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Professional paper

CLINICAL OUTCOMES OF TURBT IN BLADDER TUMORS: A RETROSPECTIVE ANALYSIS WITH INFLAMMATORY BACKGROUND

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Abstract

Background: Bladder tumors represent one of the most common malignancies of the urinary tract, with transurethral resection of bladder tumor (TURBT) remaining the cornerstone of diagnosis and initial treatment. Increasing evidence suggests that tumor development and progression are influenced not only by histopathological characteristics but also by inflammatory and immune-mediated mechanisms.
Objective: The aim of the study was to present the initial experience in the surgical management of bladder tumors at the General Hospital of Gostivar, based on real clinical cases**.** To evaluate the clinical, histopathological, and short-term oncological outcomes of patients treated with TURBT for bladder tumors in a single center, with consideration of the inflammatory background reported in the literature.
Materials and Methods: This retrospective study conducted between August 1, 2023 – July 31, 2024 and were included 21patients, 18 males and 3 females, who underwent TURBT for bladder tumors at a single urology center at the General hospital "Ferid Murad" Gostivar. The mean age was 63 years. Demographic data, tumor type, pathological stage and grade, treatment approach, and follow-up outcomes were analyzed. Descriptive statistical analysis was performed, and graphical representations were generated to illustrate key findings.
Results: The majority of the patients in the trial were men**.** Most tumors were primary lesions, followed by recurrent and residual tumors. Non-muscle-invasive bladder cancer (pTa and pT1) accounted for the majority of cases, while muscle-invasive disease (pT2) was less frequent. Low-grade tumors were more prevalent than High-grade tumors. TURBT was the primary treatment modality, with selected patients requiring additional oncological management.
Conclusion: TURBT remains an effective and essential procedure in the management of bladder tumors. The predominance of non-muscle-invasive and high-grade disease highlights the importance of close follow-up and risk-adapted treatment. Inflammatory and immune mechanisms, although not directly assessed in this cohort, may play a significant role in bladder tumor behavior and recurrence.

Keywords: *bladder tumors, TURBT, urothelial carcinoma, inflammation, retrospective study*

Introduction

Urothelial carcinomas, one of the most common urological malignancies worldwide, account for almost 90% of bladder cancers (Siegel et al., 2023). The disease mainly affects older persons and is significantly more common in men (Babjuk et al., 2022). Transurethral resection of bladder tumor (TURBT) is the definitive standard for the initial diagnosis, staging, and management of bladder tumors (Herr H.W., 2020).

Bladder cancer has a high rate of recurrence, even with better surgical techniques and adjuvant therapy, especially in cases that don't have muscular invasion (Sylvester et al., 2021). One of the widely recognized prognostic factors affecting results during TURBT is tumor. According to Dobruch et al. (2021), tumor stage, grade, multiplicity, and previous recurrence are known prognostic variables that affect TURBT outcomes.

Beyond standard clinicopathological criteria, there is mounting evidence that immune dysregulation and chronic inflammation play a part in bladder carcinogenesis and tumor progression (Mantovani et al., 2008; Grivennikov et al., 2010). The adjoining tissue, which is

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rich in cells that produce inflammation, cytokines, and growth factors, supports tumor growth, angiogenesis, and immune escape (Coussens & Werb 2002). Tumor aggressiveness and prognosis in bladder cancer have been linked to systemic inflammatory indicators such C-reactive protein (CRP), neutrophil-to-lymphocyte ratio (NLR), and platelet-to-lymphocyte ratio (PLR), which represent the interplay between tumor biology and host immune response (Shariat et al., 2019; Roxburgh et al., 2013; Viers et al., 2020).

Moreover, the effectiveness of intravesical immunotherapy, especially Bacillus Calmette-Guérin (BCG), highlights the crucial role that immunological processes play in the treatment of bladder cancer (Kamat et al., 2016). Understanding the clinical behavior of bladder tumors within this inflammatory background may provide valuable insight into disease progression and recurrence.

The aim of this study was to analyze the clinical and pathological characteristics of bladder tumor patients treated with TURBT in a single center and to discuss the findings in the context of inflammation-related mechanisms reported in the literature.

Materials and Methods

This retrospective study included patients who underwent TURBT for suspected bladder tumors at a single urology center. Retrospective analysis conducted between August 1, 2023 – July 31, 2024 at the General Hospital of Gostivar. Total patients: 21; gender: 18 males, 3 females; Mean age: 63 years (range 39–90).

Patient records were reviewed for demographic data (age and sex), tumor presentation (primary, residual, recurrent, or second-look), pathological stage and grade, histopathological diagnosis, treatment modality, and follow-up outcomes.

Tumor staging was performed according to the TNM classification, and grading was based on standard histopathological criteria. Treatment strategies included TURBT alone, repeat TURBT (second-look), intravesical therapy, or further oncological intervention when indicated.

Descriptive statistical analysis was used to summarize the data. Results were presented using absolute numbers and percentages. Graphical representations were generated to illustrate gender distribution, tumor presentation, pathological stage, and tumor grade.

As this was a retrospective analysis, no additional laboratory or immunological parameters were measured.

Results

The study population showed a clear male predominance, with only three female patients identified (Figure 1). Most bladder tumors were classified as primary lesions, while recurrent, residual, and second-look cases accounted for a smaller proportion of patients (Figure 2).

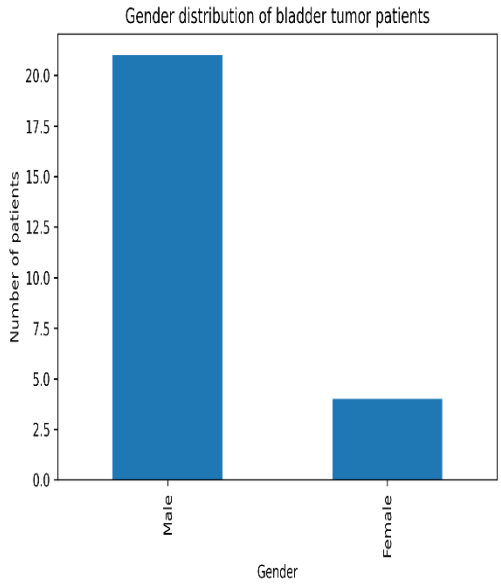


Figure 2. *Patients by gender*

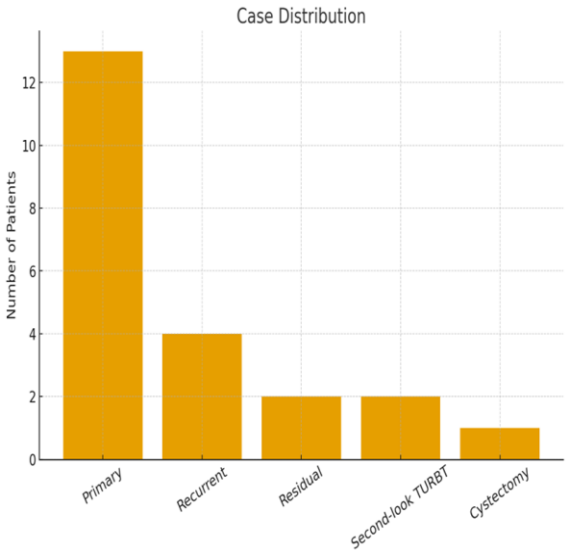


Figure 3. *Tumor presentation type*

Pathological analysis demonstrated that non-muscle-invasive bladder cancer constituted the majority of cases, with pTa and pT1 tumors being most frequent. Muscle-invasive disease (pT2) was observed in a smaller subset of patients (Figure 3). Tumor stage (TNM Classification) showed that 12 patient were with pTa (Non-invasive), 5 patients with pT1 (lamina propria invasion) and 1 patient with pT2 (muscle-invasive) who underwent to radical cystoprostatectomy after neoadjuvant chemotherapy.

