

## Original Article

# Outcome of Mainz II Pouch Urinary Diversion after Radical Cystectomy in Patients with Muscle-invasive Bladder Cancer: Our Experience

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### ABSTRACT

**Introduction:** Mainz II pouch urinary diversion in patients with muscle-invasive bladder cancer is one of the options of continent urinary diversion following radical cystectomy (RC). We aim to report our experience and the outcome of our patients who had this procedure. **Patients and Methods:** Patients who had RC and Mainz II pouch urinary diversion for muscle-invasive bladder cancer in our institution from 2007 to 2016 were evaluated. Variables analyzed included age, gender, stage of the disease, pathological grade and tumor types, complications, and survival status. **Results:** There were 11 patients who had Mainz II pouch urinary diversion after RC for bladder cancer over a 10-year period. Four (36%) were male and 7 (64%) were female. The mean age of the patients was 58.6 (range, 52–65) years. The diseases were pT2, pT3, and pT4 in 2 (18%), 7 (64%), and 2 (18%) patients, respectively. Four (36%) had pelvic nodal metastasis. Nine (82%) had a histological diagnosis of transitional cell carcinoma, and two (18%) were squamous cell carcinoma (SCC). Ten (91%) patients had high-grade disease, whereas only 1 (9%) patient had low-grade disease. Short-term morbidities were electrolytes derangement, hypokalemia, and acidosis in 2 (18%) patients and pyelonephritis in 2 (18%) patient. The two patients with invasive SCC had recurrence and death within 12 months of surgery. At present, four of the patients are alive, and seven are dead. Survival till date ranged from 8 to 120 months (mean survival time was 48 months). All patients achieved day and night time continence, and there was no significant long-term morbidity from the method of urinary diversion. **Conclusion:** Mainz II pouch urinary diversion is safe and acceptable to most of our patients with good long-term results.

**KEYWORDS:** Bladder cancer, Lagos, Mainz II pouch urinary diversion, Nigeria, outcome

## INTRODUCTION

Bladder cancer is the second most frequent cancer of the genitourinary system. It accounts for 7% of new cancer cases in men and 2% of new cancer cases in women. Up to one-third of patients present with muscle-invasive disease, whereas the rest of the urothelial carcinomas are nonmuscle invasive. In addition, 30%–40% of patients with nonmuscle invasive tumor will eventually progress to muscle-invasive disease.<sup>[1]</sup>

Radical cystectomy (RC) remains the most effective single-modality treatment option for patients with muscle-invasive disease and those with nonmuscle invasive tumor refractory to treatment by transurethral

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resection with intravesical chemotherapy and immunotherapy.<sup>[2]</sup> Following RC, there is a need for urinary diversion. Internal urinary diversion by ureterosigmoidostomy was introduced decades ago, and several modifications of the procedure have been published. Mainz II pouch, for instance, was developed at Mainz Medical School with the aim of overcoming the traditional shortcomings of classical ureterosigmoidostomy which include urge incontinence and bowel frequency.<sup>[3]</sup> Urodynamic studies in patients who had classical ureterosigmoidostomy showed that bowel contractions with a pressure rise are responsible for the incontinence.<sup>[4,5]</sup> By interrupting the circular contractions through detubularization of the bowel, a low-pressure continent reservoir is thereby created.

Majority of patients in our environment hate to have an abdominal stoma, and intermittent catheterization is often not acceptable. Therefore, Mainz II pouch urinary diversion is an acceptable compromise by these patients avoiding intermittent catheterization and the need for stoma. We, therefore, aim to report the outcome in our patients with bladder cancer who had RC with the Mainz II pouch modification of ureterosigmoidostomy as a method of urinary diversion.

## PATIENTS AND METHODS

The records of the patients who had RC with Mainz II pouch urinary diversion over 10 years (2007–2016) were retrieved. Variables recorded included age of the patients, gender, stage of disease, the histological diagnosis, grade, TNM stage, complications, and status of the patients whether alive or not. All patients were followed up prospectively with focus on their continence, renal status, and acid–base balance. Fisher's exact was used to find association between variables and the  $P < 0.05$  was considered statistically significant.

