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ORIGINAL RESEARCH

Impact of Age, TNM Stage, and Hospitalization on Bladder Cancer Survival: Evidence from a Hospital-Based Cohort in Eastern China

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Purpose: To evaluate survival outcomes and identify prognostic factors among bladder cancer patients.

Patients and Methods: A total of 488 bladder cancer patients admitted between 2007 and 2017 were followed until December 31, 2020, using both active and passive follow-up. The Kaplan-Meier method was used to estimate observed survival (OS), with group comparisons performed using the Log rank test. Variables included sex, age group, number of hospital admissions, TNM stage, and geographic origin.

Results: Of 488 patients, 485 (99.38%) were successfully followed. The majority were male (80.21%) with a mean age of 66.5 years. The average number of hospital admissions was 1.81. Overall 1-, 3-, 5-, and 10-year OS rates were 79.95%, 63.50%, 56.32%, and 45.54% for males, and 69.79%, 58.33%, 56.01%, and 56.01% for females, respectively ($P = 0.697$). Age significantly affected prognosis ($P < 0.01$), with 5-year OS declining from 66.67% (age ≤34) to 29.53% (≥80). Patients with ≥3 admissions had worse survival (44.87%) than those with one (61.93%) or two admissions (58.97%) ($P < 0.01$). TNM stage was strongly with survival: 5-year OS rates were 86.43% (Stage I), 55.48% (Stage II), 38.25% (Stage III), and 13.85% (Stage IV) ($P < 0.01$). Regional differences were not statistically significant ($P > 0.05$).

Conclusion: Advanced age and late-stage diagnosis were associated with poorer survival, while early-stage detection correlated with better outcomes. These findings underscore the importance of early screening, timely treatment, and comprehensive care strategies to improve bladder cancer survival, especially in resource-limited settings. Limitations include single-center design and absence of multivariate adjustment.

Keywords: cancer registry, follow-up, Kaplan-Meier, prognostic factors

Introduction

Bladder cancer is the most common tumor of the urinary system, with urothelial carcinoma being the predominant histological subtype. Globally, approximately 573,000 new cases of bladder cancer and 213,000 related deaths occurred in 2020, with age-standardized incidence and mortality rates of 5.6 per 100,000 and 1.9 per 100,000, respectively.[1] In China, bladder cancer ranked 13th among malignant tumors. Notably, bladder cancer ranked 7th among malignant tumors in men, with an incidence rate 3.8 times higher than in women, indicating a relatively greater impact on men.[2] Currently, smoking and occupational exposure to carcinogenic substance (such as aromatic amines and polycyclic aromatic hydrocarbons) are established risk factors for bladder cancer. Other potential risk factors include certain dietary components, alterations in the urinary microbiome (microbial dysbiosis), gene-environment interactions, and chronic exposure to diesel exhaust.[3] At diagnosis, the majority of bladder cancer are categorized as non-muscle-invasive bladder cancer (NMIBC), while low-risk NMIBC patients generally have a good prognosis, the recurrence and progression rates

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remain high for those with intermediate- and high-risk NMIBC.[4] The survival rate of bladder cancer is relatively moderate compared to other cancers, but there are significant variations across different countries or regions, among different demographic groups, and depending on tumor characteristics.[5–7]

Although bladder cancer is not among the most common cancers in China, recent data indicate an upward trajectory in its incidence and mortality rates. Epidemiological studies have identified numerous factors associated with bladder cancer development,[3,8] yet the pathogenesis of this disease remains not fully understood.[9] Historical data from China's national mortality surveys in the 1970s, 1990s, and early 2000s demonstrate rising bladder cancer mortality in men; for women, they corresponding rates were considerably lower.[10,11] Cancer registry data also reflect increasing incidence: the overall bladder cancer incidence in China reached 6.69 per 100,000, and the overall mortality rate was 2.53 per 100,000.[12] An age-period-cohort analysis using data from the 2019 Global Burden of Disease study showed that from 1990 to 2019 the age-standardized incidence rate of bladder cancer in China increased (average annual percent change [AAPC] ~ 1.5%), while the age-standardized mortality decreased (AAPC ~ −0.5%).[13] These trends underscore the need for greater attention to bladder cancer prevention and control in China.

Nantong Tumor Hospital (NTH) is the only tertiary-level specialized cancer hospital in the Northern Jiangsu region of China, serving as the primary center for cancer prevention and treatment across Nantong and surrounding areas. It is well recognised that NMIBC and MIBC differ substantially in natural history, 5-year survival outcomes, and treatment approaches, yet hospital-based survival data in China seldom stratify by these distinct entities. Recent multi-institutional analyses have highlighted that a second or restaging transurethral resection (re-TURBT) prior to BCG significantly improves long-term outcomes in high-risk NMIBC patients, underscoring the need for better-stratified clinical follow-up [14]. Despite advances in treatment, real-world survival trends in regional Chinese cohorts remain underreported, especially in the context of hospital-based care. Compared to national-level and population-based data, long-term survival data from eastern China's hospital cohorts remain limited.

To address this gap, the present study utilizes hospitalization and follow-up data from 488 bladder cancer patients recorded in the cancer registry of Nantong Tumor Hospital between 2007 and 2017. By providing hospital-based survival estimates and evaluating demographic and clinical factors, this study aims to enhance understanding of bladder cancer survival outcomes in eastern China and support data-driven strategies for clinical management and regional cancer control.

