



ORIGINAL RESEARCH PAPER

Oncopathology

BLADDER CANCER – A PERSPECTIVE VIEW

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ABSTRACT
 The most prevalent malignancy of the urinary tract is bladder cancer (BC). It has a high prevalence, significant morbidity, death, and financial burden. It spans a continuum of illness, from superficial, well-differentiated disease that has little bearing on survival to highly malignant tumors, for which the outlook for long-term survival may be bleak. The main risk factors for bladder cancer are exposure to carcinogens at work or in the environment, particularly tobacco. Transurethral resection of the bladder tumor (TURBT) is the most common procedure used to identify bladder cancer in individuals who have macroscopic haematuria. Intravesical therapies, principally Bacillus Calmette-Guérin (BCG) with maintenance, are the main therapy for non-muscle-invasive bladder cancer (NMIBC), which is prevented by breakthroughs in our genetic understanding of bladder cancer.

INTRODUCTION:

The most prevalent cancer of the urinary tract is bladder cancer, and males are four times more likely than women to develop it [1]. The most prevalent histologic type of BC is urothelial carcinoma (UC) (approximately 90 percent). The invasion of the basement membrane, lamina propria, or deeper by neoplastic cells of urothelial origin is the definition of UC. The WHO now refers to urothelial carcinoma in place of the previous term transitional cell carcinoma. When an invasion is only 2 mm deep or less, it is referred to as a "micro invasion". According to distinction, bladder cancers are classified by the World Health Organization (2016) as low grade (grades 1 and 2) or high grade (grade 3). Risk stratification is impacted by the differentiation between low-grade and high-grade urothelial disease.

Epidemiology:

BC is the fifth most prevalent cancer worldwide. The fourth most common cancer diagnosed in men and the eighth most prevalent cancer in women is bladder cancer. 65 years is the average age at diagnosis. Primary bladder cancer, particularly transitional-cell carcinoma, has been observed in teens, although being uncommonly identified before the age of 40.

Young adults typically have well-differentiated, indolent tumors. Two to three times as many men as women experience symptoms. White people experience the condition twice as often as African Americans, although their mortality rates are lower.

In underdeveloped nations versus industrialized nations, the prevalence of BC is twice as high. The majority of BCs in emerging nations are squamous cell carcinomas. [2][3][4].

Types of bladder cancer:

Depending on the tumor cells microscopic appearance. There are three primary forms of bladder cancer:

Cancer of The Urothelium.

About 90% of all bladder malignancies are urothelial carcinomas (or UCC). Additionally, it is the cause of 10% to 15% of adult kidney cancer diagnoses. The urothelial cells that border the urine tract are where it starts. Transitional cell carcinoma, or TCC, was the previous name for urothelial cancer.

Carcinoma of The Squamous Cell.

In reaction to irritation and inflammation, squamous cells form in the bladder lining. These cells may develop into

malignant ones over time. 4 percent of all bladder tumors are squamous cell carcinomas.

Adenocarcinoma.

This kind, which arises from glandular cells, makes up around 2% of all bladder tumors.

- There are further, less frequent varieties of bladder cancer, such as micropapillary, plasmacytoid, sarcomatoid, and small cell bladder cancer. Bladder sarcomas frequently start in the bladder's fat or muscular layers. A rare kind of bladder cancer with a high likelihood of metastasizing to other areas of the body is small cell bladder cancer.
- Bladder cancer can be classified as non-invasive, non-muscle-invasive, or muscle-invasive in addition to its cell type.
- Non-invasive. Non-invasive papillary carcinoma and carcinoma in situ are examples of non-invasive bladder cancer (CIS). Non-invasive papillary carcinoma is a tumor that be easily excised from a small piece of tissue. Stage Ta refers to this. CIS refers to cancer that is only present on or close to the surface of found only on or near the surface of the bladder, which is called stage Tis.
- Non-muscle-invasive. Stage I bladder cancer, also known as non-muscle invasive bladder cancer, often has only spread to the lamina propria and not to the muscle. Although this phrase is less frequently used since it can mistakenly imply that the disease is not serious, non-muscle-invasive cancer is also referred to as superficial cancer.
- Muscle-invasive. Muscle-invasive bladder cancer has spread beyond the bladder's muscle and occasionally into its fatty layers, neighboring tissues, or external organs.

