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Original Article

# Long-Term Outcome of Orthotopic Neobladder Reconstruction after Radical Cystectomy – Sohag Experience

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## ABSTRACT

**Objective:** To assess the long-term outcome of neobladder reconstruction after radical cystectomy.

**Patients and Methods:** In this retrospective study we evaluated the records of 90 patients (70 males and 20 females) subjected to radical cystectomy and orthotopic neobladder reconstruction at Sohag University Hospital, Sohag, Egypt, between January 1999 and January 2006. The age of the patients ranged from 35 to 70 years with a median age of 42 years. All patients had invasive bladder carcinoma: squamous cell carcinoma in 55, transitional cell carcinoma in 33 and adenocarcinoma in 2 patients. Thirty-five patients had a W-neobladder with serous-lined extramural ureteral reimplantation, 35 patients had Studer pouch and 20 patients had colonic (sigmoid) neobladder reconstruction. After surgery all patients were followed up for a period of 6 to 84 months (median 45 months) in order to evaluate the functional and oncological outcome.

**Results**: Thirty (33.3%) patients developed early complications (defined as within 30 days from surgery). Chest infection and wound infection occurred in 3 (3.3%) and 5 (5.6%) patients, respectively, and was treated with antibiotics. Eight patients developed paralytic ileus which was managed with naso-gastric tube drainage. Re-operation was required in 8 patients: 3 required re-suturing of the abdominal incision, bleeding occurred in 2, while 2 developed intestinal obstruction and one ureterointestinal leakage. Pouch leakage was observed in 6 patients. Late complications occurred in 18 (20%) patients. Re-operation was necessary in 15 cases: 4 with stone formation in the neobladder, 3 with incisional hernia, 5 with a stricture at the ureterovesical junction, one with vesicourethral stricture and 2 with vesicovaginal fistula. Complete continence during day and night was achieved in 63 patients (70%). The daytime continence rate was 86.6% (87 patients), while 24 patients (26.7%) had nocturnal incontinence and 3 patients (3.3%) were fully incontinent. Four patients (4.4%) used clean intermittent self-catheterization. Twenty-seven (30%) patients developed recurrence of cancer within 4 to 30 months from surgery, among them 3 with urethral recurrence, 20 with local pelvic recurrence and 4 with distant metastases. All 27 patients with tumor recurrence died from disease progression during the follow-up period; 4 patients died from causes not related to the operation.

**Conclusion:** Orthotopic neobladder reconstruction provides acceptable continence rates and has an acceptable early and late complication rate. We therefore recommend that all suitable patients undergoing cystectomy should have an option of orthotopic neobladder reconstruction.

**Key Words:** orthotopic diversion, neobladder, cystectomy

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## INTRODUCTION

The first accepted form of urinary diversion, ureterosigmoidostomy, remained popular during the first half of the last century, before its many complications (mainly infection and metabolic disturbances) were recognized[1,2]. Later, the ileal conduit became the preferred method of urinary diversion[3,4]. Simultaneously, attempts were made to develop a continent urinary diversion with an ileocecal segment[5]. Gil Vernet[6] anastomosed the ureters to the ileum of an ileocolic segment. The colon was anastomosed to the urethra after radical cystoprostatectomy. However, these operations were unpopular as they were more complex, and continence rates were low. Kock's continent ileal pouch is a popular form of reconstruction, but the presence of a stoma and the need for regular catheterization of the reservoir are major draw-backs[3,7,8].

Several principles must be observed to provide continent urinary diversion[3]: A reservoir of adequate volume is necessary and the neobladder should have a low pressure. Detubularized segments of bowel and the use of small bowel provide lower pressures. There should be no stoma and the patient should be able to void with control. The ureteric anastomosis should have an antireflux component, especially with the large volumes present in the neobladder. Potency can be maintained by preserving the neurovascular bundle. The ideal outcome is for a patient to function sexually, void volitionally and empty completely.