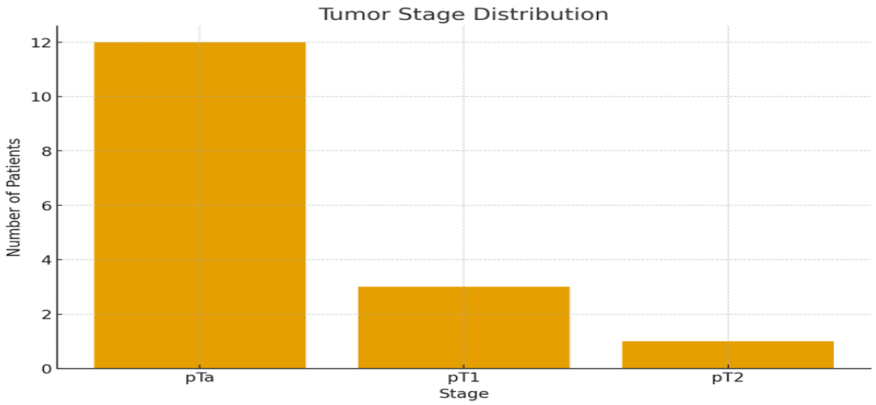


Figure 3. *Tumor stage distribution*

Low-grade urothelial carcinoma was more prevalent than High-grade disease, indicating a substantial proportion of biologically aggressive tumors within the cohort (Figure 4). We find 12 patients with low grade carcinoma and 5 patients with High-grade carcinoma.

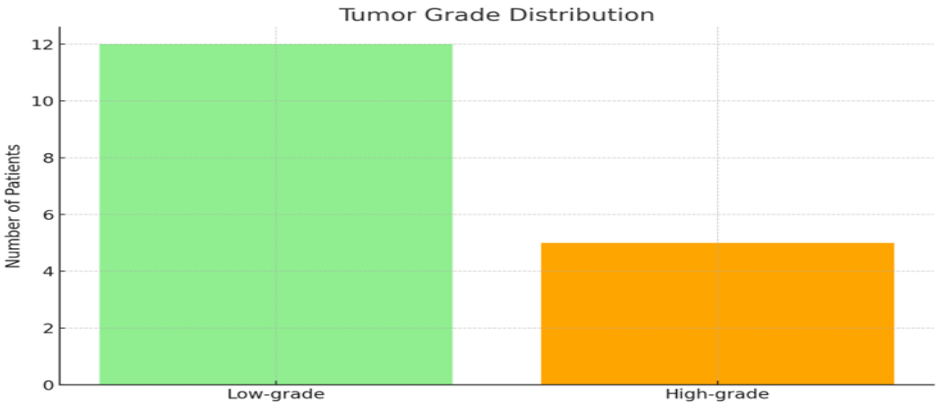


Figure 4. *Tumor grade distribution*

In the histopatological findings (Figure 5) we found out 17 cases of urothelial carcinoma and 4 cases with chronic cystitis.

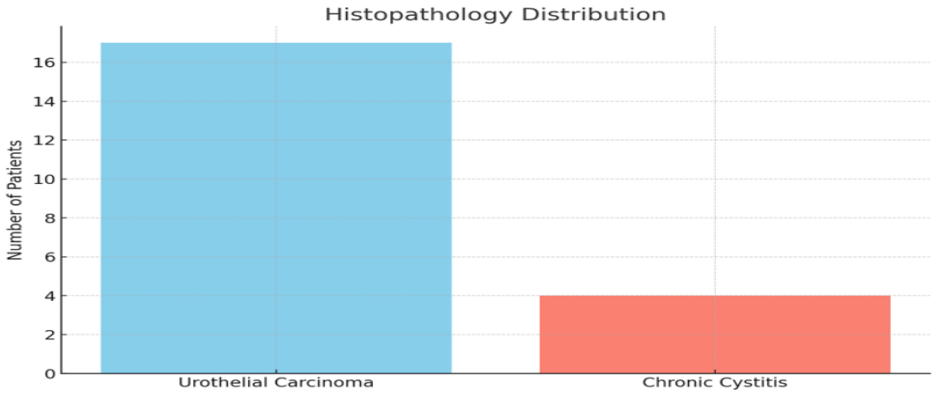


Figure 6. *Histopathology distribution*

TURBT was the primary therapeutic approach in all patients, with selected cases requiring additional treatment based on pathological findings and follow-up evaluation.