## RESULTS

There were 11 patients who had Mainz II pouch after RC during this period. The ages of the patients ranged between 52 and 65 (mean  $\pm$  SD = 58.6  $\pm$  4.9) years. Four (36.4%) were male and 7 (63.6%) were female. All were muscle-invasive bladder tumours with pathological evidence of nodal involvement in 4 (36.4%) of the cases. According to TNM Staging, 2 (18.1%), 7 (63.6%), and 2 (18.1%) patients had pT2, pT3 and pT4 diseases respectively. Nine (72.7%) had histological diagnosis of transitional cell carcinoma (TCC), 2 (18.1%) were SCC. Ten patients (90.9%) had high-grade disease while one patient had low-grade disease.

The patients have been followed up for up to 120 months. The mean postoperative survival so

**Table 1: Clinicopathological characteristics and outcome of patients who had radical cystectomy and Mainz II pouch urinary diversion**

Variable	Outcome, n (%)		Total, n (%)	P
	Alive	Dead		
Age (years)				
<60	1 (9.1)	5 (45.5)	6 (54.6)	0.137
>60	3 (27.3)	2 (18.2)	5 (45.4)	
Gender				
Male	2 (18.2)	2 (18.2)	4 (36.4)	0.477
Female	2 (18.2)	5 (45.5)	7 (63.6)	
Histology				
TCC	4 (36.4)	5 (45.5)	9 (81.8)	0.237
SCC	0	2 (100.0)	2 (18.2)	
TNM staging				
pT2	2 (18.2)	0	2 (18.2)	0.039
pT3	2 (18.2)	4 (36.4)	6 (54.6)	
pT4	0	3 (27.3)	3 (27.3)	
pN0	3 (27.3)	4 (36.4)	7 (63.6)	0.554
pN1	1 (9.1)	3 (27.3)	4 (36.4)	

TCC: Transitional cell carcinoma, SCC: Squamous cell carcinoma, TNM: Tumor-node-metastasis

far is 48 months (range 8–120 months). Overall, 4 (36.4%) patients are alive; 2 males and 2 females. Seven patients (63.6%) are dead; 2 males and 5 females [Table 1]. Out of the 9 patients with histological diagnosis of TCC, 4 (44.4%) are alive, whereas 5 (55.6%) are dead. The 2 patients who had SCC were dead, both within 12 months of surgery [Table 1]. The two patients with T2 disease are alive. There was a statistically significant relationship between the TNM staging and the outcome of the disease ( $P = 0.039$ ) [Table 1].

There was no perioperative mortality. Major short-term morbidity experienced was electrolytes derangement; hypokalemia, and acidosis ( $n = 2$ , 18%) which were successfully managed. There was also an incidence of pyelonephritis in 2 (18%) patient which resolved with antibiotics. The two patients with histological diagnosis of invasive SCC had aggressive disease with lymph node metastasis and tumor recurrence within 12 months of surgery.

All patients achieved day- and night-time continence, and there was no significant long-term morbidity from the method of urinary diversion.

## DISCUSSION

RC with urinary diversion remains the gold standard for patients with muscle-invasive bladder cancer,<sup>[6]</sup> though recent studies comparing outcomes using trimodality bladder preservation therapy which includes transurethral resection of bladder tumor followed by concurrent

chemoradiation and conventional therapy of RC alone found the former as a possible alternative.<sup>[7]</sup>

The primary goal of RC is to control the underlying malignancy. Thus, effective resection of tumor margin is of utmost priority. However, reconstructive options are often limited by the anatomic considerations and extent of the disease. Therefore, the standard practice demands a thorough and informed discussion with the patients preoperatively concerning the pros and cons of all forms of urinary diversions.

Current urological practice avails the patients and surgeons with a variety of techniques of urinary diversion, namely, incontinent urinary diversion (ureterocutaneostomy, ileal conduit, colonic and conduit) and continent options (continent sigmorectal urinary diversion, continent catheterizable urinary diversion, and orthotopic bladder substitution).