Materials and Methods

Study Design and Patients

Nantong Tumor Hospital (NTH) has been utilizing a hospital information system to collect case information since 2002. A hospital-based cancer registry system was established in 2012. Since 2010, all districts and counties in the Nantong area have implemented a comprehensive cancer registration and reporting system. This study included patients with primary bladder cancer (ICD-10 code C67) admitted to Nantong Tumor Hospital between 2007 and 2017. The proportion of histological vilification (pathological diagnosis confirmation) is 63.71% (309/485). Patients with secondary bladder cancer were excluded. The final cohort included 485 bladder cancer inpatients admitted between 2007 and 2017. The majority were male (80.2%) with a mean age of 66.5 ± 11.5 years. TNM staging was available for 61.4% of patients, while 38.6% were categorized as "not available" (NA). Most patients had one or two hospitalizations during the observation period. Detailed baseline distributions are provided in Table 1.

Follow-Up Methods

A combined approach of hospital-based tumor follow-up and population-based field follow-up was employed. Active follow-up methods included telephone calls, home visits, and on-site visits, while passive follow-up methods involved matching and verifying data with cause of death monitoring records and cancer registration reports from various districts and counties in Nantong. Survival outcomes for registered bladder cancer cases were tracked using this mixed approach. The case data underwent three rounds of on-site verification follow-ups in 2013, 2020, and 2021. The survival outcomes of all patients in this study were followed up until December 31, 2020. For cases with confirmed death, causes were verified through linkage with

Table 1 Distribution of Clinical and Demographic Characteristics Among 485 Hospitalized Bladder Cancer Patients, 2007–2017

Variable		No. Cases	Proportion (%)
Sex	Total	485	100.00
	Male	389	80.21
	Female	96	19.79
Age	0-34	3	0.62
	35-59	121	24.95
	60-79	302	62.27
	80-99	59	12.16
Number of hospitalizations	1	331	68.25
	2	81	16.70
	≥3	73	15.05
Geographic origin	HA	45	9.28
	HM	44	9.07
	QD	34	7.01
	RD	84	17.32
	RG	137	28.25
	TZ	141	29.07
TNM stage	I	113	23.30
	II	72	14.85
	III	35	7.22
	IV	78	16.08
	NA[a]	187	38.56

Notes: [a]NA: not available.
Abbreviations: HA, Hai'an; HM, Haimen; QD, Qidong; RD, Rudong; RG, Rugao; TZ, Tongzhou.

official death certificates and cancer registry records. In instances where cause of death was not available, only overall survival status (dead/alive) was recorded, consistent with standard epidemiologic practice in population-based follow-up. This multi-source validation enhanced accuracy and minimized misclassification of survival outcomes.

Outcome Measures

Registered patients may have been diagnosed and treated at multiple hospitals or admitted multiple times to our hospital. For this study, the starting date for survival rate calculation was the date of the initial diagnosis of bladder cancer at Nantong Tumor Hospital, and the primary outcome was overall survival (OS), defined as the first time from diagnosis at our hospital to death from any cause. Patients alive or lost to follow-up were censored at the date of last contact.

Statistical Analysis

Survival probabilities or observed survival (OS) was calculated using the Kaplan-Meier method, with statistical analysis performed using SPSS version 22.0. Survival functions (curves) were plotted. The variables set for the analysis included:

sex (male = 1, female = 2); age groups (0–34 = 1, 35–59 = 2, 60–79 = 3, 80–99 = 4); number of admissions (1 admission = 1, 2 admissions = 2, multiple admissions = 3); patient origin (HA, HM, QD, RD, RG, TZ). Bladder cancer staging was based on the 2017 TNM Classification (8th edition) by the International Union Against Cancer (UICC), categorized as follows: stage 0 or I = 1, stage II = 2, stage III = 3, stage IV = 4, and no staging information (NA) = 9. Cases with missing TNM staging (38.56%) were not excluded from the analysis; instead, they were categorized as "NA" and retained in the survival analysis as a separate group. Corresponding Kaplan-Meier survival curves for this group are presented in Figure to allow reference and comparison. Survival time was measured in months. Differences were compared using the Log rank test, with a P-value < 0.05 indicating statistical significance.

Ethical Considerations

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. This study protocol was reviewed and approved by the Hospital Ethics Committees of NTH (NTH-HEC-2020011). All data were obtained from hospital information system and abstracted by registry's personal, and the need for informed consent was waived. The analyzed data were anonymized and kept in protected folders accessible only to the project supervisor and the research staff. Participants were not provided monetary or material compensation for participating in this study.