Risk factors:

- Bladder cancer risk is increased by smoking. Half of all bladder cancers in both men and women are caused by smoking. Your risk of having bladder cancer is also increased by the following things:
- contact with cancer-causing substances
- Chronic kidney and bladder stones, chronic urinary tract infection, chronic kidney and bladder irritation, chronic arsenic-contaminated water, intake of processed red meat, being male, and being white are all risk factors for schistosomiasis.
- Being older, as most bladder cancers Trusted Source occur in persons over the age of 55; consuming a high-fat diet; having a family history of bladder cancer; and having

certain medical conditions, such as diabetes mellitus, HPV infection, obesity, or having undergone a kidney transplant.

- having previously received radiation therapy to treat pelvic cancer; having previously received treatment with the chemotherapeutic medication Cytoxan; and having occupational exposures to aromatic amines (beta-naphthylamine) used in the manufacturing of chemical dyes and pharmaceuticals, and in gas treatment plants.

Symptoms of bladder cancer:

1. Hematuria (gross or microscopic)
2. Irritable signs (e.g., dysuria, frequency, nocturia, urge incontinence, urgency)
3. Symptoms of obstruction (e.g., decreased force of stream, feeling of incomplete voiding, intermittent stream, straining)
4. Metastases and advanced illness signs and symptoms (e.g., abdominal, bone, flank, or pelvic pain; anorexia, cachexia, or pallor; lower-extremity edema; renal failure; respiratory symptoms; suprapubic palpable mass)

Stages of bladder cancer:

Early-stage (limited to the bladder's lining) or invasive bladder cancer are two different types (penetrating the bladder wall and possibly spreading to nearby organs or lymph nodes).

The phases range from TA (restricted to the bladder's interior lining) to IV (most invasive). The cancer is contained to the bladder lining or the connective tissue immediately below the lining in the first stages (TA, T1 or CIS), but it has not yet spread to the bladder's main muscular wall.

Cancer in stages II to IV is invasive:

In Stage II, the bladder's muscular wall has been affected by malignancy.

In Stage III, the fatty tissue outside the bladder muscle has been affected by the malignancy.

The cancer is in Stage IV the cancer has metastasized from the bladder to the lymph nodes or to other organs or bones.

TNM, which stands for tumor, node involvement, and metastases, is a more advanced and favored staging approach. this system entails Bladder tumors that are invasive can range in size from T2 (spread to the major muscle wall below the lining) to T4 (tumor spreads beyond the bladder to nearby organs or the pelvic side wall).

The involvement of lymph nodes varies, ranging from N0 (no lymph node malignancy) through N3 (cancer in many lymph nodes, or in one or more bulky lymph nodes larger than 5 cm). M0 denotes the absence of metastases outside the pelvis. M1 denotes metastasis that has spread outside of the pelvis.

Diagnosis of bladder cancer:

Internal examination, which involves inserting gloved fingers into the vagina or rectum to feel for lumps that might indicate a cancerous growth, cystoscopy, which involves inserting a small camera-equipped tube through the urethra to view inside the bladder, biopsies, which involve taking a small sample of bladder tissue for testing for cancer, a CT scan to view the bladder, an intravenous pyelogram (IVP), and X-rays.

Treatment o for bladder cancer:

- Intravesical chemotherapy or immunotherapy for superficial tumors; surgery; chemotherapy;
- Radiation treatment
- These therapies may occasionally be combined.
- Options for surgery:
- Surgery is frequently used to treat bladder cancer. Depending on the cancer's stage, a particular sort of

surgery will be performed.

- Early stage illness is the most common indication for transurethral resection of the bladder (TA, T1, or CIS).
- An area of the bladder is removed during a partial cystectomy. It is occasionally used to treat a solitary tumor that has just partially invaded the bladder wall. The majority of the bladder is kept in this kind of operation. Radiation treatment and chemotherapy are frequently combined. Fewer people will be eligible for this bladder-saving treatment.
- The radical cystectomy is complete removal of the bladder. It is used for more extensive cancers and those that have spread beyond the bladder (or several early tumors over a large portion of the bladder).

