

Bladder Diverticula in a Young Woman — Congenital or Acquired?

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BRIEF HISTORY

A 29-year-old nulligravid woman was hospitalized due to acute pyelonephritis and urinary retention presented as fever, urinary frequency and flank pain noted for 3 days. She had suffered from urinary frequency, urgency and urgency incontinence since she was a teenage. She began to present symptom of voiding difficulty with the feeling of incomplete voiding about 5 months prior to this admission. This patient had experienced acute pyelonephritis which was treated with antibiotics about 3 months ago. Review her medical and surgical history; she had received appendectomy at age of fifteen.

CLINICAL INVESTIGATION

Pelvic examination was unremarkable without any external genitalia anomaly or any palpable mass over anterior vaginal wall. The anal tone was normal. Urine analysis revealed pyuria and bacteriuria and culture of the urine grew *E.coli*. Cystoscopy revealed edematous bladder trigone mucosa, severe trabeculation and multiple diverticula over the entire urinary bladder (Fig. 1). Transvaginal sonography also showed urinary bladder with multiple diverticula and thickened bladder wall mimic an ovarian cyst (Fig. 2). Uroflowmetry study revealed that the bladder capacity was around 200 mL, the maximum flow rate (Q_{max}) was 3.6 mL/sec, voided volume was 103 mL and postvoid residual (PVR) was 100 mL. During filling cystometry, oversensitive bladder with early first desire and strong desire to void was noted. Besides, detrusor overactivity noted spontaneously during filling phase and provocative tests. When the patient voided, the detrusor pressure was 57 cmH₂O at Q_{max}. The urethral sphincter electromyography did not increase during voiding phase. There was no vesicoureteral reflux noted during voiding cystourethrogram (VCUG) examination.

CLINICAL COURSE

This patient had experienced recurrent urinary tract infection (UTI) after her first admission to our hospital. She was taught to perform intermittent self catheterization every 4 to 6 hours a day. The problem of UTI was not solved despite the patient continue to intermittent self-catheterization (ISC). Laparotomy was performed for this patient about two months later. On laparotomy, some diverticula were noted on the surface of the urinary bladder (Fig. 3). Adhesion was also noted between the perivesical tissues and the pelvic wall. The bladder was

opened, some diverticula were excised, and the bladder mucosa and muscle were re-approximated in two layers. VCUG examination was repeated 6 weeks after the operation (Fig. 4). Post-operative

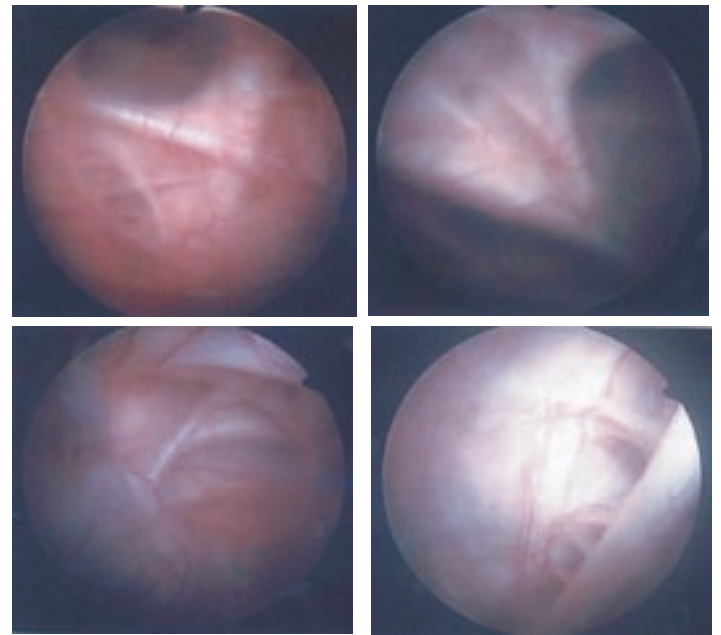


Fig. 1. Cystoscope examination: marked trabeculation over entire urinary bladder with multiple diverticula.



Fig. 2. Transvaginal sonography revealed urinary bladder with turbid urine, thick bladder wall and multiple cystic compartments.

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Case analysis

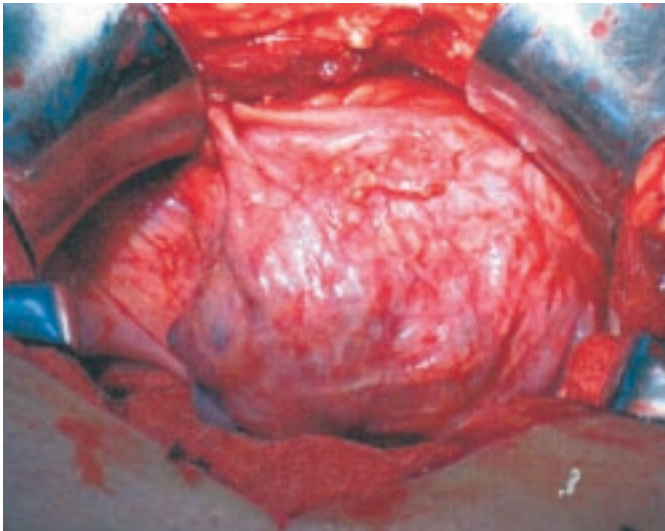


Fig. 3. Multiple diverticula noted on the surface of the urinary bladder during laparotomy.