Results

Distribution of Case Characteristics

Between 2007 to 2017, a total of 488 hospitalized bladder cancer patients from the Nantong area were recorded. Follow-up data confirmed definitive survival outcomes (alive or deceased) for 485 cases, yielding a follow-up success rate of 99.38%, only three cases were lost to follow-up. Among the 485 cases, 389 were males (80.21%) and 96 were females (19.79%). The age at first admission ranged from 20 to 93 years, with a mean age of 66.54 (±11.51) years and a median age of 68 years. Most patients were elderly with 302 cases (62.27%) aged 60–79 years. Patients aged 35–59 years accounted for 121 cases (24.95%), followed by 59 cases (12.16%) aged 80–99 years, and only 3 cases (0.62%) aged 0–34 years. Among all patients, 187 cases (38.56%) had either missing TNM information, or incomplete T/N/M records at admission, etc. These cases with missing data were therefore categorized as "not available (NA)". In total, these patients experienced 878 hospitalizations, with an average of 1.81 (±1.87) hospitalizations per patient. Specifically, 331 patients (68.25%) were hospitalized once, 81 patients (16.70%) were hospitalized twice, and 73 patients (15.05%) were hospitalized three or more times, with the maximum number of hospitalizations being 16 (Table 1).

Comparison of Survival by Sex

Among the 485 bladder cancer patients included in the analysis, the mean survival time for males was 92.83 months (95% CI: 85.43–100.24), while that for females was slightly longer at 99.06 months (95% CI: 83.59–114.53). The observed survival (OS) rates at 1-, 3-, 5-, and 10-year for males were 79.95%, 63.50%, 56.32%, and 45.54%, respectively. In comparison, the corresponding OS rates for females were 69.79%, 58.33%, 56.01%, and 56.01%. Despite slightly higher long-term survival among females, the Log rank test revealed no statistically significant difference in survival between sexes ($\chi^2 = 0.152$, P = 0.697). Detailed survival rates by sex are presented in Table 2 and visualized in Figure 1.

Comparison of Survival by Age Group

The mean survival times for bladder cancer patients varied notably across age groups. Patients aged 0–34 years had an average survival time of 60.67 months (95% CI: 29.73–91.61), those aged 35–59 years had the longest average survival at 113.23 months (95% CI: 100.27–126.20), followed by the 60–79 age group with 92.05 months (95% CI: 83.69–100.41), and the 80–99 age group with shortest survival time at 50.92 months (95% CI: 37.07–64.78). The corresponding 5-year OSs were 66.67% for the 0–34 age group, 67.51% for 35–59, 56.82% for 60–79, and 29.53% for 80–99 (Figure 2). The Log rank test demonstrated a statistically significant difference in survival among the four age groups ($\chi^2 = 26.86$, P = 0.000), indicating that is an important prognostic factor for bladder cancer survival.

Table 2 Observed Survival in 485 Hospitalized Bladder Cancer Patients by Sex, 2007–2017 (%)

Survival (Month)	Male		Female	
	OS	SE	OS	SE
12	79.95	2.03	69.79	4.69
24	69.92	2.33	63.54	4.91
36	63.50	2.44	58.33	5.03
48	59.27	2.50	57.23	5.06
60	56.32	2.54	56.01	5.09
72	53.92	2.59	56.01	5.09
84	51.10	2.67	56.01	5.09
96	49.61	2.72	56.01	5.09
108	46.23	2.87	56.01	5.09
120	45.54	2.91	56.01	5.09

Abbreviations: OS, observed survival; SE, standard error.

Comparison of Survival by Number of Hospitalizations

Survival outcomes varied according to the number of hospital admissions. Patients hospitalized once had the longest mean survival time of 98.90 months (95% CI: 90.76–107.05), followed by those hospitalized twice at 93.31 months (95% CI: 77.05–109.57). In contrast, patients with three or more admissions had a markedly shorter mean survival time of 65.38 months (95% CI: 50.25–80.52). The corresponding 5-year OS rates were 58.15% for patients with a single admission, 58.83% for those with two admissions, and 44.87% for those admitted three or more times (Figure 3). The Log rank test revealed a statistically significant difference in survival among the three groups (χ^2 = 7.62, P = 0.022), suggesting that a higher frequency of hospitalization may be associated with poorer prognosis.

Comparison of Survival by Patient Origin

The average survival periods for bladder cancer patients varied across geographic regions within the Nantong area. Patients from HA County and HM District had comparable mean survival times of 75.55 months (95% CI: 53.98–97.13) and 75.13 months (95% CI: 55.20–95.07), respectively. Patients from QD City and RD County had slightly longer mean survival times at 87.05 months (95% CI: 63.78–110.33) and 83.70 months (95% CI: 67.05–100.34), respectively. The highest average survival duration was observe in RG City (103.75 months, 95% CI: 91.66–115.84), and TZ District (99.52 months, 95% CI: 87.28–111.76). The 5-year OSs across these regions were as follows: HA County, 39.77%; HM District, 51.35%; QD City, 55.15%; RD County, 47.28%; RG City, 66.02%; and TZ District, 59.28% (Figure 4). Despite these apparent differences, the Log rank test did not reveal statistically significant difference in survival across the six regions (χ^2 = 9.84, P = 0.08), suggesting that geographic origin was not a significant prognostic factor in this cohort.

