

## Giant bladder diverticulum in a boy

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### Abstract

Although the bladder diverticula in children are seen commonly which is association with infravesical obstruction or neurogenic bladder function, the case of giant congenital bladder diverticula are rare. In this paper, an 11 years old boy with giant bladder diverticula presenting urinary infections is evaluated in terms of diagnosis and management by current literature.

### Key Words:

Giant bladder diverticulum, diverticulectomy, urinary tract infection

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### Introduction

Bladder diverticula (BD) described as protrusions of the mucosa from a detrusor defect, are generally classified into two groups as primary (congenital) and secondary (acquired). Primary BD develop as a result of congenital weakness of Waldeyer's facial sheath, without bladder outlet disorder, whereas secondary BD usually occur as a

of neurogenic bladder or infravesical obstructions, such as in the posterior urethral valve [1,2,3]. Primary BD often grow very large and named as "giant" or "large" diverticula whose diameter measuring at least one third of the bladder diameter on VCUg [3,4,5].

Herein, we report a case with giant BD in terms of presentation, diagnosis and treatment procedure accompanied by the literature.

### Case report

An 11-year old boy was referred to our clinic from the department of pediatric nephrology as a diagnosis of bladder diverticulum. Previously, he was admitted to the pediatric nephrology department with abdominal pain, fever and dysuria for 3d, and diagnosed as urinary tract infection (UTI). Urinary ultrasonography showed low density cystic lesion (56 mm in diameter) located bladder superiorly. In evaluation of voiding

cystourethrography (VCUG), the giant BD (about 10 mm in diameter) was detected at right side without vesicoureteral reflux (VUR) (Fig. 1).

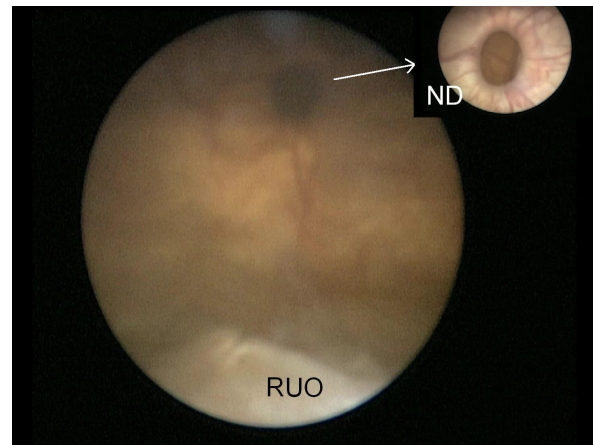


**Fig. 1.** A voidingsystourethrogram showing a posterolateral giant bladder right diverticulum.

The patient's history revealed that he has symptoms of dysuria, recurrent urinary retention with intermittent voiding, urgency and frequency, and nocturnal urinary incontinence. The relevant physical examination was normal. Blood tests were normal limits, and urinalysis showed a trace amount of white blood cells, and excessive amount of leukocytes.

After a thorough discussion of all treatment options, including conservatively observation, intravesical intervention, or extravesical repair, it was decided to remove of the diverticulum extravesically, so as to prevent recurrent UTI. Initially a cystoscopy was done to show the position of diveticulum's neck and the relation with ureteric orifices. Endoscopy displayed solitary diverticulum

above to trigone and on the posterior wall of the bladder (Fig. 2).



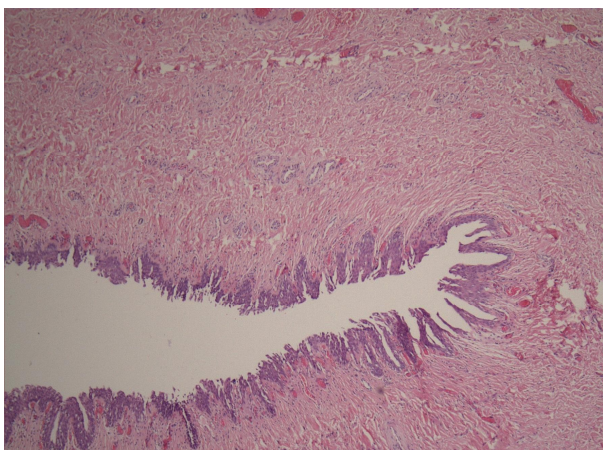
**Fig. 2.** Cystoscopic view, the narrow neck of diverticul orifice (ND: The neck of diverticulum, RUO: Right ureteral orifice).

An indwelling catheter was placed to bladder, filled with saline, underwent extravesical exploration through the Pfannenstiel incision. narrow neck was found on the posterior wall The diverticulum (7 cm in diameter) with of the bladder (Fig. 3).



