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Value of Repeated Transurethral Resection in Superficial Bladder Cancer

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ABSTRACT

Introduction: Repeat transurethral resection (re-TURBT) has been proposed as a method to improve staging accuracy and reduce the likelihood of recurrence by detecting residual tumor tissue. The purpose of this study is to evaluate the efficacy of re-TURBT in patients with superficial bladder cancer.

Materials and Methods: This prospective study included 100 patients with superficial bladder cancer (Ta and T1 stages) treated at the Urology Clinic of Istanbul Fatih Sultan Mehmet Training and Research Hospital between January 2005 and December 2006. Following the initial TURBT, all patients underwent re-TURBT within 4 to 6 weeks. Pathological findings from both procedures were analyzed to identify residual tumor presence and changes in tumor stage. Patients were followed up for 24 months to monitor recurrence rates and progression to muscle-invasive disease.

Results: Re-TURBT revealed residual tumor tissue in 40% of patients, with higher detection rates in T1 and Grade II tumors. Patients with residual tumors had a significantly higher recurrence rate (40%) compared to those without residual tumors (15%). Additionally, 20% of patients with residual tumors progressed to muscle-invasive bladder cancer, while no progression was observed in patients without residual tumors.

Conclusion: Re-TURBT plays a vital role in improving staging accuracy and reducing recurrence in patients with superficial bladder cancer. The presence of residual tumors significantly increases the risk of recurrence and progression, highlighting the importance of re-TURBT, especially in high-risk patients. These findings support the routine use of re-TURBT in managing superficial bladder cancer.

Keywords: Bladder cancer, transurethral resection, re-TURBT, residual tumor, recurrence, staging accuracy

ÖZET

Giriş: Tekrar transüretral rezeksiyon (re-TURT), mesane kanserinde evreleme doğruluğunu artırmak ve rezidüel tümör dokusunu tespit ederek nüks olasılığını azaltmak için bir yöntem olarak önerilmiştir. Bu çalışmanın amacı yüzeyel mesane kanseri olan hastalarda re-TURT etkinliğini değerlendirmektir.

Gereç ve Yöntemler: Bu prospektif çalışmaya Ocak 2005-Aralık 2006 tarihleri arasında İstanbul Fatih Sultan Mehmet Eğitim ve Araştırma Hastanesi Üroloji Kliniği'nde tedavi edilen yüzeyel mesane kanserli (Ta ve T1 evreleri) 100 hasta dahil edildi. İlk TURT'u takiben, tüm hastalara 4 ila 6 hafta içinde yeniden TURT uygulandı. Her iki prosedürden elde edilen patolojik bulgular rezidüel tümör varlığını ve tümör evresindeki değişiklikleri belirlemek için analiz edildi. Hastalar nüks oranlarını ve kas invaziv hastalığa ilerlemeyi izlemek için 24 ay boyunca takip edildi.

Bulgular: Re-TURT hastaların %40'ında rezidüel tümör dokusu ortaya çıkardı ve T1 ve Grade II tümörlerde daha yüksek saptama oranları vardı. Rezidüel tümörü olan hastalarda nüks oranı (%40), rezidüel tümörü olmayanlara (%15) kıyasla anlamlı derecede yüksekti. Ek olarak, rezidüel tümörlü hastaların %20'si kas invaziv mesane kanserine ilerlerken, rezidüel tümörü olmayan hastalarda ilerleme gözlenmedi.

Sonuç: Re-TURT, yüzeyel mesane kanserli hastalarda evreleme doğruluğunu artırmada ve nüksü azaltmada hayati bir rol oynamaktadır. Rezidüel tümörlerin varlığı nüks ve progresyon riskini önemli ölçüde artırarak, özellikle yüksek riskli hastalarda re-TURT'un önemini vurgulamaktadır. Bu bulgular, yüzeyel mesane kanseri tedavisinde re-TURT'un rutin kullanımını desteklemektedir.

Anahtar Kelimeler: Mesane kanseri, transüretral rezeksiyon, re-TURT, rezidüel tümör, nüks, evreleme doğruluğu

Bladder cancer is one of the most common malignancies affecting the urinary system, with approximately 90% of cases being classified as transitional cell carcinoma (1). While the majority of these tumors are superficial at the time of diagnosis, they possess a significant tendency for recurrence, with approximately 70-80% of superficial tumors recurring during follow-up. Furthermore, 20-30% of these cases may progress to become invasive, posing a severe threat to the patient's prognosis (1). The high recurrence and progression rates highlight the need for effective treatment strategies to manage bladder cancer recurrence and prevent progression (2).