## PATIENTS AND METHODS

In this retrospective study we evaluated the records of 90 patients (70 males and 20 females) subjected to radical cystectomy and orthotopic neobladder reconstruction at Sohag University Hospital, Sohag, Egypt, between January 1999 and January 2006. The patients' age ranged from 35 to70 years with a median age of 42 years. All patients had invasive bladder carcinoma: squamous cell carcinoma was found in 55, transitional cell carcinoma in 33 and adenocarcinoma in 2 patients. Thirty-five patients had a W-neobladder with serous-lined extramural ureteral re-implantation, 35 patients had Studer pouch and 20 patients had colonic (sigmoid) neobladder reconstruction. After surgery all patients were followed up for a period of 6 to 84 months (median 45 months) in order to record early (within 30 days following surgery) and late complications and to evaluate the functional and oncological outcome. During the first year our patients were followed up monthly, then every 3 months. Daytime continence was defined as 'good' (dry with no protection), 'fair' (pad for occasional stress incontinence) or 'poor' (wet), and nighttime continence as 'good' (dry with no protection), 'fair' (dry with one awakening) or 'poor' (wet and leakage during sleep). Patients with 'good' and 'fair' outcomes were considered to be continent; whereas those with 'poor' results were considered incontinent.

## RESULTS

Thirty (33.3%) patients developed early complications. Chest infection and wound infection occurred in 3 (3.3%) and 5 (5.6%) patients, respectively, and was treated with antibiotics. Eight patients developed paralytic ileus which was managed with naso-gastric tube drainage. Re-operation was required in 8 patients: 3 of them required re-suturing of the abdominal incision, bleeding occurred in 2 cases (bleeding from the obturator vein in one and from the intestinal mesentery in the other), while 2 cases developed intestinal obstruction and one patient ureterointestinal leakage. Intestinal obstruction was managed by exploration and freeing of the intestinal loop from adhesion. Pouch leakage was observed in 6 patients and was treated conservatively by prolongation of urethral catheterization in 4 and by temporary urinary diversion with percutaneous nephrostomy in the remaining 2 patients (Table 1).

Late complications occurred in 18 (20%) patients. Re-operation was necessary in 15 cases: 4 with stone formation in the neobladder, 3 with incisional hernia, 5 with

**Table 1:** Early complications.

| Re-Operation | % | Total No. | Sigmoid bladder | Studer | Complication | W-bladder |
|---|---|---|---|---|---|---|
| - | 3.3% | 3 | 2 | 0 | Chest infection | 1 |
| - | 5.6% | 5 | 2 | 1 | Wound infection | 2 |
| - | 8.9% | 8 | 4 | 1 | Paralytic ileus | 3 |
| 2 | 2.2% | 2 | 0 | 1 | Bleeding | 1 |
| 3 | 3.3% | 3 | 2 | 1 | Wound dehiscence | 0 |
| 1 | 1.1% | 1 | 0 | 1 | Ureterointestinal leakage | 0 |
| 2 | 2.2% | 2 | 0 | 1 | Intestinal obstruction | 1 |
| - | 6.7% | 6 | 1 | 2 | Pouch leakage | 3 |
| 8 (8.8%) | 33.3% | 30 | 11 | 8 | Total | 11 |

**Table 2:** Late complications

| Re-Operation | % | Total No. | Sigmoid bladder | Studer | W-bladder | Complication |
|---|---|---|---|---|---|---|
| 3 | 6.7% | 6 | 2 | 1 | 3 | Incisional hernia |
| 4 | 4.4% | 4 | 0 | 2 | 2 | Stones in neobladder |
| 5 | 5.6% | 5 | 1 | 3 | 1 | Ureterovesical stricture |
| 1 | 1.1% | 1 | 0 | 1 | 0 | Vesicourethral stricture |
| 2 | 2.2% | 2 | 0 | 1 | 1 | Vesicovaginal fistula |
| 15 (16.6%) | 20.0% | 18 | 3 | 8 | 7 | Total |

a stricture at the ureterovesical junction, one with vesicourethral stricture and 2 with vesicovaginal fistula. The stones were managed by litholapaxy in 2 patients and by open surgery in the other 2. Incisional hernia was treated with hernioplasty. The strictures at the ureterovesical junction were managed by exploration and re-implantation of the ureter into the neobladder, while the vesicourethral stricture was repaired by visual internal urethrotomy. The vesicovaginal fistulae were repaired by transvaginal repair in one patient and by abdominal repair in the other (Table 2).

Complete continence during day and night was achieved in 63 patients (70%). The daytime continence rate was 86.6% (87 patients), while 24 patients (26.7%) had nocturnal incontinence and 3 patients (3.4%) were fully incontinent. Four patients (4.4%) used clean intermittent self-catheterization.

Twenty-seven (30%) patients developed recurrence of cancer within 4 to 30 months from surgery, among them 3 with urethral recurrence, 20 with local pelvic recurrence and 4 with distant metastases. All 27 patients with tumor recurrence died from disease progression during the follow-up period; 4 patients died from other causes not related to the operation.

