

**ORIGINAL RESEARCH**

# Assessing the Long-Term Functional Outcomes of Neobladder Reconstruction

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Received Date: 22 May, 2024

Acceptance Date: 20 June, 2024

**ABSTRACT**

The objectives of urinary diversion have progressed from simply diverting urine through a conduit to orthotopic reconstruction. This approach provides a safe and continent means to store and eliminate urine, aiming to improve the patient's quality of life. A neobladder enables patients to maintain a normal lifestyle and better self-image after bladder removal by creating a natural extension of continent, cutaneous urinary diversion that is directly connected to the native urethra. Importantly, this does not compromise oncological outcomes. Long-term functional results of orthotopic ileal W-neobladder with serous lined extramural ureteric implantation have been demonstrated to be effective and durable in various studies. Over the past decades, significant advancements have been made in understanding bladder carcinoma and neobladder construction.

Our study analyzes the short- and long-term functional outcomes of neobladder reconstruction in patients who underwent radical cystectomy at our center. We also compare our functional results of orthotopic neobladder reconstruction with those of a previous pilot study.

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**INTRODUCTION**

Neobladder, also known as orthotopic neobladder or continent urinary reservoir, is a surgical procedure used in the treatment of bladder cancer or other conditions where the bladder needs to be removed.

**Here's an introduction to neobladder:**

Neobladder surgery involves removing the diseased bladder and creating a new bladder-like reservoir using a segment of the patient's intestine or other tissues. This reservoir is then connected to the urethra, allowing the patient to urinate normally. Unlike traditional urinary diversion methods like an external urostomy bag, neobladder reconstruction aims to provide a more natural way of storing and voiding urine.

**Key points about neobladder surgery include:**

1. **Surgical Procedure:** The surgery involves careful removal of the bladder and reconstruction of a new bladder-like structure using a segment of intestine or bowel. This is done to preserve urinary function as much as possible.
2. **Functionality:** After recovery, patients can regain near-normal urinary control. They typically learn to control their urination patterns, although they may need to self-catheterize initially to ensure complete bladder emptying.
3. **Recovery and Management:** Recovery from neobladder surgery can vary, but patients often

experience improvement in quality of life compared to traditional urinary diversion methods. Post-surgery, they may need to manage their fluid intake and monitor for complications such as urinary tract infections or changes in urinary function.

4. **Considerations:** Neobladder surgery is not suitable for all patients, and candidacy depends on factors such as the extent of the cancer, overall health, and patient preference. It requires careful consideration and consultation with healthcare providers.

Neobladder surgery represents a significant advancement in urological care, offering a more integrated and functional solution for patients requiring bladder removal due to cancer or other medical conditions.

**AIMS AND OBJECTIVE**

- Assess residual urine, continence, postoperative complications, and quality of life after orthotopic neobladder reconstruction.
- Evaluate short-term and long-term functional outcomes of orthotopic reconstruction using the W pouch.
- Compare the current study results with previous pilot study results of orthotopic bladder reconstruction.

## MATERIALS AND MEATHODS

This is a retrospective and prospective study of patients with urinary bladder cancer who underwent radical cystectomy and orthotopic ileal W neobladder with serous lined extramural ureteric implantation at RD Gardi Medical College over a period of three years.

### Inclusion Criteria

- All patients eligible for cystectomy were considered candidates for orthotopic ileal neobladder reconstruction.
- Patients of all ages and sexes were included.
- Indications for cystectomy included muscle-invasive bladder cancer.
- Advanced chronological age was not considered a contraindication for orthotopic diversion.

### Evaluation Process

Patients were evaluated at 3-month intervals for the first year, every 6 months for the second year, and annually thereafter. They were asked to maintain a voiding diary, noting episodes of urgency and incontinence. Detailed histories of daytime and nighttime continence, post-void residual volume, and the frequency of clean intermittent catheterization (CIC) were recorded at each visit.

### Bladder Training

Voiding intervals were gradually increased from 2 to 4 hours in 0.5-hour increments, ensuring the patient remained continent during the specified period. The goal was to expand the bladder to achieve a final capacity of 350-400 ml. The frequency of CIC was reduced according to post-void residual volumes until it was eventually tapered off.

