BIPOLAR ENERGY FOR TRANSURETHRAL RESECTION OF NON MUSCLE INVASIVE BLADDER CANCER - HISTOPATHOLOGICAL AND PREDICTING DISEASE RECURRENCE

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SUMMARY

Objectives: *To evaluate the histopathology and predict recurrence in bipolar energy for transurethral resection of bladder tumors (TURBT).* ***Subjects and methods:*** *This was a prospective and descriptive study that was done between October 2015 and November 2018. Sixty-two patients of non-muscle invasive bladder cancer underwent bipolar TURBT using saline irrigation solutions.* ***Results:*** *Male 80.7%, female 19.3%. Average age 61.9 ± 15.1. The history of bladder tumor surgery: Tumor recurrence 29.0%. Tumor number: single 40.3%; 2 - 7 tumors 48.4%; > 8 tumors 11.3%. Size of tumor: 88.7% ≤ 3 cm, 11.3% > 3 cm. Risk group stratification: low-risk tumors 20.9%, intermediate-risk tumors 69.3%, high-risk tumors 9.7%. Grading: G1: 80.65%, G2: 17.74%, G3: 1.61%. Staging: Tis 1.61%, Ta 91.94%, T1 6.45%.* ***Conclusion:*** *Bipolar energy for TURBT with one year follow-up has a recurrence rate of 12.9% and the complete response was 87.1%. The recurrence rate increases according to risk factors like the number of tumors, the tumor size, the pre-operation status which is primary or recurrent tumors, staging and grading of tumors.*

** Keywords: Bipolar; Bladder tumor; Saline; Transurethral resection.*

INTRODUCTION

Bladder cancer, most commonly epithelium carcinoma, is a common malignant tumor in the urinary tract. At the time of diagnosis, approximately 75% are non-muscle invasive bladder cancer. After transurethral resection of non- muscle invasive bladder tumors, the recurrence disease is 50 - 70%, with 45% progression, more invasive than before [9].

The summary of GLOBOCAN-2019 Cancer Journal, bladder cancer has the 8th highest incidence rate in the world and the 11th highest mortality rate. In 2018, there were about 549.400 patients with new bladder cancer in the world. The number of deaths due to bladder cancer was 199.900 people [5].

Therefore, the use of histopathological variables such as the number of tumors, the tumor size, staging and grading of tumors. To predict the risk of recurrence has an important significance. As progression has a poor prognosis, it is important to classify patients for further treatment planning so that the patient can benefit from early cystectomy or can be best managed by bladder preservation treatment [7].

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SUBJECTS AND METHODS

1. Subjects

62 patients were diagnosed with bladder cancer and its post-operative pathological results were non-invasive muscle bladder cancer (pTis, pTa, pT1). These patients were treated with bipolar TURBT, from October 2015 to November 2018 at the Urological Department, Military Hospital 103.

***** *Selection criteria:*

+ The results of post-operative pathology were pTis, pTa, pT1.

+ Patients suffered from primary bladder cancer or recurrence.

+ Patients were pumped Doxorubicin into the bladder after surgery according to the correct regimen.

+ Patients had enough records to conduct a research analysis.

2. Methods

** Research design:* A prospective and descriptive study.

** Research process:*

- The patient was diagnosed with cystoscopy and a biopsy before surgery.

- Indication: tumor size ≤ 5 cm, tumor number < 25, unlimited tumor position.

- Surgical technique: depending on the tumor base and tumor location. Small tumors can be resected en bloc; larger tumors should be resected separately infraction. Take the tumor base containing muscularis propria and its margin to make the pathology.

- Adjuvant intravesical chemotherapy: Instillation of doxorubicin into the bladder in the first week post-operative, one dose/week and treated with 8-week maintenance.

** Research parameters:* Age, gender, history of bladder tumor: primary or recurrence tumor, tumor number, tumor size, post-operative pathology: grading, staging; risk group stratification; recurrence rate; probability of recurrence categories.

RESULTS

1. Characteristics of patients

- Gender: Male 80.7% (50 cases), female 19.3% (12 cases).

- Average age: 61.9 ± 15.1 years old, the youngest 26 years, the oldest 91 years.

2. Characteristics of tumor

** The status of tumor:*

- Prior recurrence status: Recurrence tumor 29.0% (18/62).

