

Bladder Bother

by Dr Gerald Tan

New advances in the treatment of muscle-invasive bladder cancer

THE BLADDER IS a hollow muscular organ whose twin functions are to store and empty urine produced by the kidneys. Bladder cancer refers to the uncontrolled growth of cells in the lining of the bladder wall. It occurs most commonly in chronic tobacco smokers. Occupational exposure to chemicals, such as benzidine and 2-naphthylamine, is also a well-known risk factor.

How is bladder cancer diagnosed?

Bladder cancer classically presents with painless blood in the urine (known as haematuria). Other symptoms may include frequent or painful urination. Cystoscopy of the bladder, wherein a flexible endoscope is passed through the urethra into the bladder under local anaesthesia, is the most accurate way to obtain samples for biopsy and to determine if cancer is present. Once confirmed, accurate staging of the bladder cancer would include (1) computed tomography (CT) of the urinary tract, popularly known as a CT urogram; (2) endoscopic removal of the bladder tumour under general anaesthesia, to ascertain the grade of cancer and whether it has invaded into the muscular wall (Figure 1); and (3) chest X-ray and bone scan to determine if there is spread of cancer to distant organs (known as metastasis).

Why is muscle-invasive bladder cancer (MIBC) bad news?

Most bladder cancers are detected early and are confined to the epithelial lining of the bladder (stage pT1). Endoscopic removal of these tumours alone is curative (Figure 2), and all that is required is regular surveillance with cystoscopy to detect any recurrence. However, cancers that have invaded into the muscular wall of the bladder (stage pT2-T4) are more aggressive, and without definitive surgical treatment, the cancer will quickly spread to the lymphatic system outside the bladder and then to distant organs. Once the cancer cells have invaded into the muscular wall, the only effective cure lies chiefly in radically removing the whole bladder and its surrounding lymph nodes, and diverting the urine outside of the body through either an artificial conduit using a loop of intestine, or fashioning a new pouch from intestine (known as a neobladder). Agreeing to proceed with surgery is a difficult decision for patients with muscle-

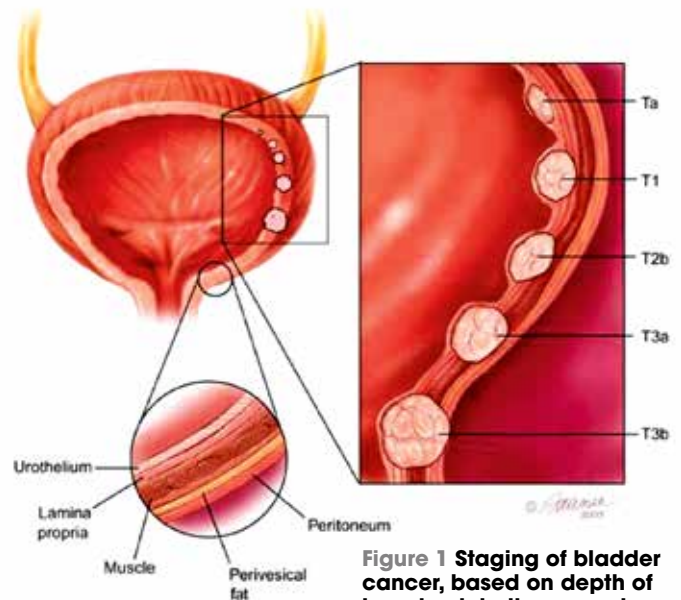


Figure 1 Staging of bladder cancer, based on depth of invasion into the muscular wall of the bladder

invasive bladder cancer, as they cannot accept the loss of the natural functions of their bladder and the need to have a permanent pouch for urinary diversion. Many MIBC patients go into denial when faced with this diagnosis and do not follow-up with their doctors, resulting in loss of valuable time and the opportunity for curative surgery.

What new advances in this field have helped to improve outcomes for such patients?

