Initial Experience With Surrounding En Bloc Transurethral Resection Of Bladder Tumor And Simultaneous Chemotherapy For Treating Non-Muscle Invasive Bladder Cancer

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Abstract

Introduction: The standard treatment for non-muscle-invasive bladder cancer (NMIBC) is transurethral resection of the tumour (TURBT) with adjuvant intravesical instillation therapy, as indicated by the tumor's risk of recurrence and progression. Despite adequate treatment, two-thirds of patients will have an intravesical recurrence, and one in every five will progress to muscle-invasive disease (MIBC) [3-a5].

Materials and Methods: Data were analysed from 55 consecutive patients who were newly diagnosed with NMIBC using magnetic resonance imaging (MRI) scanning and diffusion-weighted imaging (DWI), as well as cystoscopic examinations, and were treated between January 2021 and December 2021. These patients received either conventional TURBT and simultaneous chemotherapy (n=22) or surrounding en bloc TURBT and simultaneous intravesical chemotherapy (n=33). Primary NMIBC diagnosed with cystoscopic examination and MRI scanning, as well as a tumour diameter of 0.5-4.0 cm, were inclusion criteria.

Results: The surrounding en bloc TURBT was performed on 33 patients, while conventional TURBT was performed on 22 patients. There were no significant differences between the two groups in demographics, age, tumour diameter, number of tumours, T stage, or grade ($p > 0.05$). In the surrounding en bloc TURBT group, 18 (54.5%) of 33 patients had a single lesion, while 13 (60.0%) of 22 patients in the conventional TURBT group had a single lesion. Multiple lesions were discovered in 15 (45.5%) of 33 patients and 9 (40.0%) of 22 patients. The tumor diameter ranged from 0.5 to 4.4 cm (2.25 ± 0.96 cm) in the surrounding en bloc group and 0.8 to 4.5 cm (1.91 ± 0.95 cm) in the conventional group, and there was no statistically significant difference in tumor diameter between the two groups.

Conclusion: The findings of this study suggest that urologists can widely use surrounding en bloc TURBT and simultaneous intravesical therapy with a general bipolar electrode loop. It will help most patients with NMIBC reduce recurrence, even if they have T1 bladder cancer. The innovative strategy was feasible, effective, and risk-free. We believe that en bloc TURBT combined with concurrent chemotherapy will become the new standard for treating NMIBC in the future.

KeyWords: non-muscle-invasive bladder cancer, concurrent intravesical chemotherapy, simultaneous intravesical chemotherapy.

INTRODUCTION

The standard treatment for non-muscle-invasive bladder cancer (NMIBC) is transurethral resection of the tumour (TURBT) with adjuvant intravesical instillation therapy, as indicated by the tumor's risk of recurrence and progression. Despite adequate treatment, two-thirds of patients will have an intravesical recurrence, and one in every five will progress to muscle-invasive disease (MIBC) [3-a5].[1]

The TURB's quality determines the patients' prognosis and treatment costs. A re-TURB was performed on 935 patients in a retrospective multi-institutional cohort of 2,451 patients with T1G3/HG tumours treated with adjuvant bacillus Calmette Guérin (BCG). Only in patients with muscle in the specimen from the initial resection did the second resection improve recurrence-free survival (RFS), progression-free survival (PFS), and overall survival (OS).[2] Furthermore, the absence of detrusor muscle in the specimen has been linked to a significantly higher risk of residual disease, early recurrence, and tumour under staging. As a result, the presence of detrusor muscle in the specimen is regarded as a quality criterion for resection.[3]

Interestingly, two recent systematic reviews found residual tumour at re-TURB in up to 67% of Ta patients and 71% of T1 BC patients, even if muscle was present in the initial specimen. A retrospective multicenter study, on the other hand, found only 6.4% of residual cancer at re-TURB after en-bloc TURB (eTURB) for high risk NMIBC.[4]

In general, immediate instillation chemotherapy after TURBT should be completed within 24 hours of surgery, which may reduce the risk of recurrence in NMIBC patients. To improve the efficacy of instillation chemotherapy, we developed simultaneous intravesical instillation, in which patients receive immediate gemcitabine instillation chemotherapy within 10 minutes of TURBT.[5]

In this study, we combined en bloc resection of bladder cancer with the loop electrode and concurrent chemotherapy in patients with NMIBC. We present our preliminary findings and compare the oncological outcomes of the novel strategy to those of the conventional operation.

