25 Years of Experience With 1,000 Neobladders: Long-Term Complications

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Purpose: We analyzed the long-term complications (greater than 90 days postoperatively) in a large, single center series of patients who underwent cystectomy and substitution with an ileal neobladder.

Materials and Methods: A total of 1,540 radical cystectomies were performed at our center between January 1986 and September 2008. Of the patients 1,013 received an ileal neobladder. Only the 923 patients with followup longer than 90 days (median 72 months, range 3 to 267) were included in analysis. All long-term complications were identified. The complication rate was calculated using the Kaplan-Meier method.

Results: The overall survival rate was 65.5%, 49.8% and 28.3% at 5, 10 and 20 years, respectively. The overall long-term complication rate was 40.8% with 3 neobladder related deaths. Hydronephrosis, incisional hernia, ileus or small bowel obstruction and feverish urinary tract infection were observed in 16.9%, 6.4%, 3.6% and 5.7% of patients, respectively, 20 years postoperatively. Subneovesical obstruction in 3.1% of cases was due to local tumor recurrence in 1.1%, neovesicourethral anastomotic stricture in 1.2% and urethral stricture in 0.9%. Chronic diarrhea was noted in 9 patients. Vitamin B12 was substituted in 2 patients. Episodes of severe metabolic acidosis occurred in 11 patients and 307 of 923 required long-term bicarbonate substitution. Rare complications included cutaneous neobladder fistulas in 2 cases, and intestinal neobladder fistulas, iatrogenic neobladder perforation, spontaneous perforation and necrotizing pyocystis in 1 each.

Conclusions: Even in experienced hands the long-term complication rate of radical cystectomy and neobladder formation are not negligible. Most complications are diversion related. The challenge of optimum care for these elderly patients with comorbidities is best mastered at high volume hospitals by high volume surgeons.

Key Words: urinary bladder, urinary diversion, urinary bladder neoplasms, cystectomy, complications

Abbreviations and Acronyms

RCX = radical cystectomy

UTI = urinary tract infection

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RADICAL cystectomy has been assessed as the most difficult surgery of any urological procedure. RCX is also the most difficult robotic procedure and more so when diversion is done completely intracorporeally. The risk of RCX is based not only on the technical challenges of the procedure but also on the nature of the patients needing RCX. Decreased morbidity, rapid postoperative rehabilitation, limited hospital stay and cost containment are difficult to achieve while the early RCX morbidity rate remains 11% to 68%.[1–3] The literature is replete with reports of perioperative complications but there is a paucity of

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data on long-term complications. The difficulty in comparing complications across series is manifold. The lack of standardization hampers the progress of decreasing the morbidity and complications associated with RCX. RCX and urinary diversion are 2 steps of 1 operation. However, groups have reported the complications of RCX, ignoring that most complications are diversion related.[3] This may seem semantic but it is not.

We present grades and rates of long-term complication in 1,000 neobladders during 25 years at 1 high volume center. All patients were operated on by high volume surgeons under standardized conditions. We report indications for surgery, operative technique (only 1 type of diversion), postoperative care, complications and comorbidity.

MATERIALS AND METHODS

Study Population

We established a computerized database containing comprehensive clinical and pathological information on all 1,540 patients who underwent RCX between January 1986 and September 2008 at our institution. In 281 patients there was an absolute contraindication to a neobladder and so 1,013 received a neobladder. The clinical and pathological characteristics of all 1,540 patients were recently reported in a study providing detailed information on preoperative assessment, followup, specific patient preparation, operative technique and postoperative care.[3]

A total of 923 patients had a minimum followup of 3 months (tables 1 and 2). Mean body mass index was 26.2 kg/m^2 (range 15.2 to 41.9), mean American Society of Anesthesiologists score was 2.2 and mean Charlson index was 3.0. The overall survival rate at 5, 10, 15 and 20 years was 65.5% in 423 evaluable patients, 49.8% in 185, 37.0% in 80 and 28.3% in 19, respectively. Median followup was 72 months (range 3 to 267 months). Followup examinations were done with special regard to complications, neobladder function and oncological outcome. Followup every 3 months for the first 2 years included at least history, clinical examination, abdominal ultrasound, urinalysis, venous blood gas analysis (base excess), serum parameters (urea and creatinine), urine cytology and chest x-ray. At 6-month intervals computerized tomography of the abdomen and urethroscopy were performed. Yearly followup included vitamin B12 determination and plain x-ray of the kidneys, ureters and bladder. In all patients who were not seen at our institution for followup we performed yearly questionnaire surveys and received information on each inpatient treatment during followup. For this analysis we performed additional telephone interviews with patients who did not complete the questionnaires. No patient withdrew from the study during followup.

Table 1. *Patient characteristics*

	No. Pts
Gender:	
F	128
M	795
Age:	
Less than 40	23
40–49	75
50–59	235
60–69	391
70–79	191
80 or Greater	8
Benign underlying disease	22
Malignancy:	
Bladder tumor	882
Transitional cell Ca	825
Other bladder tumors	57
Other malignant tumors	19

Table 2. *Malignant bladder tumor maximum stage*

	No. pN0 cM0	No. pN+ cM0	No. pNX cM1 or pM1	Total No.
pTa/is/1	232	4	1	237
pT2a/b	322	44	2	368
pT3a/b	127	82	5	214
pT4a/b	35	26	2	63
Totals	716	156	10	882

Complications

All complications and the date of onset were recorded, defined and graded by an established 5-grade, 11-domain modification of the original Clavien system.[4] The Clavien system focuses mainly on the therapeutic consequences of a complication, emphasizing the level of intervention required to deal with it. The system is usually used to report complications in a defined time frame, eg 90 days for perioperative complications. The incidence of long-term complications increased with time. Since followup ranged from 3 to 216 months, we calculated the incidence of complications using the Kaplan-Meier-method. To evaluate correlations between risk factors and the long-term complication rate we used univariate analysis with the chi-square test.

Long-term functional results, such as incontinence, urinary retention, and male and female sexual function, will be reported separately.

RESULTS

Upper Tract Safety

Ureteroileal stenosis developed 3 to 160 months postoperatively in 102 of the 923 patients (11.05%). Using the Kaplan-Meier method the overall rate at 5, 10, 15 and 20 years was 10.8%, 13.8%, 16.9% and 16.9%, respectively. Within 2 years after surgery a third of hydronephrosis cases were caused by tumor compression or infiltration of the ureter. The nontumor related stenosis rate at 5, 10 and 15 years was 7.8%, 11.0% and 13.6%, respectively. A total of 18 patients with hydronephrosis in the long term had dilatation preoperatively.

Until 1996 an antirefluxing technique was used in 361 patients. Since then, a refluxing Wallace tech-