In the last decade, three significant advances have occurred in the treatment of muscle-invasive bladder cancer: (1) the use of neoadjuvant chemotherapy before radical surgery, (2) meticulous removal of pelvic lymph nodes, and (3) minimally invasive approaches for surgical removal of the bladder.

1. Neoadjuvant Chemotherapy for MIBC

In the past decade, several published papers have demonstrated that giving combination chemotherapy containing cisplatin for patients with MIBC confers a 5% to 8% improvement in overall survival.^{1,2} Administering chemotherapy before surgery, instead of after the event, means that it is delivered at the earliest time point where

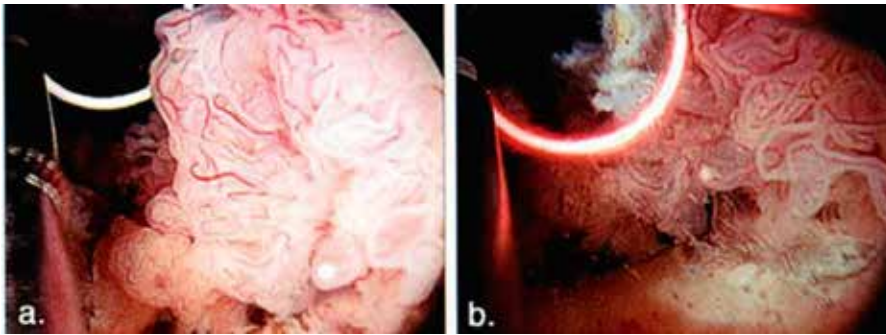


Figure 2 a) Endoscopic view of the bladder tumour b) Endoscopic piecemeal removal of the tumour down to the bladder wall using a high energy cutting loop through the endoscope

the burden of micrometastasis is lowest and the cancer cells are most sensitive to treatment. In addition, it also helps to reduce the residual tumour burden and decrease positive margins and lymph node involvement. Most international guidelines now routinely recommend neoadjuvant chemotherapy before radical surgery, unless the patient has impaired kidney or overall function and is not able to tolerate this.^{2,3}

2. Extended Pelvic Lymph Node Dissection during Radical Surgery

The lymphatic system comprises lymph nodes throughout the body. These serve as 'police stations' which filter or trap harmful particles such as infections or cancer cells, and are packed with defence cells known as lymphocytes or macrophages. In MIBC, bladder cancer cells often spread first to the pelvic lymph nodes around the bladder. In recent years, surgeons have been aggressively extending the amount of lymph nodes removed during surgery with curative intent. The majority of published studies demonstrate improved survival and reduced cancer recurrence, if patients have an extended lymph node dissection performed at time of surgery (commonly taken to mean all lymph nodes in the region of the aortic bifurcation and common iliac vessels).⁴

3. Robotic-Assisted Surgery to Remove the Bladder

Curative surgery for MIBC involves removing the bladder and prostate in men (womb and ovaries in women), extended removal of the surrounding lymph nodes, and reconstructing the urinary tract with either urinary diversion through an artificial conduit, or a pouch to mimic the function of the bladder (known as orthotopic neobladder). This challenging surgery is routinely performed through a lower midline incision under general anaesthesia, and is often associated with significant blood loss and need for blood transfusion.

In recent years, urologists have been pushing the envelope and developing new techniques for performing the same surgery through small incisions using the da Vinci[®] surgical robot (Figure 3). This affords the surgeon improved vision and dexterity during the surgery, leading to significantly less



Figure 3 The da Vinci[®] Robotic System, in which the surgeon operates seated at the console whilst the surgical team assists at the patient's side to change the robotic instruments

blood loss and perioperative complications, quicker recovery of bowel function, and shortened hospital stay. Recently published studies have demonstrated that using the da Vinci robot to perform this surgery is safe in older patients above 70 years of age – this is widely attributed to the benefits of less blood loss encountered during robotic surgery. More and more centres worldwide are now adopting robotic surgery to deliver improved outcomes for this challenging surgery. eh

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