

Perspective

A basic overview on bladder cancer including signs, symptoms, and diagnosis

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ABOUT THE STUDY

Bladder cancer refers to a variety of cancers that develop in the tissues of the urinary bladder. Blood in the pee, urinating pain, and low back pain are all symptoms. It's triggered when the bladder's epithelial cells turn cancerous. Smoking, genetic factors, prior chemotherapy and radiotherapy, chronic bladder infections, and exposure to specific chemicals are all risk factors for bladder cancer. Transitional cell carcinoma is the most prevalent kind. Squamous cell carcinoma and adenocarcinoma are two other kinds. The most common method of diagnosis is cystoscopy with tissue biopsies. Transurethral resection and medical imaging are used to determine the cancer's stage.

Signs and symptoms

Blood in the urine is a common symptom of bladder cancer, which may or may not be visible or detected without the use of a microscope. The most common symptom of bladder cancer is blood in the urine, which is painless. The presence of visible blood in the urine may be temporary, and a urine test to establish the presence of non-visible blood may be required. At first, 80 to 90 percent of people with bladder cancer have visible blood. Bladder or ureteric stones, infection, kidney disease, kidney malignancies, or vascular abnormalities are all possible causes of blood in the urine, albeit none of them (save kidney cancers) are usually unpleasant. Other signs and symptoms include urination pain, frequent urination, and the need to urinate but not being able to. These signs and symptoms aren't specific to bladder cancer; they can also be caused by non-cancerous conditions such as prostate infections, overactive bladder, and cystitis. Some bladder cancers, such as urachal adenocarcinoma, create mucin, which is secreted in the urine and causes it to thicken. Pelvic or bone pain, lower-extremity swelling, and flank pain are all symptoms of severe illness. A perceptible lump may be discovered during a physical

examination.

Diagnosis

Globally, cystoscopy, a process in which a flexible or rigid tube (called a cystoscope) containing a camera and numerous tools is put into the bladder through the urethra, is the best way to diagnose the status of the bladder. The procedure's flexibility allows for a visual inspection of the bladder, minimal restorative work, and the collection of samples from worrisome lesions for biopsy. A rigid cystoscope is utilized in the operating room under general anesthesia to perform corrective procedures, biopsies, and more comprehensive tumor removal. In contrast to papillary lesions, which extend into the bladder cavity and are easily apparent, carcinoma in situ lesions are flat and indistinct. Multiple samples from various locations of the internal bladder wall are required to detect carcinoma in situ lesions. The identification of cancer in situ can be aided by photodynamic detection (blue light cystoscopy). A dye is injected into the bladder with the use of a catheter in photodynamic detection. Under blue light, cancer cells pick up the dye and become visible, offering visual indications to locations that need to be biopsied or removed. Urine cytology can be acquired from voided urine or during the cystoscopy procedure ("bladder washing"). For low-grade or grade 1 tumors, cytology is not extremely sensitive (a negative result cannot confidently rule out bladder cancer), but it has a high specificity (a positive result reliably detects bladder cancer). Human complement factor H-related protein, high-molecular-weight carcinoembryonic antigen, and nuclear matrix protein 22 are some of the latest non-invasive urine binding indicators available to aid in the identification of bladder cancer (NMP22). The CertNDx Bladder Cancer Assay, which identifies FGFR3 mutation, and the Urine Bladder Cancer Test (UBC), which is a sandwich ELISA for Cytokeratin 8/18 fragment, are two further non-invasive urine-based assays. Similarly, NMP22 is a sandwich

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ELISA and NMP22 Bladder Check is a dipstick immunoassay that both detect the tumor marker nucleus mitotic apparatus protein (NuMA) (a type of nuclear matrix protein). UroVysion is a fluorescent in situ hybridization technique that identifies aneuploidy on chromosomes 3, 7, and 17 as well as the deletion of the 9p21 locus. The ImmunoCyt test detects glycosylated CEA and MUCIN-like antigens *via* immunofluorescence (M344, LDQ10, 19A11). The BTA-STAT immunoassay detects human complement factor H-related protein using a dipstick immunoassay. BTA-TRAK is a sandwich ELISA that detects

both human complement factor H-related protein and human complement factor H. Sensitivities ranged from 0.57 to 0.82 for each biomarker, with specificities ranging from 0.74 to 0.88. When utilized in conjunction with urine cytology, biomarkers performed better than when used alone. However, low-grade cancer detection accuracy is weak, and 10% of tumors are still missed. Urinary biomarkers are not indicated for identification and surveillance in current guidelines.