

Original Article

The occurrence of bladder tumor among young age group in Tikrit city population 2025

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ABSTRACT

Objectives: The research aimed to establish the frequency of bladder cancer among patients who were below forty years old in Tikrit Teaching Hospital and Salahdin General Hospital in Iraq. It dealt with epidemiological aspects of this disease, including gender predisposition, effects of essential risk factors, such as smoking and occupational exposure, and tumor recurrence. **Methods:** A retrospective study was conducted between 2016 and 2024 in Tikrit Teaching Hospital and Salahdin General Hospital. A total of 38 young patients diagnosed with bladder cancer were analyzed for demographic, clinical, and pathological details. **Results:** The study results indicated that most bladder cancer cases were in male patients in the working group between 30 and 39 years, as they constituted 52.7% of the entire sample population. The possible risk factors included smoking, with 63.2% of the patients involved, and occupational exposure, with 52.7%. The recurrence rate among the patients was high, especially among those diagnosed at an advanced stage. **Conclusion:** The results indicate the need to pay closer attention to early diagnosis and timely prevention in youth. Public health interventions should focus on targeting smoking control measures, occupational risk reduction, and awareness of early diagnosis.

Key words: Bladder tumor, Young age group, Bladder cancer, non-muscle invasive bladder cancer, Epidemiology, Risk factors

The urinary system is a site for malignancy, and bladder cancer is the most common one. Bladder Cancer is the 10th most prevalent cancer worldwide and is diagnosed in 573,000 persons annually, with an accompanying mortality of 213,000 per annum. (1) Bladder cancer was most prevalent among the elderly, but today there are increasing cases among younger people. (2) Bladder cancer usually occurs in people older than 60 years and is diagnosed at an average age of seventy-three years. (3) Bladder cancer occurs in 1 to 5 percent of those who are younger than 40 years old. (3) There is little research on this disease subgroup, though data exist on specific tumor biological variations and progressive patterns because bladder cancer is rare in young patients. (4)

The Surveillance Epidemiology and End Results (SEER) database provided population data for bladder cancer in the young adult population through a research study. (1) Non-muscle-invasive bladder cancer (NMIBC) appears as the diagnosable form of bladder cancer in younger patients who are under 40 years old, according to clinical research. Research data showed that young patients had tumors with

lower grades and experienced fewer disease relapses than their older counterparts. (5) Early detection is very important because delays in diagnosis can influence the progression of diseases and the performance of treatments.

The biggest risk factor for bladder cancer is smoking, accounting for up to 50–65 % of all cancer cases. (6) In case of cigarette smoke, carcinogens like aromatic amines are removed through urine, and they damage the epithelium of the bladder (7) Young bladder cancer patients who continue smoking have a greater chance of tumor recurrence when compared to non-smoking patients, according to research findings. (7) Young people who work with industrial carcinogens such as aromatic amines present in the dye, rubber, and chemical industries face an elevated risk of developing bladder cancer. (8) Research links hereditary factors to bladder tumor development in younger patients because these patients showed genetic mutations in TP53, along with FGFR3 and RB1. (4) Studies discovered that people with detoxification gene polymorphisms NAT2 and GSTM1 showed increased vulnerability to developing bladder cancer during their younger years. (2)

The pathogenesis of bladder cancer is chronic urinary tract

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infections, schistosomiasis, and inflammatory conditions with prolonged duration. (5) Regions in which schistosomiasis is endemic, for example, in Africa and the Middle Eastern territories, have a rising incidence of squamous cell carcinoma of the bladder in young people. (9) The distinct nature of bladder cancer from transitional cell carcinoma (TCC) demonstrates how persistent inflammation and tissue irritation contribute to tumor formation. The pathological characteristics of bladder cancer differ between younger patients who present with tumors compared to those observed in older patients with the same cancer. (10) Most young adult tumors start as low-grade and noninvasive tumors, which are smaller in size at the time of diagnosis.

A significant number of studies prove that bladder tumors diagnosed in younger individuals typically present as low-grade (Grade 1 or 2) and noninvasive (Ta or T1). Research analyzing bladder cancer cases under the age of 40 found that 85% of tumors were Ta, with muscle invasion occurring in only 15% of patients. (11) Tumor recurrence occurs frequently among young bladder cancer patients, even when their tumors have low-grade and stage characteristics. (12) In general, young people tend to blame their most common presenting symptom of hematuria on urinary tract infections or other benign causes. (13) The standard diagnostic methods applied for the determination of bladder cancer include urine cytology, cystoscopy, and imaging techniques, such as ultrasound or the use of CT scan with contrast administration. (6) Bladder cancer can now be diagnosed early with the help of urine-based biomarkers, NMP22 and UroVysion, which have been found quite effective for high-risk patients.