Comparison of Survival by TNM Staging

Between 2007 to 2017, survival outcomes differed markedly according to TNM stages at diagnosis. The mean survival times were 109.09 months (95% CI: 102.11–116.06) for Stage I, 69.14 months (95% CI: 60.45–77.83) for Stage II, 68.04 months (95% CI: 55.27–80.82) for Stage III, and only 20.38 months (95% CI: 13.74–27.02) for Stage IV. Patients with unknown or missing TNM staging information (NA) had an average survival of 97.34 months (95% CI: 86.89–107.79). The corresponding 5-year OS rates were 86.43% for Stage I, 55.48% for Stage II, 38.25% for Stage III, 13.85% for Stage

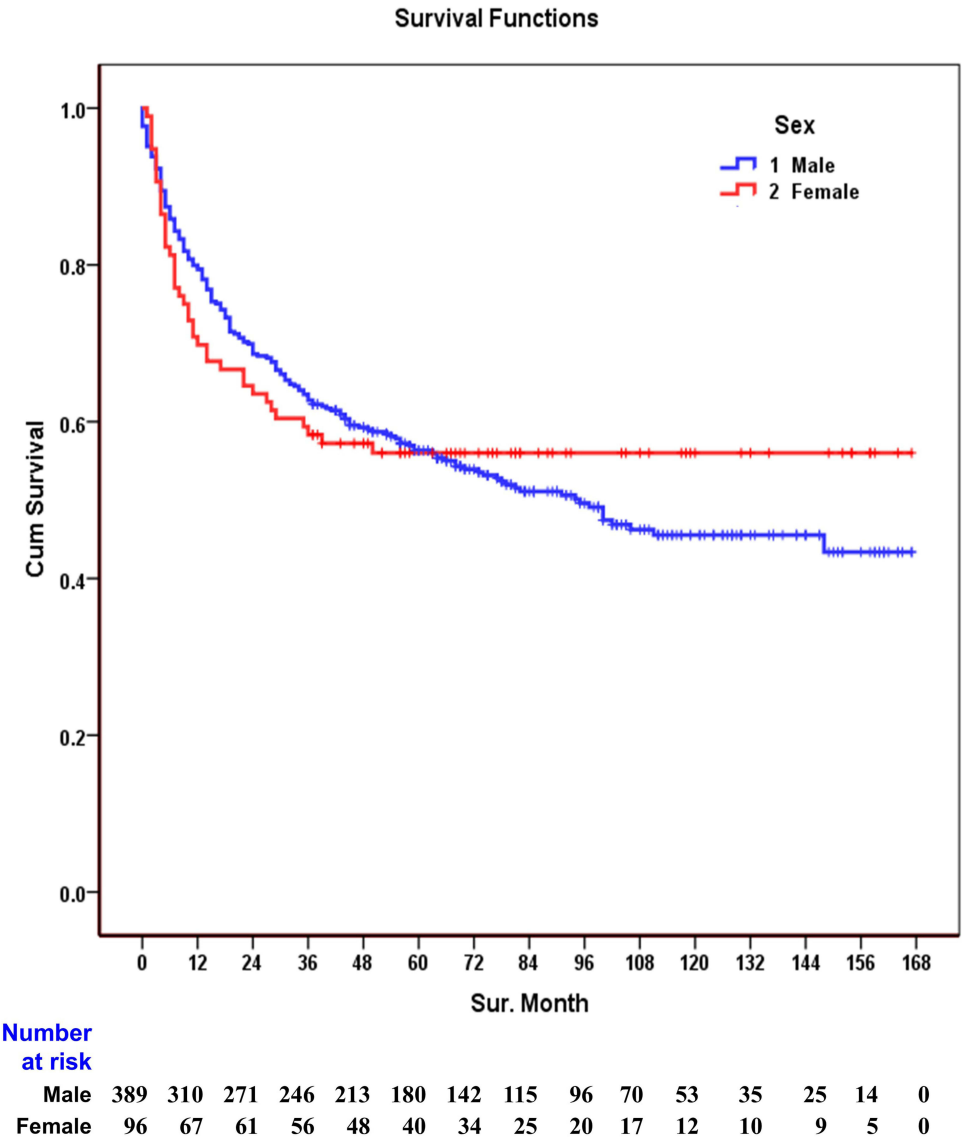


Figure 1 Observed survival in 485 bladder cancer inpatients by gender during 2007–2017 (%).

IV, and 58.80% for the NA group (Figure 5). The Log rank test indicated a statistically significant difference in survival among patients at different TNM stages (χ^2 = 184.12, P = 0.000) confirming TNM stage as a strong prognostic factor for bladder cancer survival.

Discussion

Current Research Status

Bladder cancer management comprises surgery, chemotherapy, radiotherapy, immunotherapy, and targeted therapy, with surgery remaining the cornerstone for early-stage disease.[15,16] Recent real-world Chinese studies have shown that neoadjuvant immunotherapy plus chemotherapy improves pathological responses and downstaging in MIBC compared to chemotherapy alone, suggesting that immune-chemotherapy backbones can meaningfully shift perioperative outcomes.[17] The HER2-targeted antibody–drug conjugate disitamab vedotin (RC48-ADC), especially when combined with immunotherapy, has shown activity even among patients with low or negative HER2 expression, helping delineate subgroups likely to benefit from targeted or immune-based regimens and underscoring the need for molecularly informed treatment selection.[18]

