Outcome of orthotopic sigmoid versus ileal neobladder reconstruction

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Abstract

Introduction: Radical cystectomy with orthotopic urinary diversion is considered the gold standard for treatment of muscular invasive bladder cancer or high-risk nonmuscular invasive bladder cancer. The choice of orthotopic neobladder reconstruction depends on the clinical outcomes of it and should be planned with the patients, especially the risk of incontinence.

Methods: This study included 52 Egyptian patients underwent radical cystectomy and orthotopic neobladder reconstruction with sigmoid (25 patients) and ileal (27 patients) segments. Postoperative clinical outcomes between the sigmoid and ileal neobladder groups were compared.

Results: In the present study, 12 intraoperative complications (6 in each group) and 19 postoperative complications (17 in sigmoid and 15 in ileal group) occurred; however, there was no significant difference in the incidence of intraoperative and postoperative complications between both groups. There were no significant differences in the continence status and spontaneous voiding between both groups. There were no significant differences in maximal flow rate and voided volume between both groups. Night voiding frequency in the ileal neobladder patients was significantly smaller than sigmoid neobladder patients. Free flowery showed a significant difference of voiding time and volume in favor of sigmoid neobladder group. Maximum urethral pressure and urethral closing pressure were significantly higher in ileal neobladder group.

Conclusions: Both types of neobladder reconstruction resulted in comparatively satisfactory outcomes; however, the voiding function in sigmoid neobladder group appeared to be more favorable than that in ileal neobladder group.

Keywords: Cancer bladder, continence, cystectomy, ileal neobladder, sigmoid neobladder, urodynamic

INTRODUCTION

Radical cystectomy for bladder and urinary diversion is considered the gold standard for the treatment of muscular invasive bladder cancer or high-risk nonmuscular invasive bladder cancer. Urinary diversion was usually classified into three categories: orthotopic neobladder, ileal or sigmoid conduit, and cutaneous ureterostomy. Orthotopic neobladder reconstruction became a common urinary diversion following cystectomy for cancer bladder. The potential benefits of neobladder surgery over creation...
of an ileal conduit include better quality of life and avoiding stoma with its cosmetic, psychological, and other complications.

The selection of a neobladder as the urinary diversion of choice requires that patients have normal renal and liver functions and are likely to be compliant with neobladder training. Extensive preoperative counseling about the risk of orthotopic neobladder diversion should be planned with the patients, especially the risk of incontinence (daytime or nighttime) and hypercontinence.

The W-ileal neobladder with subserosal ureteral tunnel has the best functional results of the different ileal neobladders. Diurnal and nocturnal continence ranged from 97.3% to 80%, respectively. Complete detubularization, double folding, and taeniectomy are major modifications applied to the sigmoid neobladder to lower its resting pressure and improve its functional characters. The objective of the study is to compare continence rates and urodynamic parameters among patients who received orthotopic bladder substitution after radical cystoprostatectomy using sigmoid neobladder with taeniectomy versus W-ileal neobladders with extramural subserosal tunnel.

Objectives
The objective of the study is to compare the clinical outcomes of sigmoid and ileal neobladders following radical cystectomy.

METHODS
From 2008 to 2015, 98 male patients underwent radical cystoprostatectomy for bladder carcinoma and orthotopic continent urinary diversion at our institutes. Only 66 patients met our inclusion criteria and agreed to involve in our study, 35 with a sigmoid neobladder and 31 with an ileal neobladder. From this, only 52 male patients who passed 12 months after radical cystoprostatectomy and orthotopic neobladder construction were completed the present study. They divided into two groups: 25 patients with sigmoid neobladder (Group A) and 27 patients with W-ileal neobladder (Group B) [Figure 1].

Patient selection
Inclusion criteria were as follows: Male gender, invasive bladder cancer, negative posterior urethral biopsy, and general fitness for radical cystoprostatectomy with orthotopic neobladder construction with serum creatinine <1.8 mg%. Exclusion criteria were as follows: pelvic recurrence and pelvic irradiation. Data of all patients were collected and evaluated in concerning with clinical assessment pre- and postoperatively including continence status and operative findings, timing of surgery, type of intestinal segment used, type of ureterointestinal anastomosis, and intra- and postoperative complications.