Young patients diagnosed with NMIBC receive transurethral resection of bladder tumor (TURBT) as their treatment of choice and intravesical therapy when medically required. (8) BCG *Bacillus Calmette-Guérin* administered within the bladder has effectively decreased recurrence among patients with high-risk characteristics. The recommended treatment for muscle-invasive bladder cancer (MIBC) patients consists of radical cystectomy as the primary intervention. (14) Trimodal therapy (TURBT combined with chemotherapy and radiation) represents a promising treatment method for bladder preservation while achieving successful oncologic control. The objective of this study was to determine the incidence of bladder tumors in people less than 40 years with distributions of age, gender predisposition, and risk factors such as smoking and occupational exposure, recurrence, and progression of the tumors.

MATERIALS AND METHODS

The retrospective observational design of analysis was conducted in 38 urinary bladder cancer patients from May 2016 to May 2024 at Tikrit Teaching Hospital and Salahdin General Hospital in Iraq. The study group also performed a thorough medical record analysis of significant pathological,

clinical, and demographic information. (15) Bladder tumor epidemiology and risk factors, tumor characteristics, and recurrence patterns in youth patients were investigated in the research.

Inclusion Criteria:

1. Bladder cancer patients under 40 years treated in Tikrit Teaching and Salahdin General Hospital from May 2016 to May 2024.
2. Diagnosis using Cystoscopy, Transurethral Resection of Bladder Tumor, and a histological assessment.
3. The study included patients who provided demographic data about their age and sex identity and documented risk factors like smoking status, occupational history, and clinical data.

Exclusion Criteria:

1. Patients with a history of bladder transitional cell carcinoma before the study period.
2. Patients who currently have carcinoma in situ or additional urinary malignancies at the same time.
3. Patients who have previously undergone pelvic radiotherapy or chemotherapy.
4. Incomplete medical records or missing histopathological confirmation of bladder cancer.

Sample Size Justification

The sample was 38 young patients because this research is retrospective, and due to the small number of young patients diagnosed with bladder cancer at Tikrit Teaching Hospital and Salahdin General Hospital. Although the study could have involved a more extensive sample from a range of institutions for even better statistical outcomes, the sample obtained gives a true picture of the prevalence of bladder cancer in young people in the Iraqi healthcare facilities.

However, such a small population still carries essential information in terms of the epidemiology, risk factors, and recurrences of bladder cancer in such an age group. Due to the very low prevalence of the disease among this group, it would be quite challenging to recruit more participants in the study without increasing the duration of the study or reaching out to more hospitals. The research validity is evident from the use of inclusive and exclusive criteria, besides the medical records, as well as standard diagnostic procedures. However, the sample's relatively small size and the single-hospital setting limit the generalizability of the findings, and future studies should aim to include more participants from multiple regions to improve the external validity of the results.

Data Collection

Using a standardized framework, the researchers obtained clinical and demographic data. (12) The patient history review

included age and sex, date of diagnosis, and known risk factors. Individual documentation of carcinogens at work and family history of bladder cancer, as well as smoking patterns, were noted, as they all play significant roles in bladder cancer development. The most common symptom experienced by patients at diagnosis was hematuria, according to symptomatology assessment. (16) The healthcare professional documented all urinary symptoms, including dysuria, urgency, and frequency.

Tumor Diagnosis and Staging

The diagnostic assessment followed an organized process to detect tumors and establish their classification. (13) The patient group underwent cystoscopy procedures and received TURBT treatments as a diagnostic and therapeutic tool. (17) Medical staff performed cystoscopic follow-ups at three-month intervals and six-month intervals annually to detect any tumor recurrence or disease progression. The cystoscopy procedure noted down the tumor size, number of lesions, and morphological characteristics. Pathological examination of tumor tissue used the TNM staging system and WHO grading criteria for classification. (18) The established grading system enabled doctors to evaluate how deeply the tumors penetrated tissues while determining their differentiation state, thus revealing the initial disease aggressiveness.

