACCI) was used to assess a patient's preoperative health.[10] In addition, the Clavien-Dindo scale was used to grade postoperative complications.[11] Patients were excluded from this study if their surgery was performed for malignancy, if they did not undergo a cystectomy with urinary diversion, or if they did not have at least 30 days of follow-up. Lastly, information about the type of insurance at the time of cystectomy was also collected.

Statistical Analysis

Initial statistical analysis of continuous variables was performed using the *t* test (mean comparison test), and initial analysis of categorical variables was carried out using the Pearson chi-square test. The eligible cohort of patients was separated into 2 groups: patients who experienced a Clavien-Dindo complication ≥grade II and those patients who did not. The associations between the occurrence of a Clavien-Dindo complication ≥grade II and age, gender, AACCI, operative time, estimated blood loss, indication for surgery, and type of surgery were assessed with multivariate logistic regression.

RESULTS

Of the 163 patients identified in the initial collection of medical record numbers based on the screened CPT codes, 139 patients met eligibility for inclusion. Three patients were excluded because the primary indication for the surgery was malignancy, 1 patient was excluded because she did not have at least 1 month of follow-up, and 20 patients were excluded because they underwent only a partial cystectomy without urinary diversion.

The mean age was 52.2 years (18-82 years), 82 patients (59%) were women, and the median follow-up was 13 months (range 1-124 months; interquartile range, 29). Of note, 17 patients had between 30 and 90 days of follow-up. The overall AACCI was 4.6. Table 1 displays the results of the comorbid medical conditions and preoperative characteristics overall and in the 2 study groups. In addition, analysis revealed the following distribution of the type of insurance: 50 patients (36%) had Medicaid, 45 patients (32%) had private insurance, 43 patients (31%) had Medicare, and 1 patient (1%) was self-paying.

The indication of severe incontinence contained those patients who underwent the surgery because of incontinence and did not fit into another indication category. In the vesicovaginal fistula indication group, 5 patients had a history of radiation. Also, all the patients with