**Fig. 3.** Operative view of diverticulum (D: Diverticulum, B: Bladder).

The defect of the detrusor muscle was repaired with two layers using 3-0 polyglactin sutures (Vicryl®, Ethicon, Johnson & Johnson, Brussels, Belgium). Bladder indwelling catheter was removed at 5th postoperative day. The patient was discharged uneventfully. Histopathologic examination revealed a thick mucosa lined with urothelium (Fig. 4).



**Fig. 4. The histopathology of the diverticulum showed bladder mucosa lined by urothelium with fibrous wall and thin smooth muscle (hematoxylin-eosin, original magnifications  $\times 100$ )**

Urodynamic study was performed postoperatively, and revealed normal bladder compliance, good capacity, and normal detrusor activity. Patient is asymptomatic during the 2 years follow-up period.

### **Discussion**

The BD have been classically defined as “herniations of the bladder mucosa result of a smooth muscle defect”, and can either be primary (congenital) or secondary (acquired) [6]. Secondary BD are seen in trabeculated bladders, may occur in multiple, and usually are associated with bladder outlet obstructions

related to neurogenic bladders, posterior urethral valves, or urethral strictures. Primary BD generally occurs in weak – walled bladders in the absence of bladder outlet obstruction [4]. Primary BD tends to be solitary and is located at the junction of the bladder trigone and detrusor, and adjacent to ureteral orifices. This anatomic location, close to the insertion of the ureter to the bladder, is important because large BD can impress upon or distort the ureteral orifices. Garat et al. [7] also described three types of primary BD as posterolateral, paraureteral and multidiverticular. The diverticulum in our case located posterior wall of the bladder, and at superior to trigone. This location is unusual, and it corresponded to the posterolateral group according to Garat’s classification. Although the majority of patients with BD are asymptomatic, the most common clinical presentation of large BD is acute UTI due to urine stasis within the diverticulum, and intermittent miction or poor voiding stream associated with substantial postvoiding residual urine that may gradually reach chronic retention [3]. In addition, different cases including infravesical obstruction, recurrent peritonitis and spontaneous rupture due to BD are reported in the literature [1,2,8]. The BD in the present case was diagnosed during an investigation for recurrent UTI. Patients’ history revealed symptoms of voiding dysfunction also. Diverticula in a diameter measuring at least one third of the bladder diameter on VCUg

named as “giant” or “large” BD [5]. Giant BD is unusual in childhood and occurs almost exclusively in boys with a varying spectrum of clinical presentation [3]. The size of diverticulum in our case was found about 7 cm in diameter, but it was seem wider on the VCUG.

VCUG is standard for diagnosis of BD although BD may actually be seen on ultrasound, computed tomography and intravenous urography [4]. VCUG offers also several information regarding concomitant VUR and bladder neck and urethral morphology [3]. The bladder diverticulum in our patient was diagnosed by using VCUG, and there was no VUR.

In treatment procedure of BD, close observation is routinely strategy as long as child remains asymptomatic. It has been reported that small size BD can be followed conservatively, but larger ones should be corrected by surgery [4,7]. The surgical indications include the symptomatic BD (recurrent UTI, hematuria), dysfunctional voiding findings and an association of VUR [4]. Because of our patient had the symptomatic disease and dysfunctional voiding findings, immediately underwent a definitive surgery. Prior to surgery, cystoscopic evaluation of the bladder is recommended to specifically display the location of the BD’s neck with respect to ureteral orifice. Thus, if it is determined a ureter that opens to the neck or into inside of diverticulum on cystoscopic evaluation, in

which case it may be necessary an ureteroneocystostomy at the same time [4,5]. It has been described several intra or extravesical procedures for surgical treatment of BD. The video assisted endoscopic approaches have also been reported according to the experience of the surgeon [3,4,6,7,9]. The BD which located near to ureteral orifice and associated with VUR should be excised intravesically, because of reach to the diverticulum by extravesical route is difficult, and may need an ureteroneocystostomy. In our patient, because of the diverticulum located at the posterior wall of bladder, and far from the ureteral orifices, we preferred extravesical diverticulectomy.

In conclusion, the giant BD are rare condition, can diagnosed by VCUG easily, surgical excision may need if it is symptomatic. Cystoscopy prior to surgery helps to recognize of the location of diverticulum, extravesical diverticulectomy is suitable approach in the patients who have diverticulum far from the ureteral orifices.

## **CONFLICT OF INTEREST**

None declared

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