Chemotherapy:

Chemotherapy is the practice of administering any of a class of medications whose primary function is to either kill or inhibit the division of rapidly proliferating cells. Chemotherapy medications are absorbed by cancer cells more quickly than by normal cells (but all cells are exposed to the chemotherapy drug). Depending on the stage of the cancer, chemotherapy medications are either administered intravenously (via a vein) or intravesically (straight into the bladder by a catheter threaded through the ureter).

The following are some typical chemotherapy medications used to treat bladder cancer:

- Methotrexate
- Vinblastine
- Doxorubicin
- Cyclophosphamide

Chemotherapy can have side effects, and the degree of these symptoms is determined on the specific medication used and the patient's tolerance to the medication. Although chemotherapy can be used alone, it is frequently combined with radiation therapy or surgery.

Intravesical Therapy:

Bladder cancer may be treated with intravesical (into the bladder through a tube inserted into the urethra) immunotherapy or chemotherapy.

Immunotherapy is the technique of using the immune system of the body to combat cancer cells. A vaccination known as Bacillus Calmette-Guérin (BCG) is widely used in the intravesical therapy of bladder tumors in stages Ta, T1, or carcinoma in situ (limited to the inner lining). A BCG-containing fluid is retained in the bladder throughout the procedure for a few hours before being drained.

Intravesical chemotherapy with mitomycin C is any other remedy option. Because the chemotherapy is given immediately into the bladder, different cells in the physique are not exposed to the chemotherapy, which reduces the possibilities for facet results from the chemotherapy. It's additionally regularly given as a single dose after a tumor has been eliminated by way of cystoscopy.

Radiation therapy:

Radiation therapy damages the DNA of most cancers cells by means of bombarding them with high-energy X-rays or different sorts of radiation. It may additionally be a choice to surgical procedure or used in aggregate with surgical treatment or chemotherapy. Radiation remedy can be delivered externally or internally.

In external radiation therapy, the radiation source is a machine outside the body that directs a focused beam of radiation at the tumor. With higher imaging applied sciences in use today, computer-guided radiation delivered from numerous angles minimizes radiation publicity to surrounding tissues and organs, limiting harm to these tissues. Fatigue, swelling of gentle tissues and pores and skin

infection are frequent aspect consequences of exterior radiation.

Internal radiation therapy is now not frequently used for bladder cancer. In this kind of treatment, a radioactive pellet is inserted into the bladder through the urethra or an incision in the lower abdomen. Internal radiation requires a hospital stay facility continue to be for the duration of the path of treatment, which can be various days, after which the pellet is removed.

Prognosis:

The prognosis of UC relies upon on a couple of factors. TNM stage is the most vital prognostic element of urinary bladder carcinoma. The 5-year typical survival (OS) for pT1 is 75%, for pT2 is 50%, and for pT3 is 20%. The invasion of muscularispropria determines whether or not the affected person staging is pT1 vs. pT2. Some histologic editions of UC have a incredibly poorer prognosis when in contrast to ordinary UC. These variations encompass urothelial carcinoma with rhabdoid features, urothelial micro-papillary carcinoma, plasmacytoid carcinoma, sarcomatoid carcinoma, small cell carcinoma, and undifferentiated carcinoma. Other bad prognostic elements of UC consist of lymphovascular invasion, the presence of urothelial carcinoma in situ, recurrence, massive tumor size, and multicentricity.[5]

Prevention:

The following elements and behaviours can limit your danger of getting bladder cancer:

No smoking

Avoid second-hand cigarette smoke

Avoid different carcinogenic chemicals

Drink lots of water

CONCLUSION:

Improved understanding of the molecular biology and genetics of bladder cancer has evolved the way localized and advanced disease is diagnosed and treated. While intravesical BCG has remained the mainstay of remedy for intermediate and high-risk non-muscle-invasive bladder cancer, the therapeutic picks for muscle-invasive and superior sickness has multiplied to encompass immunotherapy with checkpoint inhibition, focused therapies, and antibody-drug conjugates.

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