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Diagnosis and management of incidental ureterocele during
the treatment of clinically localized prostate cancer

Abstract Two instances of simultaneous diagnosis of prostate cancer and ureterocele were recently identified. In one patient an ectopic ureterocele in a duplex system with an obstructed upper pole was unroofed at the time of radical prostatectomy. Surgical excision of the ureterocele wall provided decompression of the obstructed system. In a second patient, bilateral intravesical ureteroceles associated with normal renal units were left untreated. Complications were not associated with the untreated ureteroceles. On rare occasions a ureterocele may be discovered incidentally during the evaluation of patients with prostate cancer. When radical prostatectomy is planned, treatment of the ureteroceles should be determined by the ureterocele’s size, anatomic configuration, and location and by the degree of obstruction of the affected renal unit. Surgical excision of the ureterocele at the time of radical prostatectomy may be the best approach for patients requiring treatment.

Case reports

Case 1

A 51-year-old male with no prior urologic history, including no prior urinary tract infection, was evaluated for a steadily rising serum prostate-specific antigen (PSA) level. His serum PSA value was 21.9 ng/ml and the percentage of free PSA was 4.1. The digital rectal examination (DRE) was normal and urinalysis was unremarkable. Transrectal ultrasound (TRUS) revealed a 25-cm³ prostate with no hypoechoic lesion suspicious for prostate cancer. However, during TRUS a septate cystic lesion suggestive of a ureterocele was noted, involving the right hemitrigone and extending into the bladder neck (Fig. 1). Renal ultrasound demonstrated a small duplex kidney on the right, with hydronephrosis of the upper pole. Sextant biopsies revealed a Gleason 3 + 4 = 7 adenocarcinoma in the right mid- and right apical prostate, showing perineural invasion, as well as a small focus of Gleason 3 + 4 = 7 adenocarcinoma in the left midprostate. A bone scan and computerized tomography (CT) were negative for metastatic disease. Contrast CT confirmed the presence of a duplex system on the right, with a nonfunctioning atrophic, hydronephrotic upper pole being associated with a right ectopic ureterocele (Fig. 2a). A [99mTc]-DPTA nuclear scan demonstrated a small right kidney contributing 34% of the total renal function. Flexible cystoscopy confirmed the presence of a large ectopic right ureterocele extending into the bladder neck, but the upper pole orifice could not be identified (Fig. 3).
Case 2

A 56-year-old patient was evaluated because of an elevated serum PSA value of 5.2 ng/ml after a previously negative set of sextant biopsies. His medical history and physical examination, including a DRE, were unremarkable. TRUS revealed a 51-cm³ prostate gland with a hypoechoic lesion on the right midgland suspicious for prostate cancer as well as the bilateral presence of small intravesical ureteroceles (Fig. 4). Renal ultrasound demonstrated normal kidneys without evidence of duplication or hydronephrosis. Sextant prostate biopsies and additional lateral biopsies of the peripheral zone at the base, midgland, and apex demonstrated a 3-mm focus of prostatic adenocarcinoma in the left midgland with a Gleason score of $4 + 4 = 8$.

Results

The first patient underwent bilateral pelvic lymph node dissection and radical retropubic prostatectomy. The left neurovascular bundle was spared, but the right cavernosal nerves were widely excised and reconstructed with a sural nerve graft [9]. Intraoperatively at the time of bladder neck transection, entry into the ureterocoele resulted in clear-fluid efflux from the decompressed ureterocoele. Although the right lower pole and left ureteral orifices were easily identified and stented, multiple efforts to pass a stent into the upper moiety were unsuccessful. To ensure adequate drainage of the upper pole, the anterior wall of the ureterocoele was widely excised. The bladder neck was reconstructed in standard fashion, with the walls of the ureterocoele being carefully tacked laterally to the bladder on either side prior to eversion of the bladder neck mucosa. Ureteral stents were left in place until the 5th postoperative day. The patient subsequently had an uneventful recovery. The final histology report revealed a large pT3aN0M0, Gleason 3 + 4 = 7 transition-zone tumor with level III established extracapsular extension to the anterior prostate surface and a positive surgical margin at that level. Postoperatively, repeat renal ultrasound at 3 months displayed decompression of the right upper moiety. The patient achieved complete continence within 6 months. However, although the PSA value remained lower than 0.1 ng/ml for 6 months postoperatively, it subsequently rose to 0.2 ng/ml. A follow-up CT obtained during the evaluation for metastatic disease confirmed complete resolution of the ureterocoele with decompression of the upper pole (Fig. 2b). The patient was treated with adjuvant external-beam radiation, resulting in a sustained drop in his PSA level to less than 0.1 ng/ml.

The second patient underwent bilateral pelvic lymph node dissection and a right unilateral nerve-sparing radical retropubic prostatectomy. Intraoperatively the ureterocoeles were seen situated entirely within the bladder, and each was associated with a single ureteral orifice bilaterally. The procedure, including bladder neck constriction and vesicourethral anastomosis, was performed uneventfully without manipulation of the ureterocoeles. The postoperative course was uneventful, and the final pathology revealed a pT2N0M0, Gleason 4 + 3 = 7 transition-zone tumor with level I capsular invasion at the anterior prostate and negative surgical margins. At the 3-month follow-up visit the patient was noted to have mild stress incontinence, and his serum PSA level was less than 0.1 ng/ml. Repeat renal ultrasound scanning displayed normal kidneys with no hydronephrosis.

Discussion

The embryological basis for ureterocoele development is incompletely understood. Ureterocoeles may be caused by obstruction due to incomplete breakdown of Chwalla’s membrane, a two-cell layer between the ureteral bud and the wolffian duct [3]. Alternatively, ureterocoele formation may result from delayed arrival of the ureteral bud into the bladder, with expansion occurring as part of the flaring of the common excretory duct [14]. A third theory suggests that ureterocoele formation is due to an intrinsic muscular deficiency of the distal ureter and bladder trigone [13]. Ureterocoeles are classified as either intravesical or ectopic [7]. Ureterocoeles are typically diagnosed early in childhood because of infection of the involved renal unit. When diagnosed in adulthood, ureterocoeles are usually intravesical, associated with a single collecting system, and are less likely to affect the function of the involved kidney [4]. Adult ectopic ureterocoeles are rare, and they are most commonly associated with a duplex kidney [1].

Depending on the renal function, the presence and degree of ureteral dilatation and vesicoureteral reflux, and the patient’s age and infection status, treatment options for ureterocoeles include endoscopic incision, upper-pole partial nephrectomy with partial or complete ureterectomy and lower-pole ureteral reimplantation, ureteroureterostomy, and ureteropyelostomy. Recent studies indicate that although most children (93%) with intravesical ureterocoeles can be treated definitively by endoscopic incision, a significant proportion (nearly 50%) of patients with ectopic ureterocoeles, initially treated with endoscopic incision, subsequently require a second open surgical procedure, most often partial nephrectomy with ureterectomy and excision of the ureterocoele or reimplantation of the ureter from the lower pole [2, 5].

In the rare case in which a ureterocoele is detected in combination with additional lower urinary tract disease, especially malignancy, decisions regarding combined management of these problems are necessary if treatment of the ureterocoele is indicated. In the case of concurrent localized prostate cancer and ureterocoele, when radical prostatectomy is selected as the definitive treatment for prostate cancer, simultaneous management of the ureterocoele is warranted, especially in cases in which ipsilateral ureteral obstruction is present,