- The rate of recurrence related to prior recurrence status:

+ The pre-operation status of tumor being primary: The rate of post-operation recurrence 6.8%

+ The pre-operation status of tumor recurrence: The rate of post-operation recurrence 27.8%. (OR = 5.25; 95%CI: 1.103 - 25.0501, p = 0,039).

** Number of tumors:*

Table 1: Number of tumor (n = 62).

Number of tumors	Number of patients	%
1 tumor	25	40.3
2-7 tumors	30	48.4
≥ 8 tumors	7	11.3
Total	62	100.0

** The rate of recurrence related to the number of tumors:*

Table 2: The rate of recurrence related to the number of tumors.

Tumor number	Recurrence (n, %)	p
1	1 (4.0)	
2 - 7	3 (10.0)	
> 8	4 (57.1)	0,0008

** Size of tumor:*

- Tumor ≤ 3 cm: 88.7% (55/62); 3 cm: 11.3% (7/62).

Table 3: The rate of recurrence related to the tumor size .

Tumor size	n (%)	p
≤ 3 cm	7 (12.7)	
> 3 cm	1 (14.3)	0.63

The biggest tumors were chosen

** Post-operative pathology:*

- Staging: Ta 91.9% (57/62), T1 6.5% (4/62), Tis 1.6% (1/62);

- Grading: G1 80.7% (50/62), G2 17.7% (11/62), G3 1.6% (1/62).

** The recurrence rate related to the extent of invasive tumor (stage):*

Table 4: The recurrence rate related the extent of invasive tumor.

Stage of tumor	Status of recurrence (n, %)	p
Tis	0 (0.0)	
Ta	6 (10.5)	
T1	2 (50.0)	0.06

** The recurrence rate related the grading level:*

- Grade 1: Recurrence rate 8% (4/50), Grade 2: 27.3% (3/11), Grade 3: 100% (1/1) (p = 0.0073).

** Risk group stratification:* According to the European association of urology guidelines (EAU)-2019 [4]:

- Low-risk tumors group: 21.0% (13/62);

- Intermediate-risk tumors group: 69.3% (43/62);

- High-risk tumors group: 9.7% (6/62).

** The recurrence rate related to the risk group:*

- Low-risk tumors group: Recurrence rate 0.0%;

- Intermediate-risk tumors group: Recurrence rate 13.9%;

- High-risk tumors group: Recurrence rate 33.3% (p = 0.12).

** The probability of recurrence categories:* According to the European organization for the research and treatment of cancer scoring system [4]:

- Very low-probability of recurrence group: 19.4% (12/62) ;

- Low-probability of recurrence group: 41.9% (26/62);

- Intermediate-probability of recurrence group: 32.3% (20/62);

- High-probability of recurrence group: 6.4% (4/62).

** Treatment result:* Good 96.8% (60 cases), moderate 3.2% (2 cases).

* *Recurrence* (one year follow up):12,9% (8/62).

** Recurrence rate according to the probability of recurrence categories:*

Table 5: Recurrence rate according to probability of recurrence categories.

Recurrence diseases	Probability of recurrence categories								p
	Very low		Low		Intermediate		High		
	n	%	n	%	n	%	n	%	
Yes	0	0.0	2	7.7	4	20.0	2	50.0	0.042
No	12	100.0	24	92.3	16	80.0	2	50.0	
Total	12	100.0	26	100.0	20	100.0	4	100.0	62

- Very low-probability of recurrence: 0.0% (0/12);
- Low-probability of recurrence: 7.7% (2/26);
- Intermediate - probability of recurrence: 20.0% (4/20);
- High-probability of recurrence: 50.0% (2/4).

DISCUSSION

The number of tumors is a risk factor for the prognosis of recurrence, patients with multiple tumors often have a higher recurrence rate than single tumors. In this study, patients with 1 tumor, from 2 - 7 tumors and 8 tumors or more had a recurrence rate of 4.0%; 10.0% and 57.1%, respectively (p = 0.0008). According to the study by Ha Manh Cuong, Do Truong Thanh et al. (2019): The reccurrence rate with 1 tumor, from 2 - 7 tumors and 8 tumors or more was 5.55%; 11.11% and 66.66%, respectively (p < 0.01), the follow-up time was 18 months [1]. The study by Wang L. et al (2014) had 1 tumor with the recurrence rate of 24.3%, multiple tumors with 44.7% recurrence (p < 0.0001) [10].

