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Clinical Efficacy of Transurethral Resection of Bladder Tumors and its Impact on Patient Prognosis

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Abstract: *Objective:* To explore the clinical benefits of transurethral resection of bladder tumors (TURBT) in treating bladder cancer. *Methods:* 60 bladder cancer cases were divided into a control group and an observational group according to their surgical plans. The control group underwent traditional open surgery, while the observation group underwent TURBT. The general surgical observation indicators, postoperative complication rates, and prognosis were compared between the two groups. *Results:* The operative time, urinary catheter indwelling time, and hospitalization time of the observation group were shorter than those of the control group. Besides, the observation group also had smaller intraoperative blood loss compared to the control group. The postoperative complications and the disease recurrence rate after 1 year of follow-up of the observation group were both lower than those of the control group ($P < 0.05$). There was no statistically significant difference in mortality between the two groups after 1 year of follow-up ($P > 0.05$). *Conclusion:* TURBT can shorten the operative time and accelerate the recovery of bladder cancer patients. Besides, it also has a lower risk of postoperative complications and recurrence. Therefore, it should be popularized in clinical practice.

Keywords: Transurethral resection of bladder tumors; Bladder cancer; Clinical efficacy; prognosis

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1. Introduction

Bladder cancer is one of the top ten common malignant tumors and also the most common type of urogenital tumor. As the name suggests, it refers to malignant tumors on the bladder mucosa. Most of the patients are middle-aged and older men, and the disease is more prevalent in Western countries. However, in recent years, with the changes in diet and living habits, the number of people who have bladder cancer in China has also increased [1]. There are currently many methods for treating bladder cancer, with surgery being the preferred option. However, open surgery is highly invasive. It could easily cause urinary incontinence, erectile dysfunction, and other complications that will seriously affect the patient's quality of life. There is still a high probability of disease recurrence after surgery [2]. Transurethral resection of bladder tumors (TURBT) has been

used clinically in China since the 1980s, it has been proven to effectively preserve organs while maximizing the removal of lesions with less stress damage [3]. In this study, 60 bladder cancer patients were selected as samples to study the application of TURBT.

2. Materials and methods

2.1. Materials

60 bladder cancer cases were enrolled, all of which were treated between October 2020 and October 2022. The patients were divided into a control group and an observation group based on the type of surgery received, with 30 cases in each group. The control group consisted of 25 males and 5 females, aged between 55 and 80 years old, with a mean of 67.53 ± 8.19 years; the course of disease ranged from 2 to 13 months, with a mean of 7.51 ± 3.18 months. There were 26 males and 4 females in the observation group, aged 55 to 82 years old, with a mean of 67.68 ± 8.25 years; the duration of the disease was 2 to 14 months, with a mean of 7.55 ± 3.20 months. There was no significant difference in the baseline data between the two groups ($P > 0.05$). Inclusion criteria: (1) Diagnosed with bladder cancer by pathological examination; (2) no invasion of perivesical tissue; (3) first case and had complete clinical data; (4) met the relevant indications for surgical treatment; (5) conscious and able to communicate normally and had no history of mental, cognitive, or psychological diseases; (6) signed informed consent. Exclusion criteria: (1) Presence of severe dysfunction of important organs such as heart, lung, and kidney; (2) presence of other malignant tumors; (3) presence of severe urinary system infection; (4) presence of blood system and immune system diseases; (5) contraindications related to surgical treatment; (6) transferred to another hospital midway or dropped out of the study.

2.2. Method

The control group received traditional open surgery. The patients were instructed to assume a prone position (buttocks are elevated), and general anesthesia was administered. After the anesthesia came into effect, a 7–10 cm incision was made in the middle of the lower abdomen. After incising the bladder tissue layer by layer, the tumor tissues were removed via electrosurgery. Tumor tissues in the ureter were also removed together. Subsequently, a drainage tube will be left in place, and the abdominal wall will be closed layer by layer to complete the operation. After surgery, pirarubicin was used to perfuse the bladder according to routine procedures, and relevant antibiotics and chemotherapy drugs were administered according to the doctor's instructions.

The observation group underwent TURBT. Epidural anesthesia was administered at the lithotomy position at the bladder. After the anesthesia took full effect, a resectoscope was slowly inserted through the urethra to observe internal lesions and locate the tumor. After locating it and determining the quantity, size, and other characteristics of the tumor, the tumor tissues were effectively resected in an antegrade or lateral manner "from far to near" and "from small to large." The resection range must include the tumor tissue and its base. The superficial muscle tissue 2 cm above the tumor should be cut to a depth that reaches the deep muscle layer of the bladder. Finally, after confirming that the tumor tissue has been completely removed, rinse it with an appropriate amount of distilled water and leave a urinary catheter to complete the operation. Postoperative operations were the same as those in the above group.

2.3. Observation indicators

(1) General observation indicators of surgery

The operative time, intraoperative blood loss, urinary catheter indwelling time, and hospitalization time

were compared normatively between the two groups.

