Surgeons at Penn Medicine are performing continent urinary diversion and orthotopic neobladder procedures following cystectomy for invasive bladder cancer.

Surgery for high risk bladder cancer (>T2 disease or high grade non-invasive disease refractory to other treatment) is complex and combines the removal of the bladder (cystectomy) with some form of urinary tract reconstruction. Cystectomy generally involves a prostatectomy in men and a hysterectomy and partial vaginectomy in women. In both cases, a meticulous, extended pelvic lymphadenectomy is also performed. Neoadjuvant chemotherapy is usually performed in the presence of muscle invasive disease, but adjuvant chemotherapy may also be used in appropriate situations. Chemotherapy, offered by the Division of Hematology/Oncology at Penn, can improve survival outcomes in patients with bladder cancer.

Urinary diversion, performed after the cystectomy, is required since the function of urine storage and emptying has been lost after the removal of the bladder. In the United States, the procedure is most often accomplished with a simple ileal loop diversion in which a short portion of small intestine is attached to the ureters from the kidneys and then brought to the skin. This is covered by an external stoma bag where urine is stored and emptied by the patient.

Since the mid 1980’s Penn surgeons have improved upon cystectomy with urinary diversion by constructing a continent neobladder that eliminates the need for a stoma bag. Neobladder reconstruction allows the patient to retain a normal body appearance and maintain urinary function while treating the cancer. Approximately 80 to 90 percent of patients nationwide receive a simple ileal loop; nearly half of Penn patients undergo continent reconstruction.

Orthotopic neobladder surgery involves the creation of a pouch in the pelvis constructed from a portion of the small bowel and anastomosed to the urethra. (Figure 1). After such surgery, patients can void through the urethra. A separate procedure, cutaneous continent diversion, involves an intraabdominal pouch constructed from detubularized bowel and accessed from a small, flat, catheterizable stoma at the skin no wider than the head of a pencil eraser. These more sophisticated forms of reconstruction do not interfere with either neoadjuvant or adjuvant administration of chemotherapy.

The general goals of orthotopic neobladder surgery and cutaneous continent diversion include the creation of a reservoir with adequate capacity, urinary continence during normal activity and volitional emptying. The majority of patients (approximately 98%) regain daytime continence. Some patients may have urinary seepage in the evening (10-15%) which is correctable with pelvic floor training and evening fluid intake.

CASE STUDY

Mr. Y, a 62 yr old male, was referred to Penn Urology following an episode of gross hematuria, after which a cystoscopic exam demonstrated a sessile lesion in the posterior wall of the bladder. On final pathology, Mr. Y was noted to have tumor invasion in the muscularis propria of the bladder. A metastatic evaluation consisting of a chest and abdominal CT revealed no sign of metastases or lymphadenopathy. Mr. Y reported a 30-pack/year smoking history, but no family history of cancer. His medical history included two cardiac stents placed within the past five years for cardiovascular disease.

After a thorough consideration of his options, Mr. Y chose to have a cysto-prostatectomy with a neobladder and lymph node dissection. He was scheduled for surgery within six weeks. Because his clinically displayed disease was low volume, Mr. Y chose not to have chemotherapy prior to surgery.
Mr. Y's surgery was initiated with a lower midline incision and exposure of the pelvic organs, during which the ureters were identified and mobilized and an extensive pelvic lymph node dissection was performed. A cystectomy and prostatectomy were then performed with attention to preservation of nerves and continence mechanisms and without compromise to the oncologic principle of obtaining negative margins. Once these procedures were accomplished, an appropriate segment of bowel was selected and demarcated and separated from the GI tract, but maintained on its vascular supply. A bowel anastomosis was then performed, and the bowel segment opened to provide maximal surface area and optimal volume for the neobladder (Figure 1). The pouch was then constructed and the ureters anastomosed to it to bring the kidneys and pouch into continuity.

After the construction of the pouch, it was reanastomosed to the urethra, which was determined to be healthy by a negative frozen margin. Mr. Y was hospitalized for five to eight days and returned for X-ray studies two weeks later to assess healing of the pouch.

At this point, all additional drains were removed and Mr. Y was scheduled for continence training with experts in pelvic floor rehabilitation at Penn Urology. His final pathology was pT2a N 0/48 M0. He did not have post-operative chemotherapy. At five years post-surgery, he showed no evidence of cancer recurrence.

FACULTY TEAM
Penn urologists bring a wealth of knowledge to the care of patients with urologic problems and are known for their expertise in cancer, voiding dysfunction, urinary incontinence, stone disease, interstitial cystitis and male sexual dysfunction. Penn urologists perform an average of 50 cystectomy surgeries each year for bladder cancer. Orthotopic neobladder surgery and cutaneous continent diversion surgeries have been performed at Penn for more than two decades.

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