Single Center Experience with Secondary Urinary Diversion after Initial Radical Cystectomy and Primary Urinary Diversion

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Abbreviations and Acronyms

IC = interstitial cystitis
ONB = orthotopic neobladder
RC = radical cystectomy
UC = urothelial carcinoma
UD = urinary diversion

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Purpose: We evaluate the risk of a second urinary diversion in patients after radical cystectomy and urinary diversion.

Materials and Methods: We retrospectively analyzed the records of 1,614 patients who underwent urinary diversion from January 1986 to March 2009. The primary diversion was neobladder in 71.9% of male patients and 42.3% of female patients, conduit in 17.6% and 38.6%, and ureterocutaneostomy in 9.5% and 12.5%, respectively. The outcome of interest was the need for a second urinary diversion.

Results: A total of 51 second/third diversions in 48 patients formed the study population. Mean time from primary to second diversion was 57 months (range 0 to 286). The indication for cystectomy was oncologic in 28 patients and nononcologic in 23. Conversions were continent to continent (14), incontinent to continent (14), continent to incontinent (13) and incontinent to incontinent (10). Twelve patients had tumor recurrence impacting the initial diversion. In 8 patients the indication was abscess necrosis of the diversion or radiogenic damage. Six patients with renal failure required conversion. All patients with conversion from incontinent to continent had a strong desire to avoid a stoma. Four patients died perioperatively and short bowel syndrome developed in 1 patient.

Conclusions: A second urinary diversion was required in 1.8% of patients with bladder cancer with a heterogenous etiology vs 25% when the underlying disease was nononcologic. Only men with apex sparing cystectomy and women whose bladder had not been removed achieved excellent functional outcomes for later orthotopic reconstruction.

Key Words: urinary diversion, reoperation, cystectomy

The combination of an extensive extirpative procedure with urinary tract reconstruction in an elderly population with comorbidities leads to significant perioperative morbidity. It is common knowledge that the dominant driver of the complications of this operation is not the extirpative component (RC) but rather the reconstructive component (UD). While complications after urinary diversion in the immediate postoperative period have been well documented,[1–4] information regarding the long-term consequences associated with UD has been limited.[5–8] Since a second diversion is an infrequent problem after RC, there is a limited number of events at most single institutions. As a result there are few data in the literature to characterize the risk of a second diversion. We evaluated this

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risk in patients who underwent cystectomy in the setting of bladder cancer or a nononcologic disease and determined differences in the requirement of a secondary diversion, reporting what is to our knowledge the largest series of patients.

MATERIALS AND METHODS

Between January 1986 and March 2009, 1,614 patients (female 385 and male 1,231) underwent UD at our institution. Patient characteristics were entered into a prospectively maintained institutional review board approved database. The patient database was consistently curated, maintained and updated by a dedicated manager. All patients were proactively and meticulously followed at specified intervals by telephone calls and/or mailed correspondence to document the disease course. Details may be obtained from previous publications of our RC/UD series.[2,8]

With the exception of patients with an elective indication (dislike of initial UD), indications for a second/third UD were imperative (table 1). Cases of short bowel syndrome and vitamin B12 deficiency were excluded from study. However, no other preoperative tests specific to patients with a second/third UD were ordered, such as small bowel follow-through.

To assess lower urinary tract function in detail, voiding and continence diaries and a standardized questionnaire were completed at 6 and 12 months after surgery, and annually thereafter. The questionnaire assessed the presence and degree of daytime and nighttime urinary incontinence, described as few drops, a spoonful, half a glass and almost all; frequency of daytime and nighttime incontinence episodes; number of pads used and whether the pads were dry, humid or wet; and whether patients sensed when they lost urine during the day and night. The use of 1 safety pad per day or less was classified as continent, ie excellent.

Table 1. *Indications for second diversion in 48 patients*

	No.
Oncologic:	
Upper tract recurrence/involvement:	
T pouch, solitary kidney, transitional cell carcinoma of ureter	1
Neobladder, local recurrence infiltrating ureter	1
Mainz II, recurrence at ureteral implantation site	1
Urethral recurrence/second tumor:	
Neobladder, male	2
Neobladder, female, Morbus Paget urethra	1
Neobladder, female, obstructive local recurrence	1
Recurrence invading diversion/tumor in diversion/invasion:	
Neobladder, male	2
Colon conduit, adenocarcinoma of colon	1
Augmentation with neobladder, transitional cell carcinoma of trigone	1
Neobladder, vaginal carcinoma	1
Emergency:	
Pelvic abscess	2
Ischemia of mesenteric artery	1
Radiogenic damage	1
Necrosis of conduit	3
Necrosis of neobladder	1
Malfunction of initial diversion:	
Persisting symptoms from IC after supratrigonal RC	1
Persistent pain (Mainz II)	1
Ureteroenteric stricture	2
Conduit stenosis	5
Conduit stricture/neurogenic tract	1
Renal failure:	
Obstruction	6
Dislike of initial diversion:	
RC for benign disease	7
RC for malignant disease + no evidence of disease for more than 12 mos	5

RESULTS

The primary UD in our series of 1,614 patients was an ileal neobladder in 71.9% of male patients and 42.3% of female patients, a conduit in 17.6% and 38.6%, and (trans)ureterocutaneostomy in 9.5% and 12.5%, respectively, while continent pouches and diversions to the intestinal tract were limited to a small number of patients (table 2).

In the complete series of 1,614 patients treated with RC the underlying disease was nononcologic in 92 patients (5.7%), mainly defunctionalized bladders from radiation therapy, IC, neurologic diseases, or as a reaction to cytotoxic medication. Overall 94.3% of patients had UC. There were 25 females and 23 males for a total of 51 second/third UDs among 48 of the 1,614 patients (3.2%). In 29 of 48 patients RC and first diversion were performed at our institution, while we performed the second/third diversions in 41 of the 48 patients. The primary UD of the reoperation group was performed at a mean patient age of 50 years (range 2 to 81), compared to a mean age in the complete series of 65 years. Mean patient age at the second UD was 56 years (range 18 to 81), with a mean interval between first and second UD of 57 months (range 0 to 286). Mean survival after the second UD was 95 months.

Table 2. *Primary UD in 1,614 patients treated with RC and/or UD*

	No. Male	No. Female	Totals
Continent:			
Ileal neobladder	878	146	1,024
Trigone sparing + ileal augmentation/neobladder	5	16	21
Colonic neobladder	2		2
Kock pouch	2	4	6
Mainz pouch I	1		1
Ileal augmented rectal bladder	1	12	13
Mainz pouch II	1	7	8
Incontinent:			
Ureterointestinal implantation	2	1	3
Ileal conduit	206	137	342
Colonic conduit	8	11	19
Skin flap conduit	1		1
Pyeloileostomy	4		4
Cutaneous ureterostomy	42	21	63
Transureterocutaneostomy	75	27	102
None	3	1	4
Ureteral ligation + nephrostomy	1		1
Totals	1,231	383	1,614