MATERIALS AND METHODS

Data were analysed from 55 consecutive patients who were newly diagnosed with NMIBC using magnetic resonance imaging (MRI) scanning and diffusion-weighted imaging (DWI), as well as cystoscopic or cytological examinations, and were treated between January 2021 and December 2021. These patients received either conventional TURBT and simultaneous chemotherapy (n=22) or surrounding en bloc TURBT and simultaneous intravesical chemotherapy (n=33). Primary NMIBC diagnosed with cystoscopic examination and MRI scanning, as well as a tumour diameter of 0.5-4.0 cm, were inclusion criteria. Urothelial carcinoma was diagnosed postoperatively. Recurrent NMIBC, muscle invasive bladder cancer, concomitant upper tract urothelial carcinoma, tumour at the bladder neck, and tumour with a diameter greater than 4.0 cm were all exclusion criteria. All patients underwent TURBT at Department of urology, Rajah Muthiah Medical College Hospital,Annamalai Nagar,after getting approval from the institution's ethical committee . F26.5 continuous flow resectoscopy and a general 12-degree bipolar electrode loop were used to perform surrounding en bloc and conventional TURBT (Allen 400, Olympus, Japan). The coagulation and cutting modes were set to 200 and 120 W, respectively. Before the procedure, all patients signed informed consent forms. These patients' clinical data were collected and analysed retrospectively.

Surgical procedure: Following the induction of general anaesthesia, patients were placed in the dorsal lithotomy position. Complete cystourethroscopy with F-26 resectoscope (Olympus) was performed again before resection to avoid missing the concomitant tumour and to confirm tumour position. During the procedure, 0.9% saline was used for irrigation. Initially, normal mucosa was excised 1.0-1.5 cm away from the tumour using the surrounding tumour technique. The muscle layer was reached, and muscle fibres could be seen clearly. Following that, a blunt push combined with electric resection was advanced to the tumor's base along the muscle layer. The base of the tumour was lifted or pushed using the bipolar loop electrode under clear vision, depending on the location of the tumour, and the intact tumour was removed from the bladder walls.

The direction of the loop electrode was frequently adjusted based on the shape of the tumour. For multiple tumours, the bladder wall was divided into round areas, each of which contained some lesions, using an electrode loop. Surrounding en bloc TURBT was performed using a similar technique. The tumour was not touched by the loop electrode during the operation to avoid potential seeding. When the resection was finished, the specimen was immediately removed using a resectoscope sheath.

All patients in the en bloc TURBT and conventional TURBT groups received concurrent intravesical chemotherapy. In 40 mL of 0.9% saline, 1.0 g gemcitabine was dissolved. After the resectoscope sheath was removed, an F-18 Foley catheter was inserted into the bladder, and gemcitabine solution was immediately instilled into the bladder cavity within 10 minutes of TURBT in the operating room. The Foley catheter was also clipped for 1 hour at the same time. Following that, patients received gemcitabine intravenous chemotherapy weekly for 8 weeks. Patients were examined using MRI scanning, cystoscopic and cytological examinations every three months. If evidence of suspected recurrence was found, we performed a biopsy during the cystoscopic examination.

Statistical analysis: Non-parametric To analyse continuous and categorical data, the Mann-Whitney and chi-square tests were used. A statistically significant difference was defined as a P-value less than 0.05. All analyses were carried out using the SPSS software package (SPSS 19.0, Chicago, IL, USA).