(2) Postoperative complication rate and prognosis

The incidence rates of postoperative complications, including infection, ureteral injury, bladder bleeding, bladder spasm, etc., were counted and compared between the two groups. At the same time, the two groups were followed up for one year to compare the recurrence rate of the disease during the statistical period with the mortality rate.

2.4. Statistical analysis

SPSS25.0 for Windows was used for data processing. The measurement data were represented as mean ± standard deviation and analyzed using a *t*-test; the count data were represented as percentages and analyzed using a chi-square test. $P < 0.05$ indicated statistical significance.

3. Results

3.1. General observation indicators

As shown in **Table 1**, the operative time, intraoperative blood loss, urinary catheter indwelling time, and hospitalization time of the two groups were lower than those of the control group ($P < 0.05$).

Table 1. Comparison of observation results of general surgical indicators (mean ± standard deviation)

Group	Number of cases, *n*	Operative time (min)	Intraoperative blood loss (mL)	Urinary catheter indwelling time (d)	Hospitalization day (d)
Control group	30	78.95 ± 12.62	36.14 ± 5.82	8.49 ± 3.59	10.05 ± 4.98
Observation group	30	37.85 ± 5.98	19.54 ± 2.14	4.25 ± 1.96	5.08 ± 2.16
t	-	16.120	14.663	5.678	5.015
P	-	0.001	0.001	0.001	0.001

3.2. Postoperative complication rates and prognosis

As can be seen from **Table 2**, the postoperative complication and the disease recurrence rates after 1 year of follow-up of the observation group were significantly lower than those of the control group ($P < 0.05$). There was no difference in the mortality rate between the two groups after 1 year of follow-up ($P > 0.05$).

Table 2. Comparison of postoperative complication rates and prognosis (*n* [%])

Group name	Number of cases, *n*	Postoperative complications					Prognosis	
		Infection	Ureteral injury	Bladder bleeding	Bladder spasms	Total value	Disease recurrence rate	Mortality rate
Control group	30	2(6.67)	1 (3.33)	1 (3.33)	2 (6.67)	6 (20.00)	8 (26.67)	1 (3.33)
Observation group	30	1 (3.33)	0 (0.00)	0 (0.00)	0 (0.00)	1 (3.33)	2 (6.67)	0 (0.00)
χ^2	-	-	-	-	-	4.043	4.320	1.017
P	-	-	-	-	-	0.044	0.038	0.313

4. Discussion

The pathological types of bladder cancer differ from country to country or region to region. In Western Europe and the United States, the primary type of bladder cancer is urothelial cancer. In contrast, bladder squamous

cell carcinoma is more common in Africa. Bladder cancer is less prevalent in Eastern Europe and Asia, with most of the cases being superficial bladder cancer, which is a non-muscle-invasive malignant tumor limited to the urothelium. It is relatively common in new cases, accounting for up to 75–85%, and the progression and recurrence rates are relatively high, 40% and 70% respectively [4,5]. At present, the clinical causes of bladder cancer have not yet been clearly understood. Still, two causative factors have been clear, namely smoking and occupational exposure to aromatic amine chemicals. In addition, the clinical manifestations of bladder cancer have been statistically analyzed in a large number of clinical trials. It was found that more than 90% of the patients had hematuria as their initial clinical symptom, with different manifestations such as painless, intermittent, gross hematuria, or even microscopic hematuria. A few patients may not have gross hematuria symptoms but will develop urinary urgency, frequent urination, glucose in urine, difficulty urinating, and bladder irritation [6,7].

Surgical treatment is the primary treatment option for bladder cancer. However, traditional open surgery has larger incisions and can easily cause more bleeding and tissue damage. Therefore, the probability of postoperative complications is higher, and the prognosis is relatively unsatisfactory [8]. In recent years, as the concept of "humanistic care" continues to deepen in clinical practice, organ preservation has gradually been emphasized in surgical procedures. When applied to patients with bladder cancer, it means removing lesions as much as possible without affecting urethral function. Still, an optimum surgical procedure is yet to be formulated [9]. TURBT is the currently recommended minimally invasive surgery type. It has the following advantages [10-12]: (1) Transurethral insertion of the resectoscope does not cause too much trauma, the blood loss during the operation is less, and the stress reaction that can be induced is also smaller. (2) The electrosurgical lens can display the lesions in high definition and increases the field of view, which is more conducive to the discovery and removal of small lesions, thus reducing the risk of disease recurrence. (3) The operation preserves urethral function and is less likely to damage the urethral tissue and surrounding bladder tissue. Therefore, the probability of postoperative complications is smaller, making it more conducive to improving the patient's quality of life. According to the results of this study, compared to the control group, the operation time and postoperative recovery time of the observation group were shorter, and the total postoperative complications and disease recurrence rate were only 3.33% and 6.67%, respectively. This proves that the TURBT is superior to traditional open surgery.

5. Conclusion

In summary, TURBT can shorten treatment time, and reduce stress injuries, postoperative complications, and the probability of disease recurrence, of bladder cancer patients. Therefore, this procedure should be popularized in clinical practice.

Disclosure statement

The author declares no conflict of interest.

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