

# Transurethral en bloc Resection of Non-Muscle Invasive Bladder Tumor: Efficacy and Outcomes in Comparison to Conventional Transurethral Resection

Md. Shamim Hossain<sup>1</sup>, Md. Towhid Belal<sup>2</sup>, Tanvir Ahmed Chowdhury<sup>3</sup>, Md. Golam Mowla Chowdhury<sup>4</sup>, Md. Habibur Rahman<sup>5</sup>, AKM Khurshidul Alam<sup>6</sup>

<sup>1</sup>Assistant Professor, Department of Urology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.

<sup>2</sup>Assistant Professor, Department of Urology, Dhaka Medical College, Dhaka, Bangladesh.

<sup>3</sup>Assistant Professor, Department of Urology, Dhaka Medical College, Dhaka, Bangladesh.

<sup>4</sup>Professor, Department of Urology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.

<sup>5</sup>Professor, Department of Urology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.

<sup>6</sup>Professor & Chairman, Department of Urology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.

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## ABSTRACT

**Background:** At present, the gold standard surgical treatment option for non-muscle invasive bladder cancer (NMIBC) is transurethral resection. In conventional transurethral resection of bladder tumor (TURBT) where piecemeal resection is done, there is a significant chance of incomplete resection, under-staging of the tumor with suboptimal oncological outcomes. It has been proposed that en bloc resection of bladder tumor (ERBT) can tackle the problems we faced during conventional TURBT with relatively better oncological outcomes. This study is to see the safety, efficacy, and oncological outcomes of ERBT in comparison to conventional TURBT. **Methods:** This retrospective study was done in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from February 2019 to January 2020. We analyze the data obtained from the patients with urinary bladder mass of 2-3 cm in size, newly diagnosed and radiologically determined NMIBC. Patients with a tumor size of more than 3 cm, multiple tumors, presence of carcinoma in situ, history of prior TURBT, and radiologically suspected muscle-invasive mass were excluded from this study. Patients who underwent ERBT were compared with the patients who underwent conventional TURBT. Finally, we collected data from forty-four patients, among them 22 patients who underwent ERBT were marked as group A and 22 patients who underwent conventional TURBT were marked as group B. **Results:** The mean age was 57.8(±6.2) and 58.2(±7.3) years in group A and group B respectively. There was no statistically significant difference in gender, tumor size, grade, and stage of the tumor between the two groups. Operative time was significantly less in group A than group B (35±5.2 vs. 41±6.3, p=0.001). In group A, 100% biopsy specimen shows the presence of detrusor muscle which was statistically significant when compared with group B(p=0.03). Though the tumor recurrence rate was low in group A than in group B, it was not statistically significant. **Conclusion:** ERBT is a safe and promising technique that can be done with the same instruments used for conventional TURBT. It can reduce the rate of under staging and re-TURBT by providing good quality biopsy specimen, can also reduce the recurrence rate at the primary site. A good quality randomized control trial is necessary to declare the ERBT as superior to conventional TURBT.

**Keywords:** En bloc resection of bladder tumor, non-muscle invasive bladder cancer, efficacy and outcomes.

## INTRODUCTION

The first step of management of bladder tumor starts with transurethral resection that provides a histological diagnosis, grade, and stage as well as treatment. After conventional TURBT there is approximately a 70% chance of recurrence, the risk is highest at 3 months when first check cystoscopy is done.<sup>[1,2]</sup> Other than underlying aetiopathological factors like tumor biology and field change effects, there are several factors that are thought to be responsible for recurrence following conventional TURBT.

First, complete resection of the tumor is difficult to predict, so regrowth of persistent tumor can occur. Second, spillage of tumor cells within irrigation fluid may increase the chance of re-implantation at the resection site or a new area.<sup>[3]</sup> Beside this, as piecemeal resection is done in conventional TURBT, deeper detrusor muscle layers may be missed that leads to histological under staging and re-TURBT. Subsequently, patients suffer from morbidity, more added cost, and poor oncological outcomes. In ERBT tumor is resected en bloc including pre-marked apparently healthy margins and deeper layer of tissue, so oncological principles are better maintained than conventional TURBT where piecemeal resection is done. Previous studies show that ERBT provides a good quality biopsy specimen and reduced the rate of re-TURBT and tumor recurrence.<sup>[4,5]</sup> However, to date, ERBT vs. conventional TURBT is a debatable issue

### Name & Address of Corresponding Author

Dr. Md. Shamim Hossain  
Assistant Professor,  
Department of Urology,  
Bangabandhu Sheikh Mujib Medical University,  
Dhaka, Bangladesh.

and a further larger study is required to reach a solid comment or recommendation. In this study, outcomes regarding safety, efficacy, and oncological aspects are compared between ERBT and conventional TURBT.

