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Vesicoureteral Reflux Associated with Primary Congenital Paraureteral Diverticulum

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Abstract:

***Purpose**: To review our experience in treating patients with vesicoureteral reflux(VUR) associated with congenital primary paