

Patients with an Orthotopic Low Pressure Bladder Substitute Enjoy Long-Term Good Function



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Abbreviations and Acronyms

CIC = clean intermittent self-catheterization

eGFR = estimated glomerular filtration rate

IDC = indwelling catheter

OBS = orthotopic bladder substitute

PVR = post-void residual urine

RC = radical cystectomy

SPC = suprapubic catheter

UTI = urinary tract infection

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Purpose: Orthotopic bladder substitution has been performed on a regular basis for more than 30 years and yet data on long-term functional outcomes are still lacking.

Materials and Methods: We evaluated 181 men and 19 women who underwent radical cystectomy and urinary diversion with ileal orthotopic bladder substitution from 1985 to 2004 and who had 10 years or more of followup.

Results: Median age at radical cystectomy was 63 years (IQR 57–69). Median followup was 167 months (IQR 137–206). Daytime and nighttime continence rates peaked 24 months postoperatively and decreased slightly thereafter during almost 2 decades. At 10, 15 and 20 years daytime continence rates were 92%, 90% and 79%, and nighttime continence rates were 70%, 65% and 55%, respectively. During the day and at night fewer than 3% and 10% of patients, respectively, had urine loss 100 ml or greater at any time 10 years or longer after surgery. At 10 and 20 years 11 of 200 patients (6%) and 1 of 29 (3%), respectively, had to perform clean intermittent self-catheterization. After an initial post-operative decrease in the estimated glomerular filtration rate the subsequent decrease was less than 1 ml/minute/1.73 m² per year. A total of 81 complications were observed in 42 of the 200 patients (21%) 10 years or longer after radical cystectomy with pyelonephritis as the most frequent cause.

Conclusions: Patients who survive up to 20 years after radical cystectomy and diversion with an ileal orthotopic bladder substitution may enjoy satisfactory urinary continence and retain the ability to void spontaneously while experiencing no more than a physiological decrease in renal function.

Key Words: urinary diversion, elderly, cystectomy, quality of life, urinary incontinence

SEVERAL studies of short-term to midterm functional outcomes after urinary diversion with an ileal OBS have been published, of which some included long-term survivors.^{1–4} However, because these series included patients with short-term to midterm followup, the long-term functional outcomes, and the true incidence and characteristics of late complications in patients who live 10 years or longer

with an ileal OBS remain unknown. We report a consecutive series of 200 patients who were regularly followed for 10 years or longer after urinary diversion with an ileal OBS.

PATIENTS AND METHODS

Patient Selection

From April 1985 to December 2004 RC and urinary diversion with an ileal OBS

were performed at our institution in 474 patients, including 39 women. Other forms of urinary diversion were created in 451 patients during the study period. The 264 patients who died less than 10 years postoperatively and the 10 who underwent conversion to an ileal conduit or a continent catheterizable reservoir were excluded from study, leaving 181 men and 19 women with a median age at RC of 63 years (IQR 57–69) for final analysis (table 1 and fig. 1). Median followup was 167 months (IQR 137–206).

RC was performed for malignant tumors in 194 patients and for benign conditions in 6. All patients were continent or experienced only occasional drops of urinary incontinence. They could void spontaneously prior to RC. Selection criteria for OBS candidates were described previously.⁵

Surgical Technique

The surgical technique for nerve sparing RC was described previously.^{2,6,7} Briefly, in men the nerve fibers were commonly spared on at least 1 side in the dorsomedial bladder pedicle, ie lateral to the seminal vesicles, in the prostatovesical angle and in the paraprostatic neurovascular bundle. In women the autonomic nerve fibers in the dorsomedial bladder pedicle, ie around the cervix uteri, were commonly spared on at least 1 side and dissection ran along the anterolateral paravaginal plane no further dorsal than the 2 or the 10 o'clock position.