Transurethral resection of bladder tumors (TURBT) is the standard procedure for both diagnosing and treating bladder cancer. It allows for the removal of macroscopic tumors and provides tissue for pathological evaluation, including tumor grading and staging. However, initial TURBT may not always result in complete removal of all cancerous tissues, and in some cases, residual tumor cells remain. This has led to the practice of repeat transurethral resection (re-TURBT), which is performed to ensure complete tumor removal, improve staging accuracy, and reduce recurrence rates (3). Studies have reported residual tumor detection rates of 15% to 76% in re-TURBT procedures, and its role in managing superficial bladder cancer remains an area of active research (4,5).

The purpose of this study is to evaluate the efficacy of re-TURBT in patients with superficial bladder cancer. By assessing the pathological findings and recurrence rates in patients who undergo re-TURBT, this study aims to determine whether this procedure provides additional benefits in disease management. The results could have significant implications for the treatment protocols of bladder cancer, particularly in terms of staging accuracy and recurrence prevention.

Materials and Methods

This prospective study was conducted at the Urology Clinic of Istanbul Fatih Sultan Mehmet Training and Research Hospital. A total of 100 patients diagnosed with superficial transitional cell carcinoma (TCC) of the bladder were included in the study between January 2005 and December 2006. The inclusion criteria were patients diagnosed with Ta and T1 stages of bladder cancer, with no evidence of muscle invasion on the initial TURBT. Patients with a history of muscle-invasive bladder cancer, prior radical treatments, or those who did not undergo re-TURBT were excluded from the study.

All patients underwent an initial TURBT for diagnostic and therapeutic purposes. After the initial TURBT, patients were scheduled for a repeat TURBT within 4 to 6 weeks. During the re-TURBT, the primary objectives were to remove any residual tumor tissue and to provide further histopathological material to assess for deeper invasion. The re-TURBT was performed using the same approach as the initial TURBT, with a focus on the original tumor site and surrounding areas.

The resected specimens from both the initial and repeat TURBT were sent for pathological evaluation. All patients received intravesical mitomycin in the early postoperative period (first 24 hours). Tumors were graded based on the World Health Organization (WHO) classification and staged using the TNM classification. Residual tumor presence, grade, and stage were documented, along with any changes between the initial and re-TURBT findings.

Patients were followed up for a period of 24 months after re-TURBT. Follow-up evaluations included cystoscopy at regular intervals (every 3 months for the first year and every 6 months thereafter). Recurrence rates, progression to muscle invasion, and complications related to the procedure were recorded. Data collected from both the initial and re-TURBT procedures were analyzed to determine the impact of re-TURBT on clinical outcomes, including tumor recurrence and accurate staging.

Statistical Analysis

The Statistical Package for the Social Sciences version 25 (SPSS IBM Corp., Armonk, NY, USA) program was used. Normality of distribution of the variables was checked by Shapiro-Wilk test. Independent student t test was used for comparison of the normally distributed variable between the groups, and Mann Whitney u test was used for non-normally distributed data. Quantitative data are given as mean ± standard deviation values. The data were analyzed at a 95% confidence level, and a P value of less than 0.05 was accepted as statistically significant.

Results

A total of 100 patients were included in the study, all diagnosed with superficial bladder cancer. The median age of the patients was 65 years, with a male-to-female ratio of approximately 3:1. The majority of tumors were classified as Ta (60%) with the remaining classified as T1 (40%). The following sections outline the key findings from the initial TURBT and re-TURBT procedures, as well as the recurrence rates and progression during follow-up.

Table 1 summarizes the distribution of cases with residual tumor detected after Re-TURBT, categorized by tumor grade and stage. For Grade I tumors, no residual tumors were detected in Ta stage (0/9, 0%). However, in Grade II tumors, 23.1% of Ta cases (6/26) and 57.1% of T1 cases (4/7) had residual tumors. Overall, in the entire group, the residual tumor rate was 0% for Grade I tumors and 30.3% (10/33) for Grade II tumors, giving a total residual tumor rate of 23.8% across all cases. This highlights the significant difference in residual tumor presence between Grade I and Grade II tumors.

Table 2 shows the changes in tumor stages after initial resection and Re-TURBT. The majority of tumors initially classified as Ta GII (61.9%) remained in the same category, with only 19.2% progressing to T1 GII and 3.8% progressing to T1 GIII. In T1 GII cases (16.6% of total), stage progression occurred in 14.2% of cases for each of the following categories: T1 GIII, T2 GII, and T2 GIII. These findings indicate that a significant portion of tumors remain in the same stage after Re-TURBT, although there are cases of progression, particularly in higher-grade tumors.

The cases were evaluated in terms of tumor diameter and multifocality. The mean tumor diameters of the patients with and without residual tumor detected in Re-TURBT were 3.85 cm and 1.62 cm, respectively. The tumor diameters in patients with residual tumor detected were significantly higher than those in whom no residual tumor was detected in the second resection ($p<0.001$) (figure 1a). In terms of multifocality, the mean bladder tumor foci numbers in patients with and without residual tumor detected in Re-TURBT were 4.88 and 1.62, respectively. The tumor foci numbers in patients with residual tumor detected were significantly higher than those in whom no residual tumor was detected in the second resection ($p=0.0016$) (figure 1b).

Table 1: Distribution of cases with residual tumor detected after Re-TURBT

	Grade I	Grade II	Residual Tumor / Total Tumor number (%)
Ta	0 / 9 (0 %)	6 / 26 (23.1 %)	6 / 35 (17.1 %)
T1	-	4/7 (57.1 %)	4/7 (57.1 %)
Residual Tumor / Total Tumor number (%)	0 / 9 (0 %)	10 / 33 (30.3 %)	10 / 42 (23.8 %)

Table 2: Changes in tumor stages after initial resection and Re-TURBT

	Initial TURT (n = 42)	Ta GI	Ta GII	T1GII	T1GIII	T2GII
Ta GI	9 (21.4%)	-	-	-	-	-
Ta GII	26 (61.9%)	-	5/26 (19.2%)	1/26 (3.8%)	-	-
T1 GII	7 (16.6%)	-	1/7 (14.2%)	1/7 (14.2%)	1/7 (14.2%)	1/7 (14.2%)