## AGE SEX WISE DISTRIBUTION

AGE	PREVIOUS STUDY			CURRENT STUDY		
	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL
<40	1 9.1%	2 50%	3 20%	2 13.3%	0	2 11.11%
40-59	4 36.4%	2 50%	6 40%	5 33.3%	2 66.6%	7 38.88%
>60	6 54.5%	0	6 40%	8 53.3%	1 33.3%	9 50%
TOTAL	11	4	15	15	3	18
MEAN +/-SD	56.82+/- 14.04	34.75+/-7.80 36	50.93+/- 15.99	52.9+/- 12.71	56+/-15.09 58	53.44 +/- 12.70
MEDIAN	60		50	60		59
	t=2.97, p=0.011			t=0.39, p=0.70		

## CLINICAL PRESENTATION

	Previous	Study	Current	Study
	No. patients	(%)	No. patients	(%)
Painless haematuria	14	93.33	13	72.22
Incontinence	1	6.66	1	5.56
Blood Clots	2	13.33	1	5.56
Dysuria	2	13.33	3	16.67

Chi-sq=0.54, p-value=1.0

## Continence Assessment

- Good: Completely dry without needing protection.
- Satisfactory: No more than one pad required during the day and night.
- Unsatisfactory: More than one pad needed during the day or night.

Potency status was not considered in this study. Physical examinations included abdominal, digital rectal, and for females, vaginal examinations to rule out local recurrence.

## OBSERVATION AND RESULTS

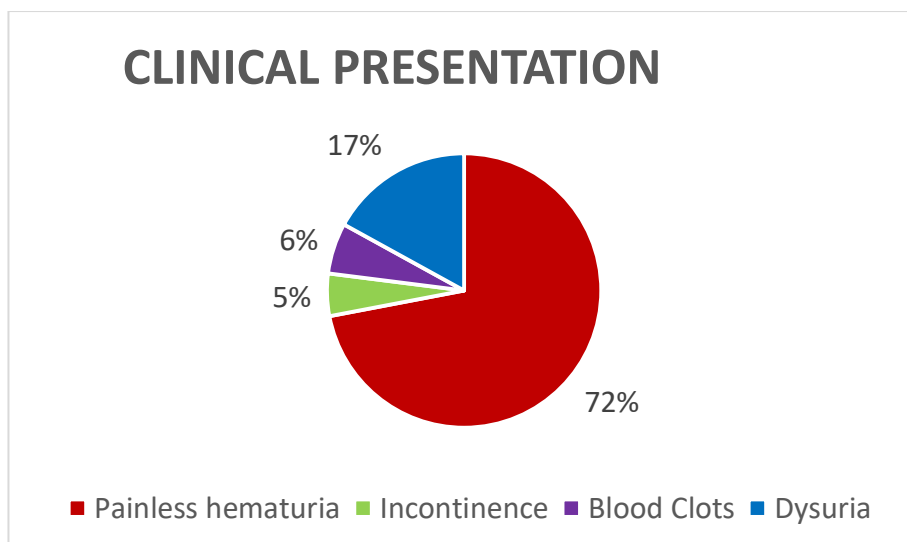
In the present study, 18 patients underwent radical cystectomy with orthotopic ileal W-neobladder and serous-lined extramural ureteric implantation for carcinoma of the bladder. Previously, a pilot study was conducted on 15 patients who underwent radical cystectomy with ileal neobladder substitution between 2007 and 2010 in the Department of Surgery at RD Gardi Medical College, Ujjain.

## Study Comparison

A prospective and retrospective comparison was made between the previous study and the current study regarding short-term and long-term functional outcomes, complications, voiding patterns, and residual urine volume assessment in orthotopic substitution.

## Previous Study Details

Participants: 15 patients who met the inclusion criteria. Procedures: 13 patients underwent radical cystectomy and orthotopic ileal W-neobladder substitution for carcinoma bladder, and 2 patients underwent orthotopic neobladder reconstruction for thimble bladder following genitourinary tuberculosis (GUTB).