Methods
Technique of ileal W-neobladder construction as described by Abol-Enein and Ghoneim, 2001, was used: an ileal segment of 40 cm is disconnected and opened entirely at the antimesenteric border. The medial limbs are sealed with a running suture and the two lateral flaps are coapted with a seromuscular running suture to create the two serous-lined intestinal troughs. The spatulated ureters are stented and anastomosed to the intestinal mucosa. The tunnel is closed over the ureters, to create antireflux mechanism. The anterior wall is closed side to side with a running suture, and then, the pouch is anastomosed to the urethra after creation of an opening in the most caudal point.

The technique of sigmoid neobladder construction as described by Khalaf, 2009, was used: after proper colonic preparation, a U-shaped sigmoid segment was isolated, fully detubularized, and the medial taenia (omentalis) excised. The segment was incised along its lateral taenia (libralis) and the medial borders of U sutured together to create U-shaped plate. Ureters were implanted through two submucous tunnels or ureteral inlay in taeniectomy bed. The U-shaped plate was folded upward on itself and the two layers sutured to close the pouch, and a dependent ureteral colic anastomosis was done.

All patients were followed up for urodynamic testing and evaluation of the voiding diary concerning, diurnal or nocturnal incontinence and its pattern, urinary frequency (diurnal and nocturnal), sensation for voiding (absent or sense of fullness), obstructive voiding
symptoms, the need for pads, occurrence of urine retention, and the need for clean intermittent catheterization (CIC).

All patients were evaluated laboratory through urine analysis, urine culture and sensitivity, and serum creatinine. Imaging included pelvi-abdominal ultrasound to assess newly developed back pressure and amount of postvoiding residual urine – more than 100 cc is considered significant – and ascending and voiding poucho-urethrogram to assess average capacity, reflux and its degree, and residual urine. Urodynamic evaluation included free flowmetry to assess voided volume, voiding time, and maximum flow rate (Q max.); filling pouchometry to assess maximum pouch capacity, pouch pressure at maximum capacity, pouch contractions (its amplitude, timing, and associated leakage), Valsalva-related leakage (to assess stress incontinence), timing of filling sensations, and compliance; and pressure flow study to assess voided volume, voiding time and residual volume, and flow rate and pattern; and urethral pressure profile (UPP) was done in cases where there was Valsalva-related leakage.

Statistical analysis
Data will be analyzed using Microsoft Excel 2010 and statistical package SPSS version 18.0 for Windows (SPSS Inc., Chicago, IL, USA). Sigmoid group data and W-ileal group will be expressed as mean ± standard error of the mean with 95% confidence interval, and \( P = 0.05 \) will be considered statistically significant. Diagnostic parameters of participants will be compared using the nonparametric Wilcoxon-Mann–Whitney U-test with paired samples (\( t \)) test, while Chi-square test will be used for comparison of categorical data.

RESULTS
Fifty-two patients with radical cystoprostatectomy and orthotopic neobladder diversion were included in the study. They divided into two groups: 25 patients with sigmoid neobladder (Group A) and 27 patients with W-ileal neobladder. In regard to the baseline characteristics of the two enrolled groups, no statistically significant differences were observed between both groups in the mean age, clinical stage of the tumor, and durations of follow-up period (\( P > 0.05 \)) [Table 1].

Operative characteristics
Diversion time ranged from 88 to 180 min with a mean of 88 ± 22.4 in sigmoid neobladder group, while in W-ileal neobladder group, it ranged from 92 to 196 min with a mean of 106 ± 20.8. Types of fashioning ureterointestinal anastomosis were shown in Figure 2. Early postoperative complications were recorded in 7 patients (28%) of sigmoid neobladder group and occurred in 5 patients in W-ileal neobladder group (18.51%). Furthermore, late postoperative complications were recorded in 6 patients (24%) of sigmoid neobladder group and in 6 patients (22.22%) of W-ileal neobladder group [Table 2]. Furthermore, data of voiding diary including diurnal and nocturnal continence, voiding, retention of urine,

| Table 1: Patient characteristics |
|---------------------------------|
| **Patient characteristics**     | **Sigmoid group** | **W-ileal group** | **P** |
| Age (years)                     | 42–67 (52±4.82)  | 43–69 (57±5.12)  | 0.668 |
| T-stage                         |                  |                  |      |
| Tis                             | 5 (20)           | 6 (22.22)        | 0.691 |
| T1                              | 7 (28)           | 6 (22.22)        | 0.505 |
| T2                              | 9 (36)           | 10 (37)          | 0.812 |
| T3                              | 4 (16)           | 5 (18.5)         | 0.564 |
| Lymphadenectomy                 |                  |                  |      |
| Yes                             | 14 (56)          | 17 (62.69)       | 0.564 |
| No                              | 11 (44)          | 10 (37.03)       | 0.053 |
| N-stage                         |                  |                  |      |
| N0                              | 13/14 (92.85)    | 16/17 (94.11)    | 0.505 |
| N+                              | 1/14 (7.14)      | 1/17 (5.88)      | 0.691 |
| Follow-up (months)              | 12–51 (37±5.62)  | 13–49 (34±7.21)  | 0.703 |