## DISCUSSION

Cystectomy is the standard treatment for patients with localized invasive bladder cancer. Various methods of continent urinary diversion have recently been developed. The main aim of these procedures is to obtain a continent reservoir with high capacity, low pressure and no reflux[9].

**Table 3:** Overview of results of some series of orthotopic neobladder reconstruction.

| Author | Complications | | | | Continence | | CISC |
|---|---|---|---|---|---|---|---|
| | Nighttime | Daytime | Leakage | Late | Early | | |
| - | 78.0% | 98.0% | 6.0% | 30.0% | 31.0% | Kulkarni et al.[10] | |
| 6.0% | 95.0% | 96.0% | 7.7% | 32.0% | 39.0% | Hautmann et al.[11] | |
| 4.0% | 86.0% | 93.0% | | 20.0% | 24.0% | Hollowell et al.[13] | |
| 9.0% | 66.0% | 95.0% | - | 48.0% | 38.0% | Joniau et al.[12] | |
| - | 78.0% | 99.0% | - | 13.5% | 23.0% | Meyer et al.[14] | |
| - | 84.0% | 92.0% | - | 47.0% | 12.0% | Studer and Zingg[18] | |
| - | 83.0% | 97.0% | - | 32.9% | 11.0% | Cancrini et al.[15] | |
| - | 80.0% | 93.0% | - | 20.0% | 9.0% | Abol-Enein and Ghoneim[16] | |
| 4.4% | 70.0% | 86.6% | 6.0% | 20.0% | 33.3% | Present Study | |

CISC = clean intermittent self-catheterization.

In the present study, early complications occurred in 30% of the patients, but surgical intervention was required in 8.8% only. This rate is similar to that described by other authors[10-14] (Table 3). Pouch leakage which Hautmann et al.[11] (7.7%) and Kulkarni et al.[10] (10%) reported to be the most common neobladder-related complication, was noted in 6.7% of our patients, and all cases were managed conservatively. However, the early complications were generally self-limited and managed conservatively with no influence on the overall outcome.

In the present study late complications occurred in 20% of the patients, while re-operation was required in 16.6% in the form of ureteral re-implantation in cases of strictures at the ureterovesical junction and visual internal urothrotomy for vesicourethral strictures. The rate of late complications in the present series is similar to that reported by other authors[10,11,13,15,16]. (Table 3) Neobladder calculi and incisional hernia are long-term complications not related to the neobladder.

Continence following orthotopic neobladder substitution is influenced mainly by bladder outlet factors, such as atraumatic sphincter preparation, preservation of sufficient functional urethral length and no kinking at the bladder outlet, which can lead to urinary retention. Continence also depends on reservoir-related factors such as detubularization of the intestinal segment, type of bowel used, spherical reservoir shape and maximum bladder capacity, because a lower pressure in the large-capacity neobladder results in a better degree of resistance across the continence zone, thereby improving continence.[17] All patients in the present series void via their native urethra following a strict regimen of voiding every 4 hours while sitting in a squatting position and exerting pressure on the suprapubic area to ensure complete emptying of the neobladder.

The daytime and nighttime continence rates in this study were 86.6% and 70%, respectively, which is similar to the rates reported in the literature[10-14,16,18] (Table 3). The median time to achieve full continence was about 3 months (2-12) which is also similar to other series.[19]

In the present study 4.4% of the patients used clean intermittent self-catheterization (CISC). This rate compares favorably to those found by Hautmann et al. (6%)[11], Joniau et al. (9%)[12] and Hollowell et al. (4%)[13].

In conclusion, orthotopic neobladder substitution has emerged as the procedure of choice after radical cystectomy and has acceptable complication rates in properly selected patients. In the present series the majority of patients undergoing orthotopic neobladder reconstruction were continent, avoiding the need for a cutaneous stoma or external urostomy appliance, thus helping them to retain their body image. The results show acceptable continence rates and no greater morbidity and mortality than with the present standard treatment of an ileal conduit. Despite these advantages, careful patient selection is required, as orthotopic neobladder reconstruction requires complex surgery but has an acceptable early and late complication rate. It provides satisfactory continence rates without compromising the cure rate. We therefore recommend that all suitable patients undergoing cystectomy should have an option of orthotopic neobladder reconstruction.

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