This table describe the various presentations of the studied subjects. Painless hematuria was the most common and was seen in 72.2% of cases and 5.56% presented with incontinence and 5.56% cases presented with blood clots and 16.67% patients presented with dysuria. This is in contrast to previous

study where 93.3% cases presented with hematuria and 13.3% patients presented with blood clots and 1% with incontinence. Hence it is proved that the hematuria is the commonest presentation in both the studies.

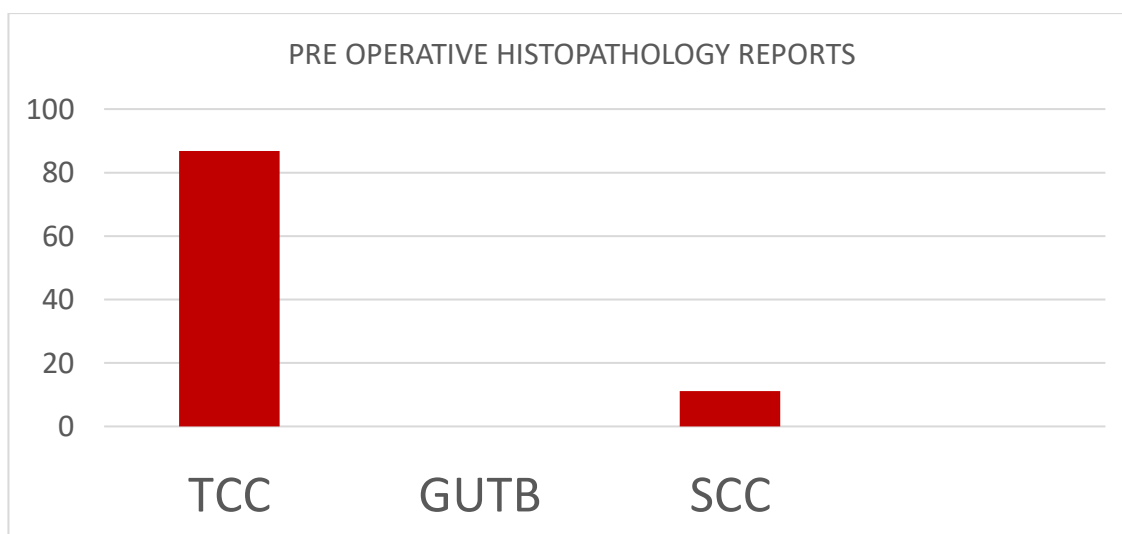
**PRE OPERATIVE HISTOPATHOLOGY REPORTS**

HPR	Previous Study		Current Study		
	Sub Type	No. of Patients	(%)	No. Patients (n=18)	(%)
TCC	Papillary	10	86.7	12	66.6
	Sessile	3		4	22.2
GUTB		2	13.3	0	0
SCC		0	0	2	11.1

Chi-sq=4.09, p-value=0.384

This table depicts the histopathological finding of the studied subjects TCC(transitional cell carcinoma) was the prominent finding of the HPR(histopathological report) and which showed 66.6% cases with papillary morphology and 22.2% cases with sessile morphology. Rest 11.1% cases were diagnosed with

SCC( squamous cell carcinoma). In the previous study 86.7% of the cases were transitional cell carcinoma and 13.3% of the cases were diagnosed with GUTB (genitourinary tuberculosis. There is no incidence of Carcinoma in situ and GUTB among patients in present study.



**EARLY COMPLICATIONS(WITHIN 3 MONTHS AFTER SURGERY)**

Complication	Type	Previous	Study	Current	Study
		No. of patients	(%)	No. of Patients	(%)
Present	Neobladder Vaginal Fistula	1	13.3	0	0.00
	Urinary Leakage From Drain	1		2	11.11
	Pseudomembranous Colitis	0		1	5.56
	Suprapubic Leakage	0		4	22.22
	Burst Abdomen	0		1	5.56
Absent		13	86.7	10	55.56

Chi-sq=5.83, p-value=0.333

The perioperative mortality rate was zero in our study. Postoperatively 33.3% cases had neobladder related complications, out of which 22.2% patients presented with suprapubic leakage and 11.1% cases had urinary leakage from drain site. 2 patients (11%) cases had neobladder unrelated complication, 5.56 % had burst

abdomen and another 5.56% patients had prolonged diarrhea due 10 pseudomembranous colitis. None of them had neobladder vaginal fistula formation in contrast to previous study where 6.5% had neobladder vaginal fistula formation.