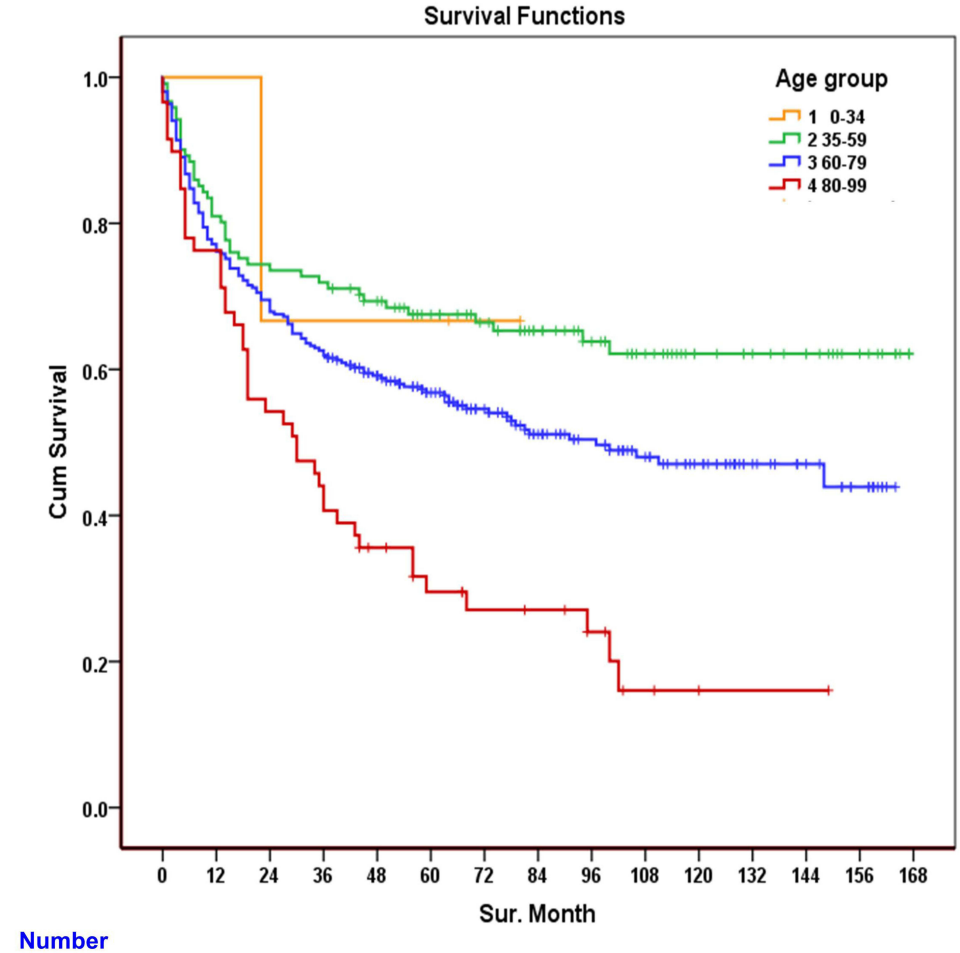


Figure 2 Observed survival in 485 bladder cancer inpatients by age group during 2007–2017.

Internationally, survival remains stage dependent. In high-income settings, 5-year OS for NMIBC approaches ~90%, whereas MIBC typically achieves ~60–70%.[15] In China, fewer survival studies are available and outcomes appear more variable: a meta-analysis reported ~50% 5-year OS for MIBC treated with radical radiotherapy plus chemotherapy, with wide ranges reflecting heterogeneity in case-mix and treatment protocols.[19] Earlier regional data from Pudong, Shanghai (2004) documented a 5-year OS of 54.76% for bladder cancer overall, highlighting persistent gaps versus developed countries and the importance of standardized staging and care pathways.[20]

Principal Findings

Our results reaffirm the primacy of stage as a prognostic anchor. Five-year OS by TNM was 86.43% (Stage I), 55.48% (Stage II), 38.25% (Stage III), and 13.85% (Stage IV). These differences were statistically significant, emphasizing that earlier detection and accurate staging translate into substantially improved survival.[21,22] Notably, cases with missing stage (NA) had an intermediate 5-year OS of 58.80%, consistent with a heterogeneous mixture of clinical severity in that category. Importantly, documentation quality improved over time: recorded TNM rose from 5.47% (2007–2010) to 70.43% (2011–2014) and 93.57% (2015–2017), reflecting institutional advances in data capture and multidisciplinary care.