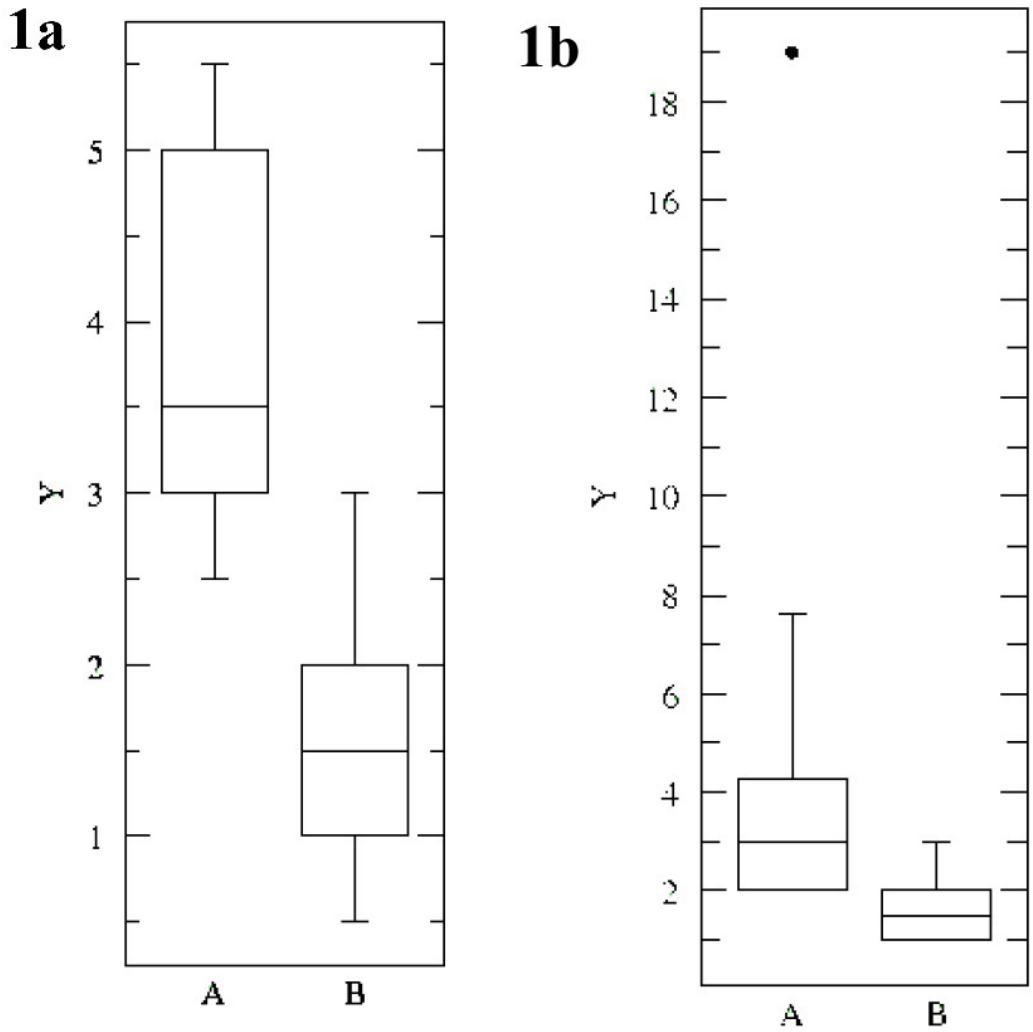

Figure 1: Relationship between the risk of detecting residual tumor in the second resection and the tumor diameter and number in the patients' first resection, 1a: tumor diameter graph, 1b: tumor number graph, A: residual tumor +, B: residual tumor -

Discussion

Bladder cancer remains a significant challenge due to its high recurrence rates and potential for progression to muscle-invasive disease (6). In our study, we found that repeat transurethral resection played a crucial role in identifying residual tumors and improving staging accuracy. Residual tumor was detected in 40% of patients who underwent re-TURBT, consistent with prior reports that found residual tumor rates ranging from 15% to 76% in patients undergoing a second resection (3,7). This reinforces the need for re-TURBT in the management of superficial bladder cancer.

The role of re-TURBT in accurately staging bladder cancer is well-documented in the literature. Our study found that 15% of patients experienced upstaging to muscle-invasive disease during re-TURBT, similar to findings from other studies (8). Accurate staging is crucial because patients with undetected muscle-invasive disease are at a higher risk for disease progression and poorer outcomes. By identifying these cases early through re-TURBT, appropriate treatment plans, such as radical cystectomy, can be initiated sooner, improving long-term survival (9).

Our results also demonstrated a significant correlation between residual tumor presence during re-TURBT and recurrence rates. Patients with residual tumors had a 40% recurrence rate, while those without residual tumors had only a 15% recurrence rate. This finding aligns with previous studies, which have shown that patients with incomplete initial TURBT or residual tumor presence are more likely to experience tumor recurrence (10). The higher recurrence rate in these patients underscores the importance of thorough tumor resection and careful follow-up.

In terms of progression to muscle-invasive bladder cancer, our study found that 20% of patients with residual tumors progressed to muscle-invasive disease during the follow-up period. None of the patients without residual tumors progressed. These findings suggest that residual tumor presence is a significant risk factor for progression, further supporting the role of re-TURBT in preventing disease advancement. Similar findings have been reported in other studies, highlighting the importance of early detection and intervention (11,12).

One of the key advantages of re-TURBT is its ability to improve the accuracy of pathological staging, which is crucial for determining appropriate treatment strategies. Our study confirmed that re-TURBT led to more accurate staging in a subset of patients, allowing for more aggressive treatment when necessary. This is consistent with findings from European and American guidelines that recommend re-TURBT as a standard practice in high-risk non-muscle invasive bladder cancer (13).

Despite the benefits of re-TURBT, some studies have questioned its necessity in all cases. For example, studies such as those by Thompson et al. have suggested that re-TURBT may not always be required in patients with small, low-grade Ta tumors (14). However, our study's findings indicate that even in superficial bladder cancer cases, re-TURBT can play a vital role in reducing recurrence and improving staging, especially in higher-risk cases. Further studies are needed to determine the exact criteria for patient selection in re-TURBT protocols.

The limitations of this study include its relatively small sample size and the short follow-up period of 24 months, which may not fully capture long-term recurrence and progression rates. Additionally, this study was conducted at a single center, which may limit the generalizability of the findings. Additionally, cost analysis was not performed in our study. Finally, patients were not subjected to subgroup analysis according to different demographic characteristics. Future studies with larger, multicenter cohorts and longer follow-up periods are needed to validate these results and provide more robust evidence for the role of re-TURBT in superficial bladder cancer management.

Conclusion

In conclusion, our study demonstrates that re-TURBT plays a critical role in the management of superficial bladder cancer by improving tumor staging accuracy and reducing recurrence rates. Residual tumor presence is a significant predictor of disease recurrence and progression, highlighting the importance of thorough tumor resection. Our findings support the use of re-TURBT, particularly in high-risk patients, as an essential tool for better disease management.

Figure Legends:

Figure 1. Relationship between the risk of detecting residual tumor in the second resection and the tumor diameter and number in the patients' first resection

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Authors' contributions

Hakan Cakir: Substantial contributions to the conception or design of the work, analysis, interpretation of data for the work, drafting the work or revising it critically for important intellectual content.

N. Doğu Güner: Final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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