

Bladder Cancer: Causes, Symptoms, Diagnosis, and Treatment

Jonathan E. Calloway*

Department of Urology & Oncology Research, Midwest Institute for Cancer Studies, Chicago, IL, USA

Introduction

Bladder cancer is one of the most common types of cancer, affecting thousands of individuals worldwide. It originates in the cells lining the bladder, an organ responsible for storing urine. While it can affect both men and women, bladder cancer is more prevalent in older adults and men. Early detection significantly improves treatment outcomes, making awareness and timely medical intervention crucial [1]. This article explores the causes, symptoms, diagnosis, and treatment options for bladder cancer, providing a comprehensive understanding of this condition [2]. Bladder cancer is a serious and prevalent form of cancer that primarily affects the urinary bladder, the organ responsible for storing urine. It is the tenth most commonly diagnosed cancer worldwide, with a higher incidence in men than in women [3]. The majority of bladder cancers originate in the urothelial cells lining the bladder, making early detection crucial for successful treatment and management. Bladder cancer typically manifests with symptoms such as blood in the urine, frequent urination, and pain during urination. While the exact cause of bladder cancer remains unclear, several risk factors contribute to its development, including smoking, exposure to certain chemicals, chronic bladder inflammation, and genetic predisposition [4].

Due to the recurrence tendency of bladder cancer, continuous monitoring and follow-up care are essential. Advances in medical research have led to improved diagnostic techniques and innovative treatment approaches, which significantly enhance survival rates and quality of life for affected individuals [5]. This article explores the causes, symptoms, diagnosis, and treatment options available for bladder cancer, providing an in-depth understanding of this condition and highlighting the importance of early detection and prevention strategies.

Causes and risk factors

Bladder cancer develops when bladder cells undergo genetic mutations, leading to uncontrolled growth. Several risk factors contribute to this process:

Tobacco smoke contains carcinogens that accumulate in the bladder, increasing the risk of cancer.

Certain industries, including dye, rubber, and textile manufacturing, involve chemicals that elevate bladder cancer risk.

Bladder cancer develops when cells in the bladder undergo genetic mutations, leading to uncontrolled growth. While the exact cause of these mutations is not always clear, certain risk factors have been identified as significant contributors to the development of bladder cancer.

Cigarette smoking is the leading risk factor for bladder cancer. Harmful chemicals in tobacco smoke are absorbed into the bloodstream and later filtered by the kidneys into urine. These carcinogens come into direct contact with the bladder lining, increasing the likelihood of cellular mutations that lead to cancer.

Prolonged exposure to industrial chemicals, particularly in

occupations related to dye, rubber, leather, textiles, and paint production, elevates the risk of bladder cancer. Workers in these industries may inhale or absorb harmful chemicals that accumulate in the bladder over time [6].

Persistent bladder infections, kidney stones, long-term catheter use, and conditions such as interstitial cystitis can lead to chronic bladder irritation, increasing the risk of squamous cell carcinoma of the bladder.

Bladder cancer is more common in older adults, particularly those over the age of 55. Additionally, men are three to four times more likely than women to develop bladder cancer, possibly due to lifestyle factors and occupational exposures [7].

Individuals with a family history of bladder cancer have an increased risk of developing the disease. Genetic mutations in certain cancer-related genes, such as RB1 and PTEN, may predispose individuals to bladder cancer.

Patients who have undergone radiation therapy in the pelvic region or received chemotherapy drugs such as cyclophosphamide for previous cancer treatments have a higher risk of developing bladder cancer.

Long-term exposure to high levels of arsenic in drinking water has been associated with an increased risk of bladder cancer. The risk varies by geographical location and water source contamination levels.

The prolonged use of specific medications, such as the diabetes drug pioglitazone, has been linked to an increased risk of bladder cancer in some studies. However, ongoing research is needed to fully establish this connection [8].

Understanding these risk factors allows individuals to take preventive measures and seek early medical intervention if they experience symptoms associated with bladder cancer.

Early diagnosis is crucial for effective treatment. Several diagnostic methods are used to confirm bladder cancer:

These tests detect abnormal cells or blood in urine samples.

A thin, flexible tube with a camera is inserted into the bladder to visualize abnormalities.

A tissue sample is taken during cystoscopy to determine the

***Corresponding author:** Dr. Jonathan E. Calloway, Department of Urology & Oncology Research, Midwest Institute for Cancer Studies, Chicago, IL, USA, E-mail: jonham_e@gmail.com

Received: 01-Jan-2024, Manuscript No: jcd-25-162254; **Editor assigned:** 04-Jan-2024, PreQC No. jcd-25-162254 (PQ); **Reviewed:** 17-Jan-2024, QC No. jcd-25-162254; **Revised:** 24-Jan-2024, Manuscript No. jcd-25-162254 (R); **Published:** 30-Jan-2024, DOI: 10.4172/2476-2253.1000276

Citation: Jonathan EC (2025) Bladder Cancer: Causes, Symptoms, Diagnosis, and Treatment. J Cancer Diagn 9: 276.