RESULTS

The surrounding en bloc TURBT was performed on 33 patients, while conventional TURBT was performed on 22 patients. There were no significant differences between the two groups in demographics, age, tumour diameter, number of tumours, T stage, or grade ($p > 0.05$). In the surrounding en bloc TURBT group, 18 (54.5%) of 33 patients had a single lesion, while 13 (60.0%) of 22 patients in the conventional TURBT group had a single lesion. Multiple lesions were discovered in 15 (45.5%) of 33 patients and 9 (40.0%) of 22 patients. The tumor diameter ranged from 0.5 to 4.4 cm (2.25 ± 0.96 cm) in the surrounding en bloc group and 0.8 to 4.5 cm (1.91 ± 0.95 cm) in the conventional group, and there was no statistically significant difference in tumor diameter between the two groups.

Variables	**Surrounding en bloc TURBT (n = 33)**	**Conventional TURBT (n = 22)**	**P Value**
Gender			
Male	23 (69%)	19 (84%)	0.076
Female	10 (30%)	3 (25%)	
Age (years)	60.12±12.12	61.08±10.65	0.0222
Diameter of tumour	2.24±0.82	1.90±0.85	0.067
<3 cm	25(77%)	18 (80%)	
≥3 cm	7 (22.8%)	5 (20%)	
Number of tumour			
Single tumour	18(54%)	14 (60%)	0.672
Multiple tumour	15 (45%)	9(40%)	
T stage			
Ta	19(59%)	15 (64.4%)	
T1	14 (41%)	8 (35.6%)	
Concomitant CIS	0	0	
Presence of muscularis propria	31 (95%)	18 (60%)	
Grade			0.925
Low grade	23 (68%)	17 (75.6%)	

High grade	10 (31.8%)	6 (25%)	
Risk groups			
Low	11 (33%)	8 (35.6%)	0.351
Intermediate	13 (39.4%)	9 (40%)	
High	9 (27.3%)	5 (24%)	

Table 1: Baseline clinical characteristics of patients

Variables	**Surrounding en bloc TURBT (n = 33)**	**Conventional TURBT (n = 22)**	**P Value**
Operation time (min)	30.12±7.12	38.52±17.17	0.374
Bladder perforation	0(0%)	0(0%)	-
Obturator reflex	3 (21%)	6 (26%)	0.412
Postoperative length of stay (day)	3.3 ± 1.7	4.5 ± 2.2	0.015
Postoperative catheterization (day)	5.4 ± 1.8	6.5 ± 2.1	0.016
Follow-up time (month)	22.7 ± 9.1	25.6 ± 6.8	0.064
Cumulative recurrence	2	9	0.004

Table 2: perioperative complications and oncological outcome

DISCUSSION

Traditional TURBT remains the standard surgical procedure for NMIBC, but the recurrence rate remains high (from 50 to 70%) due to the absence of muscularis propria in most specimens and an indefinite scope of resection. One possible explanation is that multiple pieces of specimen are more likely to spread active tumour cells.[6] When the initial TURBT is incomplete, there was no muscle in the specimen in the initial TURBT, or a stage T1 tumour is detected, a second TURBT should be performed within 2 to 6 weeks, according to EAU guidelines. When compared to traditional TURBT, surrounding en bloc resection reduces the possibility of incomplete TURBT and muscle loss, and most patients with stage T1 tumours do not require a second TURBT. The novel technique may provide adequate resection size and depth as well as accurate pathological diagnosis.[7]

Although an en bloc resection technique for NMIBC has been reported, in our study, a general bipolar electrode loop and resectoscope were used to perform surrounding en bloc resection of bladder tumour with no other special equipment. The instruments used in this study differ from those used in previous studies, such as the J shape electrode or the button electrode.[8] Furthermore, laser was used in the en bloc resection of bladder tumours, but a new energy platform may be required.[9] We coagulated the mucosa and vessels surrounding the tumour first, then vertically incised the mucosa to the deep muscle layer and used the fine loop to push or resect the layer. Another retrograde en bloc technique has been reported, and it is suitable for single or small lesions. However, a large tumour and several tumours. the technique may not be appropriate because the outline of tumours may interfere with the urologist's vision during resection.[10]