Several factors may influence the choice of the procedure for diversion. These include patient's preference, age, comorbidity, body mass index, and motivation. Others are underlying disease and indication for cystectomy.<sup>[8]</sup> The choice of urinary diversion also depends on the skill, expertise and prerogative of the surgeon. Although the type of diversion does not necessarily affect the outcome of the patients when the primary indication is bladder tumor.<sup>[9]</sup> However, it may have substantial impact on the quality of life of the patients. Mainz pouch II has been reported to have many advantages as a continent form of diversion. Some of these include the absence of urostoma which is psychologically good for the patients, as well as continence associated with the procedure.<sup>[9]</sup> Furthermore, it has a low incidence of ascending infections and good postoperative recovery with stabilization of renal function parameters.<sup>[9]</sup>

One of the key prerequisites for a sigmorectal pouch construction (Mainz II pouch) is a competent anal sphincter. Contraindications for the pouch include an incompetent anal sphincter, renal insufficiency (creatinine >1.5 mg/dl), previous irradiation of the pelvis, liver dysfunction, and diverticulosis of the sigmoid colon.<sup>[3]</sup>

The major setbacks of the classical ureterosigmoidostomy include incontinence and bowel frequency. These can be overcome by detubularization and reconfiguration of the Sigma-rectum (Mainz pouch II). This modification creates a low-pressure rectal reservoir. The procedure is safe and easy to perform with low morbidity and mortality rate and improved quality of life and appears to have satisfactory intermediate and long-term results.

In our patients, the indication for RC was muscle-invasive bladder tumor and Mainz II pouch

modification of ureterosigmoidostomy was the modality of urine diversion. Of the eleven patients, 2 (18%) had histological diagnosis of SCC. SCC usually accounts for only about 5% of bladder cancer and is usually due to cellular metaplasia from chronic irritation of the vesical urothelium (e.g. from schistosomiasis, bladder calculi, and foreign bodies). It is predominantly seen in Africa and rarely seen in the developed world. It is also more aggressive and has poorer prognosis compared to TCC. In Senegal, SCC was reported as the most predominant histological type of bladder cancer in Senegal making up 50.7%.<sup>[10]</sup>

The mean age of bladder cancer from our study is 58.6 years; this is similar to findings in other studies<sup>[11,12]</sup> where the mean age was also reported as the sixth decade of life. This is contrary to findings by Castillo *et al.*,<sup>[13]</sup> who documented the seventh decade as the mean age of their subjects. In similar studies done in Maiduguri, Northern part of Nigeria, and Senegal, the mean ages of their patients were 48.87 years<sup>[14]</sup> and 45.5 years,<sup>[10]</sup> respectively.

The incidence of bladder cancer is higher in males<sup>[15,16]</sup> possibly because of higher incidence of smoking among men. Although bladder cancer was reported to be more common in males in our environment,<sup>[14]</sup> the number of women in this study who had Mainz II pouch after RC for bladder cancer almost doubled that of men (63.4% vs. 36.4%). It was because the females were at the time of evaluation adjudged clinically to have diseases that were more suitable for RC.

The most important factor related to survival in our patient was the stage of the disease. Only patients with pT2 disease without lymph node metastasis have survived up to 10 years after Mainz II operation. This is similar to findings by Hautmann *et al.*<sup>[2]</sup> where 10-year recurrence-free survival and overall survival rates were higher in those with pT2a pN0 disease. Local and distant failure rates were also high in those with positive nodal disease. In a study comparing patients who had cystectomy on account of multiple superficial bladder tumor and those who had the procedure on account of muscle-invasive disease, it was found that the former had long-term overall survival.<sup>[15]</sup> In addition, we have found that our patients generally tolerate the operation with only very few side effects.

## CONCLUSION

Mainz II pouch urinary diversion is safe and acceptable to most of our patients with good long-term results.

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## Conflicts of interest

There are no conflicts of interest.

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