The surgical technique for the ileal reservoir was previously described.⁵ Briefly, the ileal reservoir and the afferent tubular segment are constructed from a 54 to 56 cm long ileal segment that is resected approximately 25 cm proximal to the ileocecal valve. The distal 40 to 45 cm are detubularized and reconstructed into a low pressure reservoir.⁸ The proximal 14 to 16 cm of ileum are left intact and the ureters are implanted in its most proximal part using the open refluxing Nesbit technique.⁹

Table 1. Cause of death in patients with ileal OBS

Cause of Death	No. Survival (%)	
	Less Than 10 Yrs	10 Yrs or Greater
Overall	264	61
Urological:	163 (62)	4 (7)
Local and/or metastatic urothelial Ca	153 (58)	3 (5)
Urosepsis (ascending pyelonephritis)	1 (1)	—
Urosepsis (obstructive pyelonephritis)	2 (1)	1 (2)
Prostate Ca	4 (2)	—
Renal failure (hydronephrotic kidney)	1 (1)	—
Renal Ca (urothelial + collecting duct)	2 (1)	—
Nonurological:	101 (38)	57 (93)
Malignancy	30 (11)	12 (20)
Cardiovascular	27 (10)	30 (49)
Pulmonary	14 (5)	4 (7)
Neurological	4 (2)	5 (8)
Cerebrovascular	8 (3)	—
Suicide	5 (2)	2 (3)
Gastrointestinal	8 (3)	3 (5)
Unknown origin sepsis	2 (1)	—
Unknown	3 (1)	1 (2)

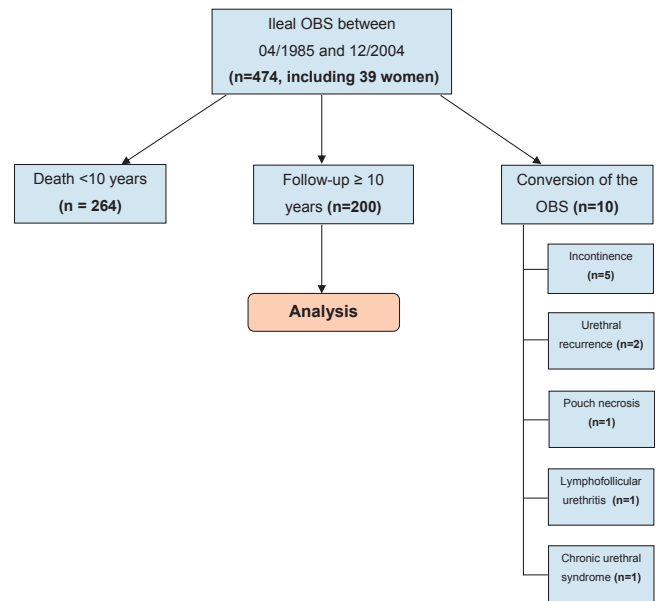


Figure 1. CONSORT diagram shows numbers of patients assigned, excluded and analyzed.

Patient Followup and Data Collection

All patients were followed prospectively according to an institutional followup protocol^{7,10} at 1, 3 and 6 months, every 6 months up to 5 years and annually thereafter. Laboratory tests included venous blood gas analyses for determining base excess. Residual urine was measured by transabdominal ultrasound and/or in-and-out catheterization. Patients with documented significant PVR (greater than 50 ml) underwent urethrocytoscopy with a rigid endoscope to detect any mechanical outlet obstruction.

Continence Definition

Continence was defined as complete dryness or loss of no more than a few drops of urine once or twice a week. Urinary continence and pad use were assessed prospectively at 6-month intervals using standardized questionnaires.¹¹

Renal Function Evaluation

eGFR was calculated using the Cockcroft-Gault equation, glomerular filtration rate in ml per minute = 1.23 (women 1.03) \times body weight \times (140 – age)/serum creatinine.

Bacteriuria and UTI Definitions

Bacteriuria was defined as 10^3 to 10^4 cfu. UTI was defined as a urine culture showing 10^5 cfu or greater. Two or more positive urine cultures during the same year were considered recurrent UTIs. UTI with 10^5 or greater bacteria was treated according to results of the antibiogram.¹²

Statistical Analysis

Daytime and nighttime continence rates as well as eGFR at different time points were depicted graphically. Complications were categorized into diversion related and cystectomy related, and tabulated. The chi-square test

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