

Outcomes of Bladder Cancer Undergoing Radical Cystectomy: A Single-Institution Experience

Abstract

Objectives: The objective of the study is to evaluate the functional outcome and postoperative complications of patients with bladder cancer undergoing radical cystectomy. **Methods:** This was a prospective, single-center study conducted between January 2013 and October 2016. Patients of either sex, aged more than 18 years, diagnosed with bladder cancer and treated with radical cystectomy and urinary diversion were enrolled in this study. Demographic and clinical characteristics, therapy and functional outcome details, and details of complications were collected. **Results:** A total of 94 patients were enrolled in the study. Overall, the mean age was 53.11 years and 74 (78.72%) patients were male. Of the 94 patients, 61 patients underwent radical cystectomy with ileal conduit (IC) and 30 patients had orthotopic neobladder. The sigmoid diversion was done in two patients, and one patient had a continent diversion. Four patients succumbed to mortality. Two patients had a recurrence at the urethral margin in IC patients. The functional outcome was found to be better in the neobladder group compared to the IC group. **Conclusion:** This study provides extensive information on outcomes of bladder cancer undergoing radical cystectomy. Studer's neobladder had slightly improved outcomes than IC.

Keywords: *Ileal conduit, orthotopic neobladder, real-world study, Studer's neobladder, transitional cell carcinoma*

Introduction

Urinary bladder cancer is one of the most common cancers of the urinary tract worldwide. Approximately, 2.4% of men and women have the risk of developing bladder cancer at some point during their lifetime and around 4.4 per 100,000 die due to bladder cancer.^[1] In India, as per the National Cancer Registry Programme, the overall incidence rate of the urinary bladder cancer was reported as 2.25% (per 100,000 annually); however, the rate in men was much higher (3.67%) than women (0.83%).^[2] Bladder cancer has a significant impact on the quality of life (QoL) of patients and the health-care system and considering its treatment cost, it is one of the most expensive cancers. The standard treatment option for muscle-invasive bladder cancer, including extensive superficial bladder cancer, is radical cystectomy with pelvic lymphadenectomy and urinary diversion. The open procedure puts a break in term

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of cystoscopic surveillance of tumor but managing the conduit still takes the toll. Somani *et al.* evaluated if health and body image are important determinants of QoL 32 patients undergoing radical cystectomy and found that health and body image may not always be important to patients for their QoL.^[3] This highlights that functional outcomes and complications need better understanding. It is also reported that survival and prognosis of patients with bladder cancer depend on age, gender, and racial factors.^[4] Hence, in the present study, the functional outcome and postoperative complications of patients with bladder cancer undergoing radical cystectomy were evaluated in a real-world setting.

Methods

This was a prospective, single-center study conducted between January 2013 and October 2016. Patients of either sex, aged more than 18 years, diagnosed with bladder cancer and treated with radical cystectomy and urinary diversion were enrolled in this study. The study protocol was approved by the Institutional Ethics Committee. Each

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study participant provided written informed consent before participation in the study. Each patient or their relatives also provided separate consent for the surgical procedure after counseling.

Patients who presented with hematuria were evaluated for the history of addiction and ultrasonography of kidney ureter bladder (KUB). Patients with the sonographic diagnosis of a mass in urinary bladder were subjected to contrast-enhanced computed tomography (CT) of the whole abdomen and pelvis. Patient having resectable mass underwent transurethral resection of a bladder tumor; however, patients with extensive bladder mass were limited to biopsy.

Based on the biopsy report and clinical staging, patients were treated with neoadjuvant chemotherapy. Ileal orthotopic neobladder (ONB) was done using a modified Studer technique. Ileal conduit (IC) with Bricker ureteric anastomosis was performed with the minimal amount of ileum. Few patients had Sigma rectum (SR) and continent diversion (CD). The choice of diversion was decided after evaluation of patient factors, surgeon's preference and experience in managing complications. Contraindication for ONB in the study was serum creatinine >2 mg/dL, chronic inflammatory bowel disease, history of previous bowel resection, tumor involvement at the bladder neck/prostatic urethra, and patient reluctance to perform a clean intermittent catheterization.

Data were collected regarding the demographic profile, histopathology of the specimen, pathological tumor stage, postoperative complications, adjuvant therapy, and relapse. The follow-up protocol consisted of renal function tests, liver function tests, urine culture, urine cytology, postvoid residual urine volume assessment (in the ONB group), and chest radiography every 3 months; urethral washing (in the IC group) and plain abdominal film of KUB every 6 months; and serum analysis for metabolic acidosis every 3 months for 1st year and then every 6–12 months' irrespective of pathological staging. In patients with pT2, N0 disease, CT urography was performed every 6 months for the first 2 years and annually thereafter; a bone scan was performed annually. In patients with >pT3 or pN+ disease, CT urography was performed at 3 months after radical cystectomy and every 6 months thereafter for the first 3 years and annually thereafter; a bone scan was carried out every 6 months. The functional outcome of all the patients was taken at 1 year of follow-up. Statistical analysis was done, and data were presented using summary statistics.