**MORBIDITY RATES IN PRESENT STUDY**

Complications	No of Patients (%)	
	After 1 month	After 3 months
Urinary leakage from drain	11.11	0
Pseudomembranous Colitis	5.56	0
Suprapubic Leakage	22.22	0
Burst Abdomen	5.56	0
Total morbidity	44.4	0

In the present study, morbidity rates during one month were higher (44.4%) as compared to previous study (13.3%). Patients with suprapubic leakage (22.22%) and urinary leakage from drain site were managed conservatively and significantly improved after 3 months. One patient with burst abdomen (5.56%) was over a 3 months period.

managed with secondary suturing with regular dressing and good antibiotic coverage. Patient with pseudomembranous colitis was managed conservatively and subsequently discharged. In this manner, the overall morbidity rates decreased significantly from 44.4% at 1 month to 0%

**FUNCTIONAL BLADDER CAPACITY(ml) AT 3 MONTHS**

Previous study(n=15)				Current Study(n=18)			
Mean	SD	Minimum	Maximum	Mean	SD	Minimum	Maximum
460.71	261.78	300	1200	408.88	163.1	300	800

T=0.69, p-value=0.492

In our study mean bladder capacity was 408.81 +/- (163.1 ml) with a minimum of 300ml and maximum bladder capacity of 800ml as compared to previous study with mean bladder capacity of 460.71 (+/- 261.78ml) with a minimum capacity of 300ml and maximum of 1200ml. The patients who had large bladder capacity volume were advised to do regular CIC.

**CONCLUSION**

Orthotopic bladder substitution is now considered the preferred method for urinary diversion after radical cystectomy. This approach aims to preserve patients' physical integrity and quality of life, offering excellent long-term functional outcomes. Despite the extended operation time and technical complexity, this procedure is associated with low mortality and acceptable morbidity. Literature reports a

postoperative mortality rate of less than 2%, which is favorable compared to conventional diversion methods like the ileal conduit.

In our study, we compared voiding patterns and assessed the short- and long-term functional outcomes of neobladder reconstruction. We used a 35-40 cm ileal loop, compared to the 45 cm segment used in previous studies. This modification aimed to reduce the need for continuous intermittent catheterization, which was found to be bothersome in cases using longer ileal segments.

This prospective and retrospective study involved patients who underwent radical cystectomy with W-shaped ileal neobladder reconstruction. We assessed the short- and long-term functional results and complications associated with the neobladder. The overall operation time decreased from 6.34 (0.86) hours in the previous study to 5.30 (0.75) hours in our

study, which was statistically significant (p-value < 0.05). The need for continuous intermittent catheterization was significantly reduced, with 44.4% of cases not requiring CIC, compared to previous studies and existing literature (p < 0.005). This improvement can be partially attributed to the shorter ileal segment (35-40 cm) used for neobladder construction. The level of continence achieved was good during both daytime and nighttime, comparable with existing data. Early and late complication rates were comparable to literature data. Morbidity rates were initially higher in the first month but reduced from 44.4% to 0% over three months. The study reported no perioperative or postoperative mortality. The incidence of reflux was low (16.67%), and there were no cases of uretero-ileal anastomotic stricture, indicating good functional outcomes from the modified serous-lined extramural ureteric reimplantation.

The long-term functional results of the orthotopic ileal W-neobladder have proven to be good and durable in various studies. It is considered the most ideal form of urinary diversion and can be regarded as the gold standard compared to other methods. With a better learning curve, established surgical protocols, and a reduced ileal segment size, the outcomes and performance of W-pouch neobladder reconstruction after radical cystectomy for carcinoma can be improved.

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