## MATERIALS AND METHODS

This retrospective study was done in the Department of Urology, BSMMU, Dhaka, Bangladesh. We collected data from hospital records and a total of 44 patients were included, among them, 22 patients who underwent ERBT were included in group A and group B included the same number of patients who underwent conventional TURBT during the period from February 2019 to January 2020. Patients who presented with the first-time occurrence of the tumor, solitary on imaging, 2-3 cm of tumor size, and NMIBC were included in this study. Tumor size more than 3 cm, multiple tumors, presence of carcinoma in situ, history of prior TURBT, and suspected muscle-invasive tumor were excluded from this study. Prior prediction of muscle invasiveness was made and the number and size of the tumor were calculated on ultrasonogram and computed tomography scan findings.

ERBT and conventional TURBT was performed by two separate urologists with experience of more than 10 years. Both procedures were performed with monopolar diathermy using a 26FR resectoscope with the 30-degree lens under regional anesthesia. The angle of the electrocautery loop was manually changed to 45-degree to perform ERBT. Following thorough cystoscopic examination, the tumor was identified and its base was marked circumferentially with electro-coagulation keeping 1 cm apparently healthy margin. All the visible vessels surrounding the tumor were coagulated. Resection started from the marked normal mucosa using cutting current and en bloc resection was completed including the deeper detrusor layer. Manually changed loop angle and resect scope beak were used to elevate the tumor from the resection bed. After detachment, tumor

mass was evacuated as a whole or cut into two or three pieces in case of the larger mass. Diagrammatic the operation note was made in every case. Both groups of patients received intravesical mitomycin within 6 hours of resection.

All patients in both groups were followed up with cystoscopy at 3 months and then 3 monthly for the first year along with some supportive investigations. The main outcome variables were significant operative complications (perforation, gross hematuria, and clot retention), presence of detrusor muscle in the biopsy specimen, and recurrence at 3 months (first follow-up cystoscopy) and at 1 year. Demographic and clinical data, as well as outcome variables, were compared between the patients who underwent ERBT and conventional TURBT. SPSS version 26, t-test, and Z-test of proportion with online calculator were used for statistical analysis. p-value was considered significant when it was <0.05.

## RESULTS

A total of forty-four patients were included in this study out of the twenty-two patients who underwent ERBT and the same number of patients underwent conventional TURBT between the time period from February 2019 to January 2020. According to inclusion criteria, patients were divided into two groups. Demographic, clinical, and tumor characteristics are compared between two groups and shown in [Table 1]. In the ERBT group, the mean age was 57.8 ±6.2 years, 59.1% was male and 40.9% was female; and in the conventional TURBT group, the mean age of the patients was 58.2 ±7.3years, 63.6% was male and 36.4% was female (age, p=0.85; sex, p=0.76). Mean tumor size was similar in both groups (2.7cm). In ERBT and conventional TURBT groups, low grade tumor was 40.9% vs. 45.5% and high grade tumor was 59.1% vs. 54.5% (p=0.76) respectively. The clinical-stage of most of the tumors was pT1 and it was 68.2% vs. 72.7% (p=0.74) between the two groups.

**Table 1: Demographic and clinical data of patients underwent ERBT and conventional TURBT.**

Variables	ERBT (n=22)	Conventional TURBT (n=22)	p-value
Age, years (mean ±SD)	57.8 ±6.2	58.2 ±7.3	0.85
Sex, n (%)			0.76
Men	13 (59.1)	14 (63.6)	
Women	9 (40.9)	8 (36.4)	
Tumor size, cm (mean ±SD)	2.7 ±0.6	2.7 ±0.5	1.00
Tumor grade, n (%)			0.76
Low	9 (40.9)	10 (45.5)	
High	13 (59.1)	12 (54.5)	
Tumor stage, n (%)			0.74
pTa	7 (31.8)	6 (27.3)	
pT1	15 (68.2)	16 (72.7)	

**Table 2: Comparison of outcomes between ERBT and conventional TURBT**

Variables	ERBT (n=22)	Conventional TURBT (n=22)	p-value
Operative time, min (mean ±SD)	35 ±5.2	41 ±6.3	0.001
Complications, n (%)			

Bladder perforation	1 (4.5)	0	
Gross hematuria	0	1 (4.5)	
Clot retention	0	1 (4.5)	
Presence of detrusor muscle			0.03
in biopsy specimen, n (%)	22 (100)	18 (81.8)	
Recurrence, n (%)			
At 3 months	3 (13.6)	5 (22.7)	0.43
At 1 year	5 (22.7)	8 (36.4)	0.32

**Table 3: Characteristics of the tumor on recurrence in two groups.**

Variables	At 3 months		At 1 year	
	ERBT (n=3)	*Con. TURBT (n=5)	ERBT (n=5)	*Con. TURBT(n=8)
Recurrence site, n (%)				
Primary site	1 (33.3)	3 (60)	2 (40)	5 (62.5)
New site	2 (66.7)	2 (40)	3 (60)	3 (37.5)
Tumor grade, n (%)				
Low	0	1 (20)	1 (20)	3 (37.5)
High	3 (100)	4 (80)	4 (80)	5 (62.5)
Tumor stage, n (%)				
pTa	1 (33.3)	2 (40)	1 (20)	2 (25)
pT1	2 (66.7)	3 (60)	4 (80)	6 (75)

\*Con. TURBT – conventional TURBT.