Results

During the study, a total of 94 patients were treated with radical cystectomy. Overall, the mean age was 53.11 years and 74 (78.72%) patients were male. Most ($n = 92$ [98%]) of the patients had a history of tobacco consumption (smoking

for males and betel nuts chewing in case of females). Of the total 94 patients, IC was performed in 61 (64.89%) patients, ileal ONB in 30 (31.91%) patients, SR in 2 (2.13%) patients and continent diversion in 1 (1.06%) patient. Mortality occurred in 4 (4.26%) patients, and all were from the IC group. The clinical stages were: T1 – 12.76% ($n = 12$), T2 – 76.59% ($n = 72$), T3 – 9.57% ($n = 9$), and T4 – 1.06% ($n = 1$). Neoadjuvant chemotherapy was given in 15 out of 94 patients (15.96%).

Histopathological examination revealed transitional cell carcinoma (TCC) in 89 (94.68%) patients, squamous cell carcinoma in 3 (3.19%) patients, small cell, and adenocarcinoma was found in 1 (1.06%) patient each. The urethral margin was positive in 2 (2.13%) patients and was negative in all other patients. The lymph node was positive in 8 (8.51%) patients. The R0 resection was possible in 87 (92.55%) patients, R1 in 4 (4.26%) patients, and R2 resection in 3 (3.19%) patients.

Major complications constituted 9.57% of the total patients whereas minor complications comprised 45.64%. The most common complication was wound infection reported in 28.89% of patients followed by urinary tract infection (12.22%) [Table 1]. The most common late complication was an incisional hernia (7.78%) followed by subacute intestinal obstruction (5.56%) [Table 2]. Mean hospital stay after surgery in the IC group and ONB group was 16.00 days and 22.53 days, respectively. SR had a mean hospital stay of 17.50 days, and patient with continent diversion stayed for 31 days.

Table 3 shows functional outcomes at 1 year. Overall, the bodily pain was reported in the majority (72.22%) of patients. Bowel symptoms were also reported in more than half of the patients (57.78%). Depression and social withdrawal were reported in 33.33% of patients. Table 4 demonstrates improvement in bladder capacity and postvoid residual urine over 1 year.

Discussion

This prospective, single-center study provides extensive information on real-world treatment of bladder cancer with radical cystectomy. Radical cystectomy and urinary diversions are the standard of care for extensive and muscle-invasive bladder cancer.^[5-8] The demographic profile of our patients was similar to that of patients from previous reports.^[5-11] In our study, clinically muscle-invasive malignancy accounted for 82 (87.23%) cases. In a previous study, it has been reported that most of the urologists in India still preferred IC for the management of muscle-invasive bladder cancer.^[12] Our results were consistent with this observation, where 57 (60.63%) of patients were managed with IC.

In the present study, the mean hospital stays of the IC group, ONB group, SR, and Mansoura pouch (CD) were 16 days, 22.5 days, 17.5 days, and 31 days. Major and minor

Table 1: Summary of complications

Complications	IC (n=57)	ONB (n=30)	Sigma rectum (n=2)	CD (n=1)	Total (n=90)	Remarks
Wound infection	15 (26.32)	9 (30.0)	2 (100)	-	26 (28.89)	-
Urine leak	2 (3.51)	5 (16.67)	-	-	7 (7.78)	3 patients of ONB, 2 of IC, 1 patient of CD and 1 patient drain eroded in ONB
Urinary tract infection	2 (3.51)	5 (16.67)	2 (100)	1 (100)	11 (12.22)	-
Ileal anastomotic dehiscence	3 (5.26)	-	-	-	3 (3.33)	-
Hemorrhage	1 (1.75)	-	-	-	1 (1.11)	-
Burst abdomen	4 (7.02)	-	-	-	4 (4.44)	Reoperation required in all cases
Rectal injury	1 (1.75)	-	-	-	1 (1.11)	Developed recto-neobladder fistula managed by ileal conduit

Data presented as n (%). CD: Continent diversion, IC: Ileal conduit, ONB: Orthotopic neobladder

Table 2: Summary of late complications

Late complications	IC (n=57)	ONB (n=30)	Sigma rectum (n=2)	CD (n=1)	Total (n=90)
Incisional hernia	5 (8.77)	2 (6.66)	-	-	7 (7.78)
SAIO	4 (7.01)	1 (3.33)	-	-	5 (5.56)
Renal deterioration	4 (7.01)	-	-	-	4 (4.44)
Pyelonephritis	2 (3.5)	-	-	-	2 (2.22)
Urinary retention	-	2 (6.66)	-	-	2 (2.22)
Recto urethral fistula	-	1 (3.33)	-	-	1 (1.11)

Data presented as n (%). CD: Continent diversion, IC: Ileal conduit, ONB: Orthotopic neobladder, SAIO: Subacute intestinal obstruction

Table 3: Summary of functional outcomes at 1 year

	IC (n=57)	ONB (n=30)	Sigma rectum (n=2)	CD (n=1)	Total (n=90)
Continence (%)	-	-	-	-	-
Day		75	60		
Night		65	55		
Bodily pain	40 (70.18)	23 (76.67)	2 (100)	-	65 (72.22)
Bowel function	Diarrhea, 28 (49.12)	Diarrhea, 23 (76.67)	liquid stool	Diarrhea, 1 (100)	52 (57.78)
Depression social withdrawal	21 (36.84)	6 (20.0)	2 (100)	1 (100)	30 (33.33)

Data presented as n (%). CD: Continent diversion, IC: Ileal conduit, ONB: Orthotopic neobladder

Table 4: Neobladder chart

	Initial	4 months	12 months
Capacity (ml)	~150	250	360
Q _{max} (ml/s)	-	14.1	15.2
Continence (%)	-	-	-
Daytime	-	40-50	55-65
Night time	-	10-15	40-50
Postvoid residual urine (ml)	-	75	60

complications were 9.57% and 45.64%, respectively, which was slightly higher than previous studies conducted at high-volume centers performing radical cystectomy.^[5-11,13,14] Perioperative mortality was 4.5%, which was slightly more than other reports of 2%–3%.^[5-11,13,14] In our study, 15.95% of patients received neoadjuvant therapy which shows a lack of penetrance of neoadjuvant chemotherapy in the setting of muscle-invasive disease.^[15] A previous meta-analysis of 15 studies that included a total of 3285 patients supports the use of neoadjuvant chemotherapy in muscle-invasive bladder cancer.^[16]

Wound infection was developed in 26 (28.89%) patients, and the urinary leak was developed in 7 (7.78%) patients. The lower incidence of urine leak in our study could be possibly due to early bladder wash by the diluted sodabcarb solution. One patient was found to have drain eroding into neobladder who underwent bilateral percutaneous nephrostomy. After the removal of drain detected on cystoscopy, the leak was stopped. A total of 10 patients developed urinary tract infection. Reoperation was done in six out of 94 patients, of which two were for neobladder fistula, and others were for burst abdomen. One patient had an intraoperative complication in the form of rectal injury and was repaired with a sigmoid colostomy. This patient underwent ONB and developed recto neobladder fistula. Finally, the patient was managed by conversion to the IC.

Histopathological examination in our study showed that TCC was the predominant histology. The urethral margin was positive in two patients and was negative in all other patients. The lymph node was positive in eight patients. These outcomes confirm the meticulous surgical dissection

of the procedure. In our study, we did not come across any distant metastasis.

We found that our patients with an IC had significantly less trouble in controlling urine than those with an ONB. This observation was consistent with previous reports.^[15,17] Better stoma appliances and postoperative care by a skilled stoma therapist might have reduced the stoma-related problems. Some degree of urinary leakage, especially at night, is a consistent finding in ONB patients.^[18]

Patients who were treated with IC have previously shown to have significant body image problems, and most of them are embarrassed due to the stoma.^[19] These patients are generally less active and restrict themselves from social activities. About 33.33% of patients suffered from depression and social withdrawal whereas 36.84% belonged to IC group compared to 20.0% in ONB group.

Studer neobladder initially starts with a capacity of ~150 ml and increases up to 400–450 ml. Daytime continence greatly increased by Kegel exercise. Night time continence was significantly enhanced by advising patients to pass urine once in the middle of the night. Significant metabolic acidosis was not seen in the present study as the sodabicar powder was given in the early postoperative period and as the shorter ileal segment was taken. In the present study, the urine leak was significantly less (7.78% of the total patients) due to early bladder wash by the diluted sodabicar solution. Continence diversion is time-consuming and with inherent complications.

Uretersigmoidostomy was done in an emergency situation in one patient, as the perioperative period was stormy. One patient with SR was operated as the patient was unable to bear the cost of ileostomy bag. Night time continence was significantly enhanced by using the rectal tube at night. In the follow-up of 90 patients, the late complications were encountered in the form of an incisional hernia. Renal deterioration, subacute intestinal obstruction occurred in four patients each in IC group and rectourethral fistula in a single patient of ONB group.

One patient from ONB group also suffered from subacute intestinal obstruction. One patient had a forgotten stent of IC patient and developed a renal stone, which was managed by percutaneous nephrolithotomy. Another patient of small cell carcinoma of urinary bladder developed stenosis at the urethra-neobladder junction, which was managed by optical dilatation.

Conclusion

Although the study was limited to a single study site, this study provides extensive information on outcomes of bladder cancer undergoing radical cystectomy. Overall, the mortality and morbidity observed in this study were comparable to the high-volume centers. Studer's neobladder was easy to make, and it has favorable long-term outcome.

Patient factors, surgeon's experience, and management of complications are key areas that must be critically assessed to select the appropriate diversion.

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Conflicts of interest

There are no conflicts of interest.

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