Treatment approach and follow up:

- **Second-look TURBT** performed in all **high-grade pT1** cases
- **BCG therapy** administered to high-risk and intermediate-risk patients

Outcomes by Risk Group

- **Low-risk group (10 patients):**
  – No recurrence during the first year
- **Intermediate-risk group (2 patients):**
  – Received BCG, no recurrence at 1 year
- **High-risk group (5 patients, pT1):**
  – Second-look TURBT confirmed no residual tumor
  – All treated with BCG; no early recurrence
- **High-risk group (1 patient, pT2)**:
  – underwent to radical cystoprostatectomy

On Figure 7 are presented 2 pictures of the bladder tumor: a) papilloma & b) massive tumor

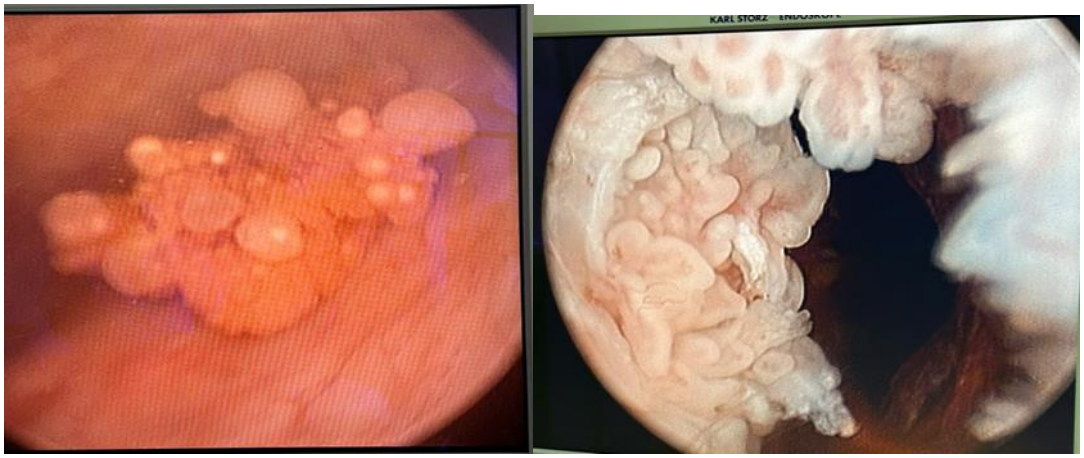


Figure 7. *a) Papilloma* *b) massive and multifocal tumor*

Discussion

The current study supports a number of well-known traits of patients with bladder tumors, such as the high frequency of non-muscle-invasive disease at initial presentation and the predominance of men. This cohort's high-grade tumor prevalence highlights the necessity of careful monitoring and risk-adapted treatment approaches (Babjuk et al., 2022; Dobruch et al., 2021).

Recurrence and progression remain major challenges in the treatment of bladder cancer, even after proper TURBT (Sylvester et al., 2021; Cambier et al., 2016). Even though conventional prognostic factors like stage and grade are still essential for risk classification, the significance of inflammation and immune response in tumor behavior has drawn more attention (Mantovani et al., 2008; Coussens et al., 2002).

As a characteristic of cancer, chronic inflammation has been linked to immune evasion, tumor development, and genetic instability (Hanahan et al., 2011; Multhoff et al., 2011). Inflammatory cells in the tumor microenvironment affect the aggressiveness of bladder cancer and how well it responds to treatment (Grivenikov et al., 2010; Dominguez-Gutierrez et al., 2020). Although not evaluated in this investigation, systemic inflammatory indicators have been shown to be independent predictors of bladder cancer patients' survival, progression, and recurrence (Coussens et al., 2020; Shariat et al., 2019; Roxburgh et al., 2013)

The role of immune-mediated pathways in bladder tumor management is further shown by the clinical success of intravesical BCG therapy (Viers et al., 2020; Redelman-Sidi et al., 2014). The inflammatory background may partly explain differences in tumor behavior and treatment response among patients with similar pathological characteristics.