Mean operative time in the ERBT group was 35±5.2min, which was significantly shorter than in the conventional TURBT group (41±6.3min, p=0.001). Per-operative bladder perforation occurred in 1(4.5%) patient in the ERBT group and in conventional TURBT group 1(4.5%) patient developed gross hematuria with clot retention. Detrusor muscle in resected biopsy specimen was present in 100% of the patients in the ERBT group whereas in the conventional TURBT group it was 81.8% (p=0.03) which is statistically significant. The recurrence rate at 3 months on first follow-up cystoscopy was higher in the conventional TURBT group (22.7%vs.13.6%, p=0.43) which is not clinically significant.

Characteristics of the tumor on recurrence in ERBT and in conventional TURBT group are shown in [Table 3]. Primary site recurrence in conventional TURBT group was higher than in ERBT group at 3 months and 1 year follow up cystoscopy; it was 33.3% vs. 60% and 40% vs. 62.5% respectively.

## DISCUSSION

Worldwide the urinary bladder cancer is at 9th position among most frequently diagnosed cancer.<sup>[6]</sup> Though the exact statistical data of urinary bladder cancer in Bangladesh is lacking, our observation suggests that the incidence is increasing day by day. The primary and gold standard initial treatment option is transurethral resection of the whole tumor with a healthy margin of 1 cm including the detrusor muscle from the base of the tumor for complete resection and also for a standard biopsy specimen.<sup>[7]</sup> It is difficult to comment whether resection is complete or not but the presence of detrusor muscle in biopsy specimen helps to assess the completeness of resection. Detrusor muscle in biopsy specimen reduces the rate of re-TURBT, under-staging of the

tumor, recurrence, and progression of the tumor, and also prevents the delays in intravesical therapy administration.<sup>[8]</sup> our study shows the better quality specimen, reduced rate of under-staging, and recurrence in the ERBT group.

In the ERBT group, the pathologist can easily identify the presence of detrusor muscle in the biopsy specimen and can assess the depth of invasion of the tumor as well as margin free status. Mean operative time was shorter in the ERBT group than in the conventional TURBT group that is statistically significant (35min vs. 41min, p=0.001) in our study. Piecemeal resection, proper hemostasis, separate biopsy specimen from the base, and retrieval of the resected specimen may be the contributing factors for the relatively longer operation time in the conventional TURBT group. Longer operative time may be the theoretical risk factor of recurrence as fragmented tumors are exposed to mucosa for a longer period in conventional TURBT. Although in our study the recurrence rate at 3 months and at 1 year in the ERBT group is less than that found in the conventional TURBT group it is not statistically significant.

In this study, per-operatively a small bladder perforation occurred in one patient in the ERBT group that was managed conservatively, and in the conventional TURBT group one patient developed hematuria with clot retention but these results were not statistically significant (p= 0.31). A prospective study of 74 patients by Hurleet al showed that detrusor muscle was present in biopsy specimens in 100% of cases of the ERBT group.<sup>[9]</sup> Our study shows similar results and in the conventional TURBT group biopsy specimens showed the presence of detrusor muscle in 18 (81.8%) cases that is statistically significant in comparison to the ERBT

group ( $p=0.03$ ). So, ERBT provides a better quality resection and specimen.

ERBT is a safe and effective procedure as our study shows minimal complications that can be managed conservatively. But it is not recommended when the tumor is large and located in such a position where instrument manipulation is difficult. Limitations of this study are a small sample size and a single-center study. A larger study and long-term follow-up are needed to make an inference though some centers are now routinely practicing it with mixed outcomes.

## CONCLUSION

In any type of cancer surgery, oncological principles should be strictly followed. In ERBT well-controlled en bloc resection of the tumor is done that provides high-quality histopathological specimen to comment regarding margin status and depth of invasion. ERBT is a safe procedure and the same equipment that used in conventional TURBT is used to perform it. To make a conclusion regarding the recurrence and progression, multiple, large volume and long-term studies are needed. However, there is no doubt this promising operative technique follows the oncological principle more than conventional TURBT. We can adopt this technique globally after confirming the superiority with randomized controlled trials to optimize the endoscopic operative technique for bladder cancer.

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