Copyright: © 2025 Jonathan EC. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

presence of cancerous cells.

CT scans, MRI, or ultrasound may help assess tumor size and spread.

Detect specific proteins linked to bladder cancer.

Types of bladder cancer

- Bladder cancer is categorized based on the type of cells affected:
- The most common type, originating in the bladder's inner lining.
- Linked to chronic bladder irritation and infections.
- A rare form that develops from glandular cells in the bladder.
- Bladder cancer is staged based on tumor growth and spread:
- Cancer is confined to the bladder lining.
- The tumor has invaded deeper layers but remains within the bladder.
- Cancer has reached the bladder muscle layer.
- The tumor has extended to surrounding tissues.
- Cancer has metastasized to distant organs.

Treatment options for bladder cancer

Treatment varies based on the cancer stage and type. Common treatment approaches include:

Transurethral Resection of Bladder Tumor (TURBT): Used for early-stage bladder cancer.

Partial or complete removal of the bladder for advanced cases.

Chemotherapy or immunotherapy drugs are delivered directly into the bladder.

Systemic drugs destroy cancer cells and prevent recurrence.

High-energy radiation targets and shrinks tumors.

Enhances the immune system's ability to fight cancer.

Focuses on specific cancer-related mutations.

Prevention strategies

While bladder cancer cannot always be prevented, certain lifestyle changes may reduce risk:

Avoiding tobacco significantly lowers bladder cancer risk.

Protective measures should be taken in high-risk workplaces.

Drinking plenty of water helps flush out toxins.

A diet rich in fruits, vegetables, and antioxidants supports overall bladder health.

Early screening helps detect abnormalities before cancer progresses.

Conclusion

Bladder cancer remains a significant health concern, but early detection and treatment can greatly improve survival rates. Understanding its causes, symptoms, and risk factors enables individuals to take preventive measures and seek timely medical intervention. Advancements in medical research continue to enhance diagnostic and treatment approaches, offering hope for better patient outcomes. Regular health check-ups and awareness play a vital role in combating this disease and improving the quality of life for those affected. Bladder cancer is a complex and challenging disease that requires a proactive approach for effective management. The key to combating bladder cancer lies in awareness, early detection, and access to appropriate medical care. As medical advancements continue to evolve, newer and more effective treatment options are being developed to improve patient outcomes.

Survivors of bladder cancer often require ongoing monitoring due to the high recurrence rate, emphasizing the importance of long-term follow-up care. Prevention strategies, including quitting smoking and reducing exposure to harmful chemicals, play a crucial role in minimizing risk. Additionally, advancements in immunotherapy and targeted therapies offer promising prospects for personalized treatment approaches.

By staying informed about the risk factors, symptoms, and treatment options for bladder cancer, individuals can take proactive steps toward early detection and effective intervention. Raising awareness and supporting research efforts remain essential in the fight against bladder cancer, ultimately improving survival rates and enhancing the quality of life for those affected by the disease.

References

1. Mamas IN, Dalianis T, Doukas SG, Zaravinis A, Achtsidis V, et al. (2019) Paediatric virology and human papillomaviruses: An update. *Exp Ther Med* 17: 4337-4343.
2. Hong Y, Li SQ, Hu YL, Wang ZQ (2013) Survey of human papillomavirus types and their vertical transmission in pregnant women. *BMC Infect Dis* 13.
3. Iaconelli M, Petricca S, Libera SD, Di Bonito P, La Rosa G (2015) First detection of human papillomaviruses and human polyomaviruses in river waters in Italy. *Food Environ Virol* 7: 309-315.
4. Della LS, Petricca S, Iaconelli M, Sanguinetti M, Graffeo R, et al. (2015) A large spectrum of alpha and beta papillomaviruses is detected in human stool samples. *J Gen Virol* 96: 607-613.
5. Dunyo P, Effah K, Udofia EA (2018) Factors associated with late presentation of cervical cancer cases at a district hospital: a retrospective study. *BMC Public Health* 18: 1156.
6. Mlange R, Matovelo D, Ramba P, Kidenya B (2016) Patient and disease characteristics associated with late tumour stage at presentation of cervical cancer in northwestern Tanzania. *BMC Womens Health* 16.
7. Wistuba II, Thomas B, Behrens C, Onuki N, Lindberg G (1999) Molecular abnormalities associated with endocrine tumors of the uterine cervix. *Gynecol Oncol* 72: 3-9.
8. Ries LAG, Young JL, Keel GE (2007) SEER survival monograph: cancer survival among adults: US SEER program, 1988-2001, patient and tumor characteristics. NIH Pub 111-22.