Our study has some limitations. Because this was a retrospective study, we used the novel surrounding en bloc technique and conventional TURBT at different times. Tumors on the bladder neck are ineligible for surrounding en bloc TURBT. The study lacked postoperative cytological evidence. The small size of the patient groups and the short follow-up period make it difficult to draw conclusions about survival. A prospective, randomised, controlled trial is required in the future.

CONCLUSION

The findings of this study suggest that urologists can widely use surrounding en bloc TURBT and simultaneous intravesical therapy with a general bipolar electrode loop. It will help most patients with NMIBC reduce recurrence, even if they have T1 bladder cancer. The innovative strategy was feasible, effective, and risk-free. We believe that en bloc TURBT combined with concurrent chemotherapy will become the new standard for treating NMIBC in the future.

REFERENCES

1. Brausi M, Collette L, Kurth K, van der Meijden AP, Oosterlinck W, et al. (2002) Variability in the Recurrence Rate at First Follow-up Cystoscopy after TUR in Stage Ta T1 Transitional Cell Carcinoma of the Bladder: A Combined Analysis of Seven EORTC Studies. Eur Urol 41(5): 523–531.
2. Svatek RS, Hollenbeck BK, Holmäng S, Lee R, Kim SP, et al. (2014) The Economics of Bladder Cancer: Costs and Considerations of Caring for This Disease. Eur Urol 66(2): 253–262.
3. Sievert KD, Amend B, Nagele U, Schilling D, Bedke J, et al. (2009) Economic aspects of bladder cancer: what are the benefits and costs? World J Urol 27(3): 295-300.
4. Soria F, Marra G, D'Andrea D, Gontero P, Shariat SF (2018) The rational and benefits of the second look transurethral resection of the bladder for T1 high grade bladder cancer. Transl Androl Urology 8(1): 46-53.
5. Gontero P, Sylvester R, Pisano F, Joniau S, Oderda M, et al. (2016) The impact of re-transurethral resection on clinical outcomes in a large multicentre cohort of patients with T1 high-grade/Grade 3 bladder cancer treated with bacille Calmette–Guérin. BJU Int 118(1): 44-52.
6. Mariappan P, Zachou A, Grigor KM, Edinburgh Uro Oncology Group (2010) Detrusor Muscle in the First, Apparently Complete Transurethral Resection of Bladder Tumour Specimen Is a Surrogate Marker of Resection Quality, Predicts Risk of Early Recurrence, and Is Dependent on Operator Experience. Eur Urol 57(5): 843-849.
7. Cumberbatch MGK, Foerster B, Catto JWF, Kamat AM, Kassouf W, et al. (2018) Repeat Transurethral Resection in Non–muscle-invasive Bladder Cancer: A Systematic Review. Eur Urol 73(6): 925-933.
8. Naselli A, Hurle R, Paparella S, Buffi NM, Lughezzani G, et al. (2018) Role of Restaging Transurethral Resection for T1 Non–muscle invasive Bladder Cancer: A Systematic Review and Meta-analysis. Eur Urol Focus 4(4): 558-567.
9. Hurle R, Casale P, Lazzeri M, Paciotti M, Saita A, et al. (2019) En bloc re-resection of high-risk NMIBC after en bloc resection: results of a multicenter observational study. World J Urol 1-6.
10. Suarez Ibarrola R, Soria F, Abufaraj M, D'Andrea D, Preto M, et al. (2019) Surgical checklist impact on recurrence-free survival of patients with non-muscle-invasive bladder cancer undergoing transurethral resection of bladder tumour. BJU Int 123(4): 646-650.