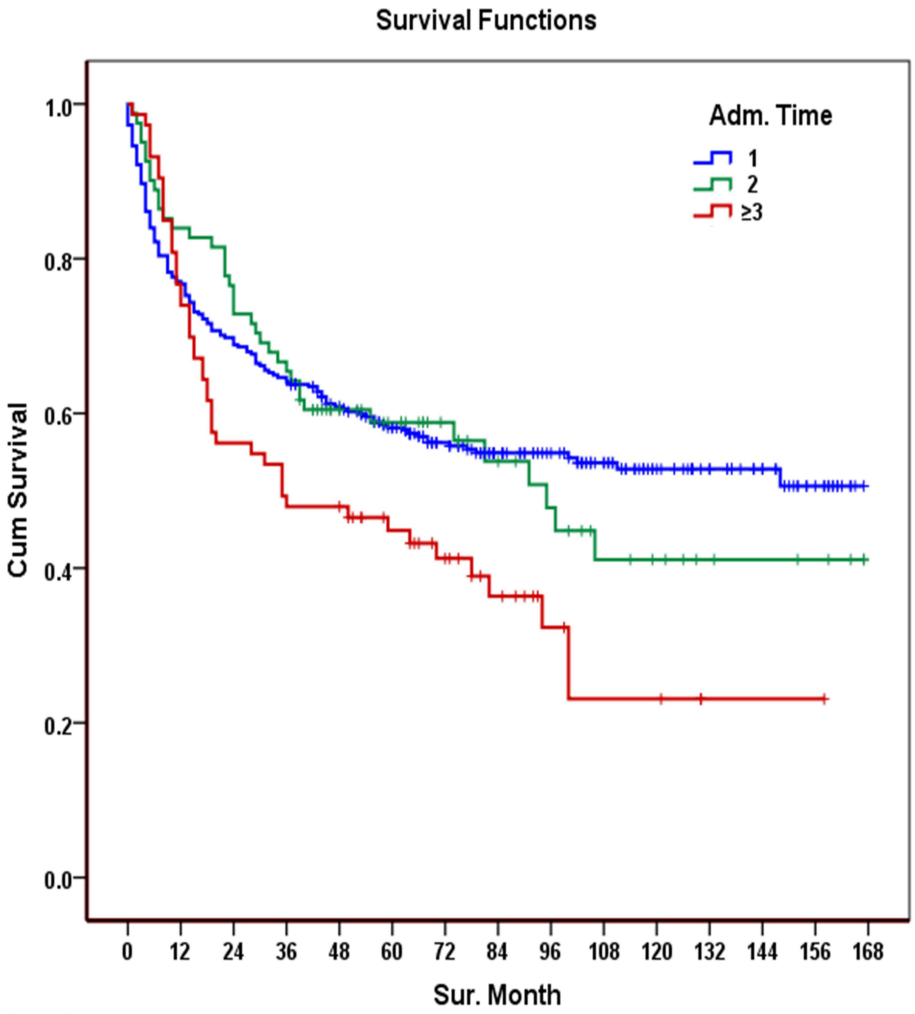
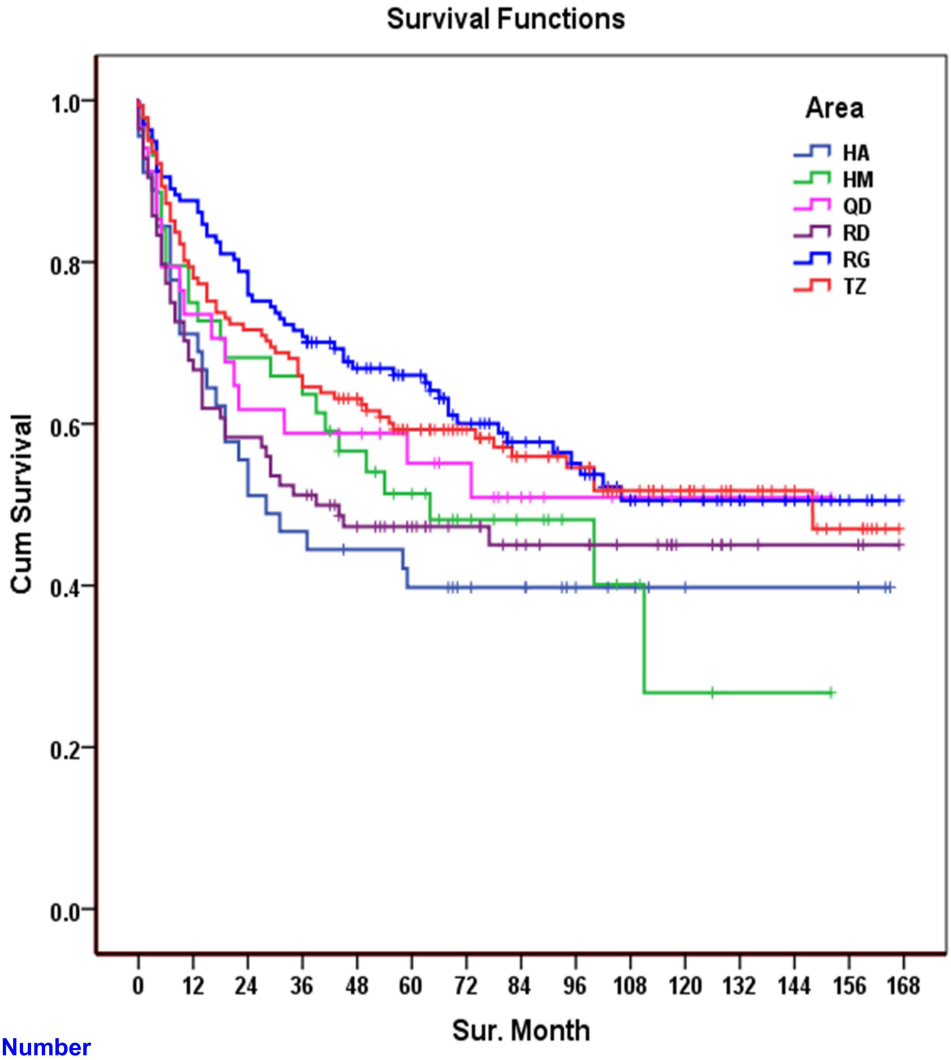


Figure 3 Observed survival in 485 bladder cancer inpatients by hospitalization during 2007–2017 (%).