If the pre-operation status is recurrent tumors, the rate of post-operation recurrence is often higher. In this study, as for the pre-operation status related to the primary tumor and recurrent tumor, the recurrence rate was 6.8% and 27.8%, respectively (OR: 5.2; 95%CI = 1.103 - 25.0501, p = 0.039). The results showed that if the pre-operation status has recurrent tumors, the recurrence rate after surgery increases up to 5.2 times. According to research by Ha Manh Cuong, Do Truong Thanh et al (2019): The primary tumor had a recurrence rate of 7.54%, the recurrent tumor had a recurrence rate of 31.25% (p < 0.05) [1].

When the tumor is larger than 3cm, the recurrence rate will be higher and the prognosis will be worse. One year follow-up results in this study indicate that when a tumor was ≤ 3 cm and > 3 cm, the recurrence rate was 12.7% and 14.3%, respectively (p = 0.63). The study by Lopez BA et al. indicates that when the tumor size was 5 cm, the probability of recurrence was 100% (p < 0.0034), with an average follow-up time of 63.82 months [8]. The study by Wang L. et al (2014) shows that if tumor was ≤ 3 cm and > 3 cm, the recurrence rate was 30.8% and 44.8%, respectively (p = 0.006), the average follow-up time of 27 months [10].

This study showed that the higher the grading level, the higher the recurrence rate; at grade 1, grade 2 and grade 3, the recurrence rate was 8.0%, 27.3% and 100%, respectively (p = 0.0073). Wang L.'s study also showed that the higher the pathology of the tumor, the higher the recurrence rate (p < 0.0001) [10].

The extent of invasive tumors has a very important prognostic value. The higher the staging level, the higher the recurrence rate. In the stage Ta tumors, the recurrence rate of tumors was 10.5%, and in the stage T1 tumors, the recurrence rate increased up to 50%, with p = 0.06. This result was also consistent with the study by Wang L et al. (2014): In stage Ta tumor, the rate of recurrence was 31.1%; in stage T1 tumor, the rate of recurrence increased to 66.7% (p < 0. 0001) [10].

Stratification of patients with bladder tumors in risk groups is needed for the purpose of follow-up, prognosis and adjuvant treatment after surgery. In this study, stratification is based on EAU-2019 guidelines [4]: The low-risk tumors group accounted for 21.0%; the intermediate-risk tumors group was 69.3% and the high-risk group was 9.7%. We found that the recurrence rate in this study increased gradually according to the level of risk. The higher the risk, the higher the rate of recurrence. The recurrence rate of low-risk group, the intermediate-risk group and the high-risk group was 0.0%; 13.9% and 33.3%, respectively (p = 0.12). A recent study by Ha Manh Cuong, Do Truong Thanh et al. (2019) also showed that the recurrence rate increased gradually according to the level of risk. In the group of low-risk patients, the intermediate-risk group and the high-risk group, the recurrence rate was 5.26%; 9.75% and 44.44%, respectively [1].

Based on the classification by Nguyen Ky [2], we had the following treatment results: Good 96.8% (60 cases), moderate 3.2% (2 cases).

After 12 months of follow-up, there were 8 cases of recurrence (12.9%); but there were no cases of tumor pathology raising staging and grading level. In one year follow-up result evaluation: 87.1% responded well, 12.9% partially responded, none of the patients did not respond to treatment. This study also showed that the recurrence rate increased gradually according to the probability of recurrence groups (p = 0.042); the group with a very low probability of recurrence, the low group, the intermediate group and the high group had a recurrence rate of 0%; 7.7%; 20% and 50%, respectively. One year after surgery, the recurrence rate in this study is also consistent with the study results by Abotaleb A. A. (2017) 15.2% [3], Gupta N. P. (2011) 12.24% [6].

CONCLUSION

Bipolar energy for TURBT with a year follow-up has a recurrence rate of 12.9% and the complete response is 87.1%. The recurrence rate increases according to risk factors like the number of tumors, the tumor size, the preoperation status, which is primary or recurrent tumors, staging and grading of tumors.

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