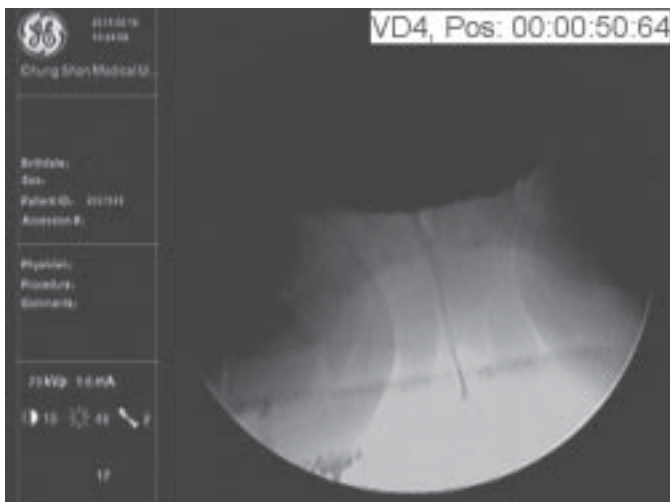
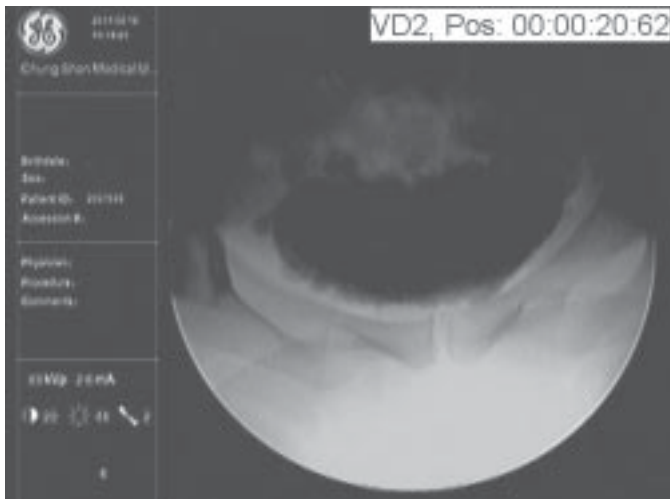


Fig. 4. Post-operative voiding cystourethrogram: some tiny diverticula noted especially at the bladder base, noted that no proximal or mid-urethral dilatation during voiding phase.

uroflowmetry showed that the functional bladder capacity was not increased, but the Qmax and voided volume were improved. This patient is currently being followed up for 2 months after the above operation.

DISCUSSION

Bladder diverticulum is a rare condition caused by weakening of the bladder muscular fibers with the eventually hernia of the bladder mucosa through the bladder wall [1,2]. It usually occurs in males; we reported a female patient with multiple bladder diverticula presented as chronic urinary retention and recurrent UTI. Bladder diverticulum can be congenital or acquired secondary to bladder outlet obstruction, neurogenic bladder or caused by iatrogenic (e.g. catheter insertion) situation. Congenital bladder diverticulum almost always occurs in boys or male patients and is usually single and larger than the acquired one [2]. It is sometimes associated with congenital connective tissue disorder such as Ehlers-Danlos syndrome and Menkes' syndrome, also a neurodegenerative disorder [2,3]. It may involve the ureter and cause vesicoureteral reflux or may cause outlet obstruction at the bladder neck or urethral region. Congenital bladder diverticulum may present clinically early in the infancy or childhood as spontaneous rupture of the diverticulum, recurrent UTI or present as obstructive symptoms [4,5]. It may be asymptomatic and present clinically late in the adulthood [6].

Acquired bladder diverticula are usually multiple and associated with bladder outlet obstruction including anatomically or functionally, infection and iatrogenic causes. Bladder outlet obstruction may be due to posterior urethral valve, prostate hyperplasia, urethral stricture, neuropathic bladder dysfunction, and urethral sphincter dyssynergia or hypertonic during voiding phase [2]. It has been noted that children with bladder diverticula have abnormal voiding pattern including detrusor sphincter dyssynergia or hypertonic urethral sphincter which further predispose these children to recurrent lower UTI. Young women with functional bladder outlet obstruction such as spastic urethral sphincter or poor relaxation of pelvic floor muscle during voiding may presented clinically as voiding difficulty, urinary retention or overactive bladder, in an extreme case, bladder diverticula may occurred [7]. These patients may treated with medication, biofeedback pelvic floor muscle training, urethral botulinum toxin A injection, ISC for urinary retention or augmentation cystoplasty if progressive decrease in bladder capacity. Surgical treatment is indicated for patients with bladder diverticulum if recurrent UTI, bladder calculi, urethral obstruction, or malignancy occurred [8]. During cystoscopic examination of these patients, the examiner should carefully look inside the diverticulum for any possibility of hidden calculi or malignant tumor.

As in our patient, laparotomy diverticulectomy was performed due to recurrent UTI. This patient was advised to continue periodic ISC postoperatively. Medication such as muscle relaxant and biofeedback pelvic floor muscle training may be beneficial to improve her voiding function.

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