In this single-tertiary-center cohort of 485 inpatients (2007–2017), 5-year OS was 56.32% for males and 56.01% for females, showing no overall sex-based difference. Temporal patterns were nuanced: men had higher short-term survival (1- and 3-year OS: 79.95% and 63.50%) than women (69.79% and 58.33%), but women demonstrated better long-term survival (10-year OS: 56.01% vs 45.54%). These patterns echo mixed international literature in which some series report poorer outcomes among women with MIBC,[5] whereas national data show no sex-based differences.[23]

Age exerted a strong, graded effect: 5-year OS was 67.51% for ages 35–59, 56.82% for 60–79, and 29.53% for 80–99. This accords with population-based evidence from China and the US, and with an Italian clinical study, that older adults experience higher mortality and lower survival than younger counterparts.[7,24,25] Hospital admissions also tracked prognosis: patients admitted once showed a 5-year OS of 58.15%, similar to those admitted twice (58.83%), but superior to those with ≥3 admissions (44.87%). In this hospital-based cohort, the number of admissions may serve as a proxy for clinical disease burden, reflecting tumor recurrence, treatment-related complications, or follow-up diagnostic evaluations. Patients with three or more admissions are more likely to have experienced disease progression, received multimodal therapy (eg, re-TURBT, intravesical instillation, or cystectomy), or undergone monitoring for suspected recurrence, all of



Number at risk

Area															
	HA	45	32	24	21	19	17	14	13	8	7	4	4	4	4	0
	HM	44	33	30	28	22	17	12	9	6	4	2	1	1	0	
	QD	34	25	21	20	19	15	13	8	6	5	4	4	3	0	
	RD	84	56	49	43	34	28	23	18	16	13	8	4	3	3	0
	RG	137	120	107	97	81	71	57	47	40	29	23	17	11	5	0
	TZ	141	111	101	92	85	71	57	45	40	30	24	16	11	7	

Figure 4 Observed survival in 485 bladder cancer inpatients by region during 2007–2017 (%).
Abbreviations: HA, Hai'an; HM, Haimen; QD, Qidong; RD, Rudong; RG, Rugao; TZ, Tongzhou.

which are associated with inferior long-term outcomes.[26] This likely reflects disease recurrence, metastatic progression, or treatment burden in frequently admitted patients.

Although crude regional variation in 5-year OS was observed across six districts within Nantong (39.77–66.02%), Log rank testing did not detect statistically significant geographic disparities; observed differences likely mirror variation in age structure, stage at presentation, referral patterns, and access to standardized therapies.

Comparison to Prior Work

The present findings align with established evidence that advanced age and later stage at diagnosis are associated with markedly reduced survival.[7,24] Stage-specific outcomes for Stage I–II in our cohort fall within ranges reported for NMIBC in developed countries (60–90%),[15,16] and our Stage I performance (5-year OS 86.43%) is particularly

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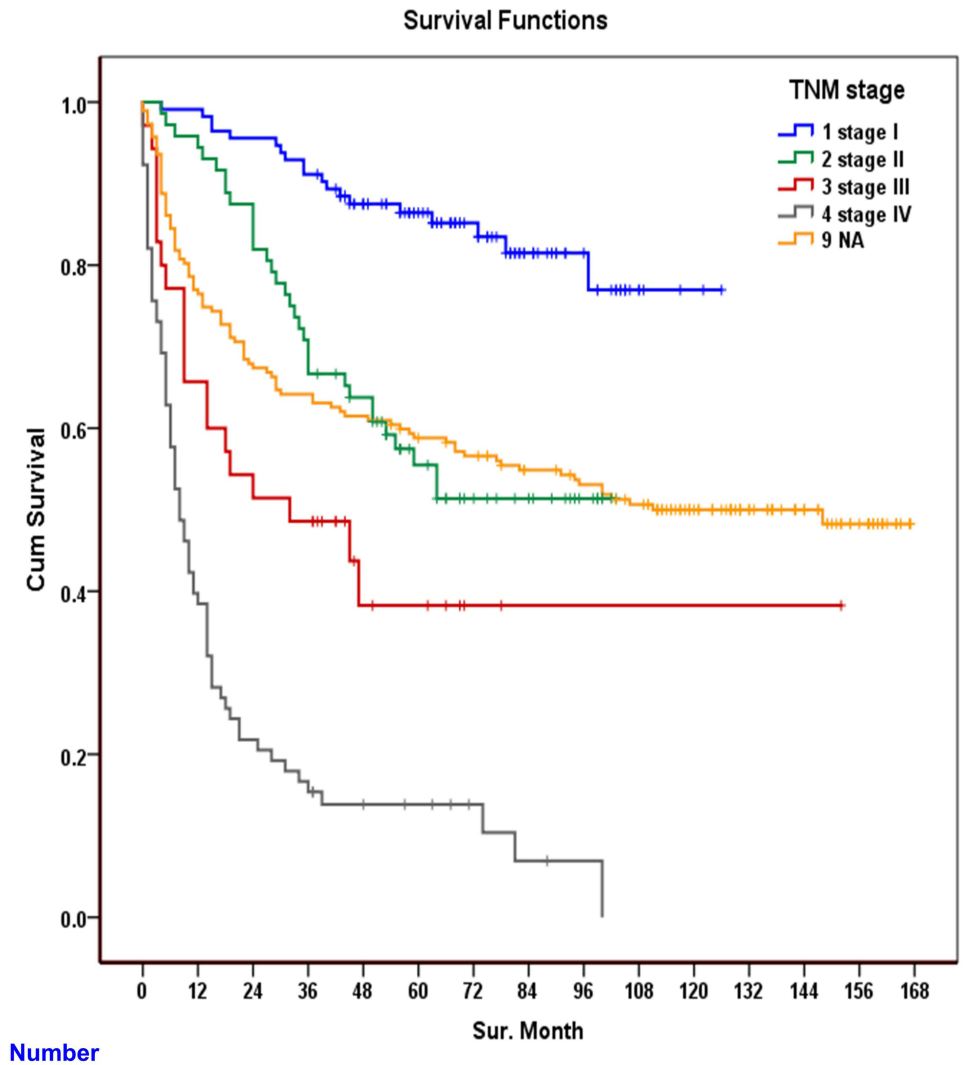