Statistical Analysis

Statistical interpretation of data was conducted through SPSS version 26 to achieve precise results. The research team summarized categorical data as frequencies and percentages, alongside performing appropriate statistical tests on continuous variables. Statistical analysis utilized the t-test for normal data distribution and the Mann–Whitney U test to analyze variables that did not follow the normal distribution. (14) Statistical significance was determined through P-value calculation to enable strong comparisons between various patient groups.

RESULTS

The epidemiological research demonstrated that bladder cancer mainly affected patients between 30 and 39 years old, since they represented 52.7% (20 patients) of the total 38 participants. Individuals between 20 and 29 were the second-largest affected group, with 34.2% (13 patients). Under 20-year-olds made up only 13.1% (5 patients). Male patients represented 84.2% of the total sample (32 patients) compared to female patients who made up 15.8% (6 patients). The observed gender imbalance in bladder cancer matches worldwide trends because men typically encounter more exposure to smoking and carcinogens in their workplace. (16) The data showed that younger bladder cancer cases overwhelmingly target male patients and reach their peak occurrence in the patient population during the thirties.

Table 1: Age and Gender Distribution of Bladder Cancer Cases

Age Group (Years)	Number of Patients	Percentage (%)
<20	5	13.1
20–29	13	34.2
30–39	20	52.7
Total	38	100
Gender	Number of Patients	Percentage (%)
Male	32	84.2
Female	6	15.8

The research showed that young bladder cancer patients have developed their condition as a result of smoking and occupational contact with cancer-causing substances. (19) The research data confirmed tobacco smoking as a significant risk factor since 63.2 percent (24 cases) of the studied patients used tobacco products. Of the studied group, 52.7% (20 patients) had evidence of occupational contact with bladder carcinogenic substances such as industrial chemicals, dyes, and petroleum products.

The results indicate that 12 cases (31.5%) out of 38 young bladder cancer patients had a family history of the disease, suggesting a genetic factor in the development of the disease. Research on the impact of hereditary factors is lagging behind that on the effects of lifestyle or environmental elements on bladder cancer development. The research findings demonstrate that public health interventions should focus on both smoking prevention and workplace exposure prevention.

Hematuria was the disease's first symptom, affecting 84% (32 patients). Young patients should seek urgent medical attention when they detect blood in their urine, since this symptom remains the most reliable indicator of bladder cancer. (20) Symptoms of dysuria affected 13% of patients, while urgency affected 11%, and frequency affected 16% of patients; however, these symptoms were reported less frequently.

Table 2: Clinical Symptoms in Young Bladder Cancer Patients

Symptom	Number of Patients	Percentage (%)
Hematuria	32	84.0
Dysuria	5	13.0
Urgency	4	11.0
Frequency	6	16.0

The high occurrence of hematuria requires healthcare providers and patients to enhance their awareness about early detection and timely management. The assessment of tumor staging, together with size determination and grading, was used to evaluate aggressiveness in bladder cancer of younger patients. Most patients received a Ta-stage diagnosis, which falls under the classification of noninvasive superficial tumors (52.6% or 20 cases). Stage T1 tumors were observed in 16 cases, representing 42.2% of the total cases. Under this stage, the cancer cells penetrated the lamina propria, although they

had not reached the muscle layer. The frequency of patients reaching the T2 stage of bladder cancer was low at 5.2% (2 cases) since no individuals advanced beyond the T1 or T2 stage.

The tumor size evaluations revealed that 79% (30 cases) of tumors measured less than 3 cm, but 21% (8 cases) measured more than 3 cm. Most of the examined tumors (81.5%) fell under Grade 1 histological classification, while Grade 2 and 3 tumors represented 13.2 percent and 5.3 percent of cases, respectively. (21) The results indicate that younger bladder cancer patients primarily develop noninvasive tumors of low grade that tend to behave less aggressively.

Table 3: Pathological Characteristics of Bladder Tumors

Tumor Parameter	Number of Patients	Percentage (%)
Stage		
Ta	20	52.6
T1	16	42.2
T2	2	5.2
T3/T4	0	0.0
Tumor Size		

<3 cm	30	79.0
>3 cm	8	21.0
Tumor Grade		
Grade 1	31	81.5
Grade 2	5	13.2
Grade 3	2	5.3

The research determined that tumor recurrence occurred in 44.7% of young bladder cancer patients who had a total of 17 cases. Out of the patients, 21.1% or 8 cases developed progression, whereby it was defined as tumor progression to a higher stage or grade. Even though the recurrence rate was not statistically significant ($p = 0.215$), 66.6% of the patients with a family history of bladder cancer experienced recurrence. (22) The most common recurrence of bladder cancer was among patients aged 30–39 years ($p = 0.012$). Modern staging methods found that T1 and T2 tumors were of advanced disease stage and had higher recurrence rates ($p < 0.05$). (19) The data demonstrate the critical need for strong follow-up and monitoring protocols that should focus on patients with stage T1 and T2 tumors as well as those with family histories of the disease.