Although immunological parameters were not directly evaluated in this retrospective cohort, the observed distribution of tumor stage and grade aligns with literature supporting an inflammation-driven component in bladder cancer progression. Future studies integrating clinical data with inflammatory and immune biomarkers may provide more personalized risk assessment and therapeutic strategies.

Conclusion

TURBT remains the cornerstone of diagnosis and initial treatment for bladder tumors. This retrospective analysis demonstrates a predominance of non-muscle-invasive but high-grade disease, emphasizing the importance of careful pathological evaluation and close follow-up. TURBT, followed by risk-based follow-up and intravesical BCG when indicated, ensured favorable outcomes with low early recurrence. Early application of second-look TURBT in

high-grade or pT1 cases is essential to ensure complete tumor resection. While immunological parameters were not directly measured, current evidence supports a significant role of inflammation and immune response in bladder tumor biology. Incorporating inflammatory perspectives into clinical assessment may enhance understanding of disease behavior and guide future research. Standardized, guideline-based treatment pathways are feasible and applicable even in general hospital settings, contributing to improved oncological care.

References

[1]. Babjuk M, Burger M, Capoun O, et al. (2022). EAU guidelines on non–muscle-invasive bladder cancer. Eur Urol.81:75–94.

[2]. Cambier S, Sylvester R.J, Collette L, et al. (2016). EORTC risk tables revisited. Eur Urol. 69:60–69.

[3]. Coussens LM, Werb Z. (2002). Inflammation and cancer. Nature.420:8 60–867.

[4]. Dobruch J, Daneshmand S, Fisch M, et al. (2021). Gender and bladder cancer. Eur Urol. 80:1–12

[5]. Dominguez-Gutierrez P.R, Kusmartsev S, Canales B.K. (2020). Immunological mechanisms in urologic malignancies. Nat Rev Urol.17:499–513.

[6]. Grivennikov S.I, Greten F.R, Karin M. (2010). Immunity, inflammation, and cancer. Cell. 140:883–899.

[7]. Hanahan D, Weinberg RA. Hallmarks of cancer: the next generation. (2011) Cell. 144:646–674.

[8]. Herr H.W. Transurethral resection of bladder tumors: principles and outcomes. (2020). Urol Clin North Am. 47:39–48.

[9]. Kamat A.M, Sylvester R.J, Böhle A, et al. (2016). Definitions and outcomes in BCG-treated bladder cancer. Eur Urol. 70:529–537.

[10]. Mantovani A, Allavena P, Sica A, Balkwill F. (2008). Cancer-related inflammation. Nature. 454:436–444.

[11]. Multhoff G, Molls M, Radons J. (2011). Chronic inflammation in cancer development. Front Immunol. 2:98.

[12]. Redelman-Sidi G, Glickman M.S, Bochner B.H. (2014). The mechanism of action of BCG therapy. Nat Rev Urol.11:153–162.

[13]. Roxburgh C.S.D, McMillan D.C. (2013). Systemic inflammatory response and cancer prognosis. Br J Cancer.109:189–195.

[14]. Shariat S.F, Svatek R.S, Tilki D, et al. (2019). Systemic inflammatory markers and bladder cancer outcomes. J Urol. 201:268–276.

[15]. Siegel R.L, Miller K.D, Jemal A. (2023). Cancer statistics, 2023. CA Cancer J Clin. 73:17–48.

[16]. Sylvester R.J, van der Meijden A.P.M, Oosterlinck W, et al. (2021). Predicting recurrence and progression in bladder cancer. Eur Urol. 79:38–48.

[17]. Viers B.R, Thompson R.H, Boorjian S.A. (2020). Preoperative inflammatory markers in bladder cancer. Urol Oncol. 38:77–84.