Number at risk

Stage															
	I	113	112	108	103	88	71	50	30	18	5	2	0		
	II	72	68	62	50	43	28	18	14	8	0				
	III	35	23	18	17	7	6	2	1	1	1	1	1	1	0
	IV	78	30	17	12	8	7	4	2	1	0				
	NA	187	143	126	120	115	107	102	93	88	82	62	45	33	19	0

Figure 5 Observed survival in 485 bladder cancer inpatients by stage during 2007–2017 (%).
Abbreviation: NA, not available.

favorable. Regarding sex, international evidence remains heterogeneous: some datasets point to worse survival among women with MIBC,[5] whereas national data from Norway suggest no sex gap in overall survival.[23] When positioned against Chinese benchmarks, our hospital-based 5-year OS lies between local population-based estimates (eg, Qidong)[7] and national averages.[6] This gradient likely reflects case selection at a tertiary referral center, regional heterogeneity in stage at diagnosis, and differences in treatment capabilities or uptake. Recent studies have underscored the prognostic significance of variant histologies—such as micropapillary, plasmacytoid, and sarcomatoid subtypes—even within the same TNM stage, which were not classified in our cohort due to missing histopathological detail.[27]

It is important to distinguish hospital-based survival from population-based metrics. The latter reflect system-level performance in prevention, early detection, and treatment access, while hospital-based data primarily reflect clinical management, patient case-mix, and institutional processes.

Strengths and Limitations

Key strengths of this study include an exceptionally high follow-up success rate (99.38%), achieved through combination of active and passive methods, minimizing attrition bias and enhancing the validity of OS estimates. The decade-long observation window further enables appraisal of long-term outcomes and temporal improvements in data completeness. Nevertheless, several limitations merit discussion. First, as a single-center cohort of moderate size, external generalizability may be limited; selection bias is inherent to tertiary hospitals where patients may present with more advanced disease or complex comorbidities. Second, analyses were not stratified by individual T/N/M components or treatment modalities (eg, surgical approach, chemotherapy, radiotherapy parameters), limiting insight into regiment-specific survival patterns. Third, important clinical covariates such as smoking status, comorbidities, tumor grade, histology were unavailable, precluding multivariable adjustment. Emerging evidence shows that long-term smoking exposure worsens progression-free survival among NMIBC patients receiving BCG therapy, reaching risk levels comparable to EAU's very-high-risk category.[28] Furthermore, repeat or restaging TURBT prior to BCG instillation improves long-term prognosis in high-risk NMIBC, but our cohort lacked consistent documentation of re-TURBT procedures.[14] Positive surgical margins, especially at the urethral or soft tissue edge, are associated with worse survival and warrant tailored postoperative strategies.[29] Surgical margin status, however, was not recorded in this hospital registry. Likewise, tumor location (eg, trigone, lateral wall) was inconsistently documented, limiting our ability to explore site-specific prognostic associations.

Unfortunately, smoking history was not routinely documented in our dataset. Although Cox proportional hazards models are commonly used in survival analysis, we did not apply them in this study. Given the descriptive aim, high proportion of missing TNM data, and lack of treatment details, adjusted modeling was deemed of limited interpretive value. These limitations— single-center design, absence of multivariate analysis and potential selection bias—should be considered in interpreting our results.

Future Directions

To enhance reliability, we implemented on-site verification and cross-validation with district cancer registries. Even so, future studies should expand to multicenter cohorts with prospective standardized data collection. Regionally, improving outcomes will require efforts in: (1) earlier detection through risk-adapted surveillance and timely hematuria evaluation; (2) standardized staging and multidisciplinary treatment planning; and (3) timely and completion curative-intent therapies, especially among older or late-stage patients. More granular clinical data—including comorbidity indices, performance status, tumor grade and histology, and treatment regimens—would enable construction of robust prognostic models. Multi-institutional collaborations with harmonized definitions would support benchmarking and guide individualized care strategies.

Conclusion

In this hospital-based cohort of bladder cancer in Eastern China, overall survival varied significantly by age, TNM stage, and hospitalization frequency. While the study provides real-world insights, its single-center design and lack of treatment data should be considered when interpreting the results. Our findings reaffirm the importance of accurate staging and early diagnosis in improving survival outcomes. Enhanced documentation, standardized care pathways, and timely interventions—particularly for older patients and those with repeated hospitalizations—may further optimize long-term prognosis.

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Disclosure

The author(s) report no conflicts of interest in this work.

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