| Table 2: Postoperative complications |
|--------------------------------------|
| **Postoperative complication**       | **Sigmoid group** | **W-ileal group** | **P** |
| Early                               |                  |                  |      |
| Urine leak                          | 2 (8)            | 2 (7.4)          | 0.691 |
| Intestinal leak                     | 0 (0)            | 1 (3.7)          | 0.505 |
| Fecal leak                          | 1 (4)            | 0 (0)            | 0.505 |
| DVT                                 | 2 (8)            | 1 (3.7)          | 0.564 |
| Wound infection                     | 2 (8)            | 1 (3.7)          | 0.564 |
| Late                                |                  |                  |      |
| Stricture urethra                   | 1 (4)            | 0 (0)            | 0.505 |
| Uretero-neobladder stricture        |                  |                  |      |
| Unilateral                          | 1 (4)            | 0 (0)            | 0.505 |
| Bilateral                           | 0 (0)            | 1 (3.7)          | 0.505 |
| Urinary fistula                     | 1 (4)            | 2 (7.4)          | 0.564 |
| Refluxing hydronephrosis            |                  |                  |      |
| Unilateral                          | 4 (16)           | 5 (11.11)        | 0.505 |
| Bilateral                           | 3 (12)           | 2 (7.4)          | 0.564 |

DVT: Deep venous thrombosis

Figure 2: Types of fashioning ureterointestinal anastomosis
pad use, constipation, and CIC were recorded [Table 3] which showed no significant differences apart of voiding frequency at night which significantly increased in sigmoid group more than W-ileal neobladder group (4 [16%] vs. 2 [7.40%], P < 0.05).

Postoperative radiological investigations revealed development of new back pressure in 13 cases (52%) of sigmoid neobladder group and 11 cases (40.74%) of W-ileal neobladder group and significant residual urine in 4 cases (16%) by US and 3 (12%) cases by pouchogram of sigmoid neobladder group and 10 cases (37.03%) by US and 12 (44.4%) cases by pouchogram of W-ileal neobladder group which significantly different between both groups. Ascending pouchogram estimated reflux, grade, capacity of the pouch, and significant residual urine [Table 4].

Postoperative data of urodynamic study including free flowmetry, filling pouchometry, voiding, and UPP were summarized in Table 5. Comparing the two groups, no significant differences were found with regard to maximum capacity, compliance, sensation, and leak of urine due to contraction or stress, but we found significant differences in regard to detrusor pressure at maximum capacity (25.76 ± 2.86 in sigmoid group vs. 22.24 ± 1.54 in W-ileal group, P = 0.05) and Valsalva leak point pressure (1.88 ± 1.24 in sigmoid group vs. 4.98 ± 2.22 in W-ileal group, P = 0.008) [Table 5]. In regard to voiding pouchometry, including voiding time, voiding volume, mean maximum flow, and significant residual urine postvoiding, there were no significant differences in both groups [Table 5].

**DISCUSSION**

Maintenance of anatomical and functional restoration is the main advantages of orthotopic neobladder using different intestinal segments after radical cystectomy. Nowadays, ileum or sigmoid orthotopic neobladder replacements are the most common procedures after radical cystectomy. Functional outcomes such as voiding pattern and continential status have been extensively evaluated in many studies.[7,8] However, it remains a matter of debate which type of neobladder gives the most favorable satisfaction for the patients. Therefore, we perform the present study to evaluate and compare the functional outcomes of sigmoid and ileal orthotopic neobladder replacement.