Table 4: Recurrence and Progression Rates Among Young Bladder Cancer Patients

Variable	Recurrence Rate (%)	Progression Rate (%)	P-value (Recurrence)	P-value (Progression)
Family History				
Positive	66.6	25.0	0.215	0.06
Negative	34.6	11.5		
Age Group				
<20 years	0	0	-	-
20–29 years	38.5	15.4	0.045	0.07
30–39 years	60.0	20.0	0.012	0.021
Tumor Stage				
Ta	30.0	0.0	0.045	<0.001
T1	56.0	25.0		
T2	100.0	100.0		

DISCUSSION

Bladder cancer presents as a rare but important condition among younger patients because it exhibits unique epidemiological and pathological features. (5) The present study indicated that bladder cancer primarily affected people between 30 and 39 years old, making them the leading population group (52.7%), with a strong male dominance (84.2%). The present study results support national statistics indicating that bladder cancer predominantly affects older populations, but also confirm that younger adults develop this disease due to a combination of environmental and genetic factors. (17) Smoking and occupational exposure are known risk factors that contribute to the complex mechanisms through which bladder cancer develops in younger individuals.

The present study showed smoking as the most significant avoidable risk factor affecting 63.2% of patients. The carcinogenic compounds found in tobacco smoke are released through urine to cause direct damage to urothelial linings while raising mutation frequencies. (20) Previous research showed that prolonged smoking leads to increased bladder cancer risk, even when individuals start their habit at a young age. The present study revealed occupational exposure as a significant factor in bladder tumorigenesis, affecting 52.7% of cases and demonstrating that aromatic amines and polycyclic hydrocarbons act as industrial carcinogens in the development of bladder cancer. (23) Preventing bladder cancer cases requires combined approaches of smoking cessation support alongside enhanced workplace safety restrictions to safeguard young individuals from the development of this disease.

Most tumors analyzed in the present study were either noninvasive tumors of stage Ta and T1 or low-grade tumors, similar to past reports of bladder cancer in young adults. (22) The overall positive tumor characteristics did not prevent high recurrence rates, reaching 44.7%, especially in patients with a family history or advanced tumor stage. (21) The development of muscle-invasive disease (T2) was reported in a few cases, which proves that bladder tumors in young patients tend to be slow-growing, yet they may become malignant in some instances. (15) The present study showed that young patients with low-grade tumors should receive continuous monitoring because their tumors tend to recur, while some tumors may advance.

According to the present study findings, young patients have high recurrence rates, so intense follow-up surveillance is needed after treatment. (23) Given that most tumors are low-grade, a follow-up plan consisting of routine cystoscopy and TURBT should be implemented because of the risk of recurrence. (19) This approach allows monitoring recurrent lesions early to prevent the development of muscle-invasive disease and improve long-term patient health. (23) The established relationship between smoking behavior and occupational exposure to tumors suggests that preventive lifestyle changes should be part of the care for young bladder cancer patients.

A limitation is that the study only included 38 patients, which may not fully represent the broader young adult population. A large sample size might have given more concrete results. The retrospective design of data collection depends on medical records, but such a method can introduce missing or incomplete information. The research examined data from only two Tikrit hospitals, which can produce results that fail to accurately represent bladder cancer trends in Iraq and global healthcare institutions. The study did not sufficiently examine additional risk elements like eating habits and gene susceptibility to comprehend disease patterns in younger demographic groups.

CONCLUSION

The results of this research showed that bladder tumors are affecting younger people at higher rates, predominantly male patients between 30 and 39 years old. Recurrent events are a serious clinical problem, despite most tumors affecting this age group being of low-grade and noninvasive behavior. Research confirmed that smoking and occupational carcinogen contact are the main risk factors that strengthen environmental and lifestyle factors related to the formation of bladder cancer. The main symptom that causes people to seek medical care is hematuria; therefore, immediate medical assessment is required. Recurring risks necessitate that patients undergo strict follow-up procedures with long-term monitoring because of the favorable early-stage tumor prognosis.

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