Transrectal Voiding Sonourethrography for Diagnosis of a Prostatic Urethral Calculus

Ismail Mihmanli, MD, Fatih Kantarcı, MD, Fatih Gulse, MD, Alev Kadioglu, MD

Obstructive uropathy is a common clinical problem, and urethral calculi constitute the least common form of calculous disease leading to obstructive uropathy. Urethral calculi may originate anywhere in the urinary tract, usually the bladder, and then migrate to the urethra. The clinical presentation is variable. Patients may have acute retention, dysuria, or a weak urine stream.\(^1\) Sonography is a useful technique in detecting urethral calculi because urethral stones are easily identified by sonographic examination. Urethral calculi are most often identified in the prostatic urethra but may also be seen in the penile urethra. Sometimes it is difficult to differentiate prostatic urethral calculi from prostatic calcifications.\(^2,3\) Therefore, this condition makes diagnosis cumbersome. Transrectal voiding sonourethrography or a trans-scrotal approach (which is generally used for urethral strictures) can be used liberally in this situation.

Here we describe our experience with the value of real-time transrectal voiding sonourethrography in detecting a prostatic urethral calculus.

Case Report

A 55-year-old man had a weak urine stream. He had no history of hematuria, urgency, frequency, or surgery. On digital rectal examination, the prostate gland was enlarged. Urine examination revealed no hematuria or bacteriuria. He was referred to our clinic for sonographic evaluation.

Urinary system sonographic examination showed a distended bladder with bilateral ureteropelvicalyceal ectasia. The wall thickness and intraluminal echogenicity of the bladder were normal. A dense calcification was noted in the central zone of the prostate gland. Transrectal sonographic examination with the patient in the left lateral decubitus position showed an enlarged prostate...
Sonourethography of a Prostatic Urethral Calculus

gland, measuring $39 \times 50 \times 46$ mm ($47 \text{ cm}^3$) in size, and a well-defined, dense calcification measuring 10 mm in diameter in the central zone of the prostate gland (Figure 1). Because there were no calcifications of the pseudocapsule or periurethral glands and because of the atypical location of the calcification in the prostate gland, the patient was asked to void during a sonographic prostatic examination.

Real-time transrectal sonourethography during voiding with the patient in the left lateral decubitus position showed that the calcified structure thought to be a prostatic calcification was moving with the urinary flow (Figure 2). This finding revealed that the structure was a calculus in the prostatic urethra rather than calcification of the prostate gland itself.

Discussion

Causes of urinary tract obstruction include prostate enlargement in men, stones in the kidneys, ureter, bladder, or urethra, tumors of the urinary tract, infection, blood clots, abnormal congenital strictures of the urethra, and an enlarged uterus in pregnant women. Signs and symptoms of urinary retention include a weak urine stream, an interrupted stream, hematuria, dysuria, and abdominal pain.

Calculi of the male urethra are rare in urologic practice. The male urethra extends from the internal urethral orifice in the urinary bladder to the external urethral orifice at the glans penis. It has 3 sections: the prostatic and membranous (diaphragmatic) parts, together referred to as the posterior urethra, and the cavernous part (anterior urethra), which consists of the bulbular and pendulous penile urethra. Urethral calculi most often originate from the upper urinary tract or the bladder and then migrate to the urethra. The membranous portion is the shortest, least dilatable and, with the exception of the external orifice, narrowest part of the canal. Urethral calculi are mostly situated proximal to this physiologic narrowing in the prostatic and penile urethra, respectively. Primary urethral calculi are usually associated with chronic urinary infection due to urethral diverticula, strictures, or previous surgery.

Prostatic calcifications are mostly found in the cephalad portion of the gland. They may also be identified in the region of verumontanum and in the ejaculatory duct, most commonly as the duct inserts into the verumontanum. Calcifications may also be situated in the caudal portion of the periurethral prostatic tissue. They mostly appear as poorly defined or amorphous hyperechoic structures on sonographic examination. Prostatic calcifications and ejaculatory duct calculi can mimic urethral calculi. Thus, prostatic urethral calculi should be distinguished from intraprostatic calcifications, which are normally found periurethrally or in the pseudocapsule.
Calculi in the internal urethral orifice can be easily identified, but calculi situated between the membranous urethra and the internal urethral orifice, where the prostatic urethra runs through the inner zone, are difficult to identify by sono-graphic examination. Radiologic examinations such as retrograde urethrography and voiding cystourethrography are considered the standard imaging techniques for morphologic and functional studies of the urethra. However, both are not only invasive but also include radiation exposure. Alternatively, the prostatic urethra can be investigated with voiding sonourethrography using high-frequency endorectal probes. The main drawback is difficulty for the patient in urinating while in the lateral decubitus position with the probe positioned rectally. In our case, the movement of the calcified structure during real-time transrectal voiding sonourethrography led us to the conclusion that the lesion was a prostatic urethral calculus.

References