Several studies reported the total incidence of early complications, which was higher in sigmoid neobladders group (33.3%-58.3%) than in ileal neobladders group (18.2%-33.3%). In addition, the late postoperative complications were strictures (ureteroenteric and vesicourethral), intestinal obstruction, incisional hernias, and neobladder calculi.[5,9]

The overall incidence of late postoperative complications was similar between the two groups. These common complications in patients with neobladders could be treated by conservative management. Incidence of these complications could be decreased with the development of new procedures and refinement of the surgical techniques.[10]

The mean maximum flow rate at free flowmetry in our study in sigmoid neobladder group was 14.68 ± 0.78 ml/s, while for ileal neobladder, it was 12.72 ± 1.36 ml/s. Schrier et al.[11] recorded a similar result (16.6 ml/s for sigmoid neobladder and 16.4 ml/s for ileal neobladder). El-Bahnasawy et al.[12] reported maximum flow of 18.75 ± 7.65 ml/s, average

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Table 3: Voiding diary

| Voiding diary | Sigmoid group (n=25) | W-ileal group (n=27) | P |
|---------------|----------------------|----------------------|---|
| Diurnal       | 22 (88)              | 23 (85.1)            | 0.92 |
| Nocturnal     | 11 (44)              | 14 (51.8)            | 0.62 |
| Voiding sensation | 6 (24)  | 10 (37.3)           | 0.58 |
| Fullness      | 19 (76)              | 17 (62.96)           | 0.66 |
| Voiding frequency | 6 (24)  | 5 (18.5)            | 0.38 |
| Day           | 4 (16)               | 2 (7.40)             | 0.04* |
| Night         | 6 (24)               | 9 (33.3)             | 0.56 |
| Voiding difficulty | 7 (28)  | 10 (37.3)           | 0.88 |
| Retention of urine | 14 (56) | 15 (55.5)          | 0.84 |
| Use of pad    | 5 (20)               | 7 (25.9)             | 0.62 |
| Constipation  | 2 (8)                | 5 (18.5)             | 0.12 |

CIC: Clean intermittent catheterization

Table 4: Radiological investigations

| Radiological investigation | Sigmoid group (n=25) | W-ileal group (n=27) | P |
|---------------------------|----------------------|----------------------|---|
| U/S Back pressure         |                      |                      |    |
| Right                     | 6 (24)               | 5 (18.5)             | 0.684 |
| Left                      | 4 (16)               | 4 (14.8)             | 0.712 |
| Bilateral                 | 3 (12)               | 2 (7.40)             | 0.594 |
| Significant residual urine| 3 (12)               | 12 (44.4)            | 0.043* |
| Ascending pouchogram      |                      |                      |    |
| Reflux                    | 2 (8)                | 3 (11.11)            | 0.594 |
| Left                      | 2 (8)                | 2 (7.40)             | 0.712 |
| Bilateral                 | 3 (12)               | 2 (7.40)             | 0.594 |
| Grade                     |                      |                      |    |
| Grade 1                   | 1 (4)                | 3 (11.11)            | 0.049 |
| Grade 2                   | 3 (12)               | 2 (7.40)             | 0.594 |
| Grade 3                   | 2 (8)                | 1 (3.7)              | 0.386 |
| Grade 4                   | 1 (4)                | 1 (3.7)              | 0.641 |
| Capacity                  |                      |                      |    |
| Good                      | 20 (80)              | 18 (66.6)            | 0.582 |
| Small                     | 5 (20)               | 9 (33.3)             | 0.611 |
| Significant residual urine| 4 (16)               | 10 (37.03)           | 0.049* |

* P- value considered significant ≥ 0.05
flow of 8.65 ± 4.54 ml/s, voided volume of 446.60 ml, flow time of 50.32 s, and postvoid residual urine volume of 18.8 ml in uroflowmetry results of W-ileal neobladder in the continent group. In detubularized sigmoid bladder substitutes, the maximum flow rate (Q max) recorded by Khalaf et al. and Koraitim et al. was 15.3 ml/s and 19 ml/s, respectively.

In Bassiouney et al. study, a postvoid residual urine volume higher than 100 ml was reported in 8 (24%) of the patients with a sigmoid neobladder and in 2 (10%) of the patients with an ileal neobladder. Voiding dysfunction is one of the most serious problems complicated orthotopic neobladder replacement, which affects adversely patients’ satisfaction. Most studies in the literature concluded that sigmoid neobladder has a better voiding function than ileal neobladder. Meyer et al. reported in their series that in good voiders, the neobladder neck should be at the most caudal portion of the reservoir with wide funneling. The prime factor for ensuring good voiding function in neobladder patients is the ability to perform effective straining and the location of the neobladder. The ideal orthotopic substitutes should be adequately evacuated (residual urine <100 ml) at nearly normal voiding intervals. The voiding intervals are considerably longer in patients with detubularized bowel substitutes owing to higher bladder capacity. Continen
tence status is another significant factor affecting quality of life. According to the meta-analysis of Tao et al., the incidences of daytime incontinence in sigmoid neobladders was from 66.7% to 90% and in ileal neobladders from 74.1% to 97%. The nighttime continence ranged from 23.8% to 65.2% and from 57.1% to 90%, respectively. This meta-analysis revealed that better continence status could be achieved in ileal neobladder group than in sigmoid neobladder group, particularly during the nighttime.

In general, continence rates improve gradually postoperatively as the neobladder volume increases, with maximum control of voiding usually requiring 9–12 months. The Copenhagen group, for example, reported nighttime continence rates of 75% at 1 year and 94% at 3 years, respectively, in a series of 166 patients. Most surgeons augmented the continence status by fashioning a compliant urinary reservoir from a detubularized intestinal segment and preserving the distal urethral sphincter as much as possible to create a reservoir with high capacity and low pressure. Surgical preparation of sphincter-active membranous urethra is of prime importance on continence status, particularly during daytime.

In a comparative study between ileal and sigmoid neobladders, the latter was associated with greater incontinence rates, and the mean continence rate was low for sigmoid neobladder patients (78.8% daytime and 45.5% nighttime) and for ileal neobladder patients (74% daytime and 59.3% nighttime). An explanation may be related to the advanced stage of the tumors with which they were dealing. This necessitated, for oncologic safety, to scarify the neurovascular bundles in most of the cases either in the sigmoid or ileal neobladder groups.

A urodynamic study was extensively used to evaluate and compare the functional outcomes of the two types of neobladder. According to the meta-analysis of Tao et al., ileal neobladder exhibited greater capacity, lower pressure, and better compliance than sigmoid neobladder. In the voiding cystometry, there was no significant difference in the maximal flow rate or voided volume between the two groups, while the postvoid residual volume was significantly smaller in sigmoid neobladder group than in ileal neobladder group. These urodynamic findings could probably further explain their continence status. For the high-capacity, low-pressure reservoir and high compliance, detubularized ileal neobladder exhibits a better degree of resistance across the continence zone. Similarly, for the worse compliance and more contractile, it is reasonable to explain the poor continence status in sigmoid neobladder group.

### Table 5: Urodynamic study

| Urodynamic study                  | Sigmoid group (n=25) | W-ileal group (n=27) | P     |
|-----------------------------------|----------------------|----------------------|-------|
| Voiding time                      | 78.3±4.98            | 98.46±10.54          | 0.05* |
| Voiding volume                    | 212.68±14.44         | 318.22±28.64         | 0.05* |
| Q max                             | 14.68±0.78           | 12.72±1.36           | 0.245 |
| Filling pouchometry               |                      |                      |       |
| Maximum capacity                  | 408.18±19.86         | 425.18±18.44         | 0.652 |
| Detrusor pressure at maximum capacity | 25.76±2.86         | 22.24±1.54           | 0.05* |
| Valsalva leak point pressure      | 1.88±1.24            | 4.98±2.22            | 0.008*|
| Leak due to contraction           | 6 (24)               | 9 (33.33)            | 0.594 |
| Leak due to stress                | 5 (20)               | 8 (29.6)             | 0.712 |
| Good compliance                   | 16 (64)              | 17 (62.9)            | 0.594 |
| Sensation                         |                      |                      |       |
| Absent                            | 6 (24)               | 5 (18.5)             | 0.594 |
| Early                             | 2 (8)                | 2 (7.4)              | 0.712 |
| Delayed                           | 17 (68)              | 20 (74.07)           | 0.594 |
| Voiding uroflowmetry              |                      |                      |       |
| Voiding time/s                    | 98.64±6.22           | 102.64±7.98          | 0.684 |
| Voiding volume/ml                 | 318.6±24.85          | 332.0±22.68          | 0.548 |
| Q max                             | 15.4±1.34            | 14.1±1.18            | 0.802 |
| Significant residual urine/ml     | 8 (32)               | 12 (44.4)            | 0.639 |
| Interrupted pattern               | 13 (52)              | 8 (29.6)             | 0.112 |
| Urethral pressure profile         |                      |                      |       |
| Maximum urethra pressure          | 1.64±1.12            | 5.86±3.78            | 0.020*|
| Maximum UCP                       | 0.82±0.46            | 4.22±2.8             | 0.008*|
| Functional urethral length        | 0.88±0.72            | 1.28±0.66            | 0.578 |

* P value considered significant ≥ 0.05. UCP: Urethral closure pressure.
In the present study, the mean maximum cystometric capacity in sigmoid neobladder was 408.18 ± 19.86 cm H<sub>2</sub>O with maximum pressure at maximum capacity of 25.76 ± 2.86 cm H<sub>2</sub>O, while maximum cystometric capacity in ileal neobladder was 425.18 ± 18.44 with a maximum pressure of 22.24 ± 1.54 cm H<sub>2</sub>O. Hence, the sigmoid neobladder had a slightly smaller capacity with significantly higher pressure than that of the ileal neobladder. Detubularization prevents complete transmission of myogenic activity from longitudinal muscle to the inner circular muscle, thereby limiting contraction and elevated intraluminal pressure.[23]

Schrier et al.[11] found a significant difference between ileal and sigmoid neobladders as regards both capacity and pressure. Capacity for sigmoid neobladder was 296 (68–554) ml with pressure of 58 (16–99) cm H<sub>2</sub>O, while capacity was 546 (208–1116) ml for ileal neobladder, with maximum pressure of 41 (13–70) cm H<sub>2</sub>O.

El-Bahnasawy et al.[12] reported in their urodynamic results of hemi-Kock and W-neobladder a maximum capacity of 655 ml, pressure at maximum capacity was 20.43 cm H<sub>2</sub>O, maximum amplitude of uninhibited contraction was 32.58 cm H<sub>2</sub>O, frequency of contraction was 2.61 every 5 min filling, and compliance was 39.96 cm H<sub>2</sub>O.

Koraitim et al.[14] found that segments containing colon had higher average pressure spikes on urodynamic studies despite detubularization and are most likely related to the muscular nature of the sigmoid colon than those containing mostly ileum, such as with Hautmann. Similarly, these high-pressure spikes may be responsible for the high incontinence rates with the ileocecal bladder substitute.

In the present study, CIC due to poor emptying was needed in 8% (2 cases) in sigmoid group and 18.5% (5 cases) in ileal group. The mean residue for sigmoid neobladder group was 85.65 (30–270) ml while 102.80 (32–280) for ileal neobladder group. Inadequate emptying of the neobladder in men is uncommon. The frequency and etiology of this complication was explained in a single institution series of 655 men reported by incomplete emptying, defined by a residual urine volume of >100 mL, was observed in 75 (11.5%) cases. This was due to mechanical obstruction, i.e., benign strictures of the neovesicourethral anastomosis or local tumor recurrence, in 52 (7.9%) patients of these, 14 patients required long-term catheterization, while the remainders were able to resume complete bladder emptying after endoscopic management. Of the 23 (3.5%) cases without a mechanical obstruction, failure of bladder emptying was due to dysfunctional voiding, requiring CISC, or indwelling catheterization.[20]

In the present study, the residual urine detected during voiding pouchometry in sigmoid group was significant in 8 patients representing 32% of the cases, and in W-ileal group, it was significant in 12 patients representing 44.4% of cases. The mean residual volume in Bassiouny et al. study[9] was lower for sigmoid neobladder patients (90.1 ± 28.3 ml) than for ileal neobladder patients (93.7 ± 34.5). In Miyake and Fujisawa trial,[27] residual urine recorded in modified sigmoid neobladder was 27.3 ± 24 ml.

The increased residual urine in the present study can be attributed to neobladder outlet obstruction due to the possible presence of some residual prostatic tissue left behind in cases where the prostatic tissue was cored out after resection of its capsule near the apex. This outlet obstruction cannot be overcome by the fragile detubularized intestinal musculature, in contrast to the unique contracting mechanism of the genuine detrusor muscle.

Although the outcomes of voiding functions and continence status in two types of neobladder were different, the renal function was well preserved within the normal range. Serum creatinine revealed no significant difference between the two groups. Reconstruction with distal ileum carries the potential risk of Vitamin B12 deficiency and biliary salt loss in ileal neobladder.

CONCLUSIONS
Orthotopic neobladder replacements using the ileum or sigmoid are two commonly accepted procedures. Ileal neobladder provided more favorable patient’s satisfaction, while sigmoid neobladder provided a better chance of spontaneous voiding. Each reconstructive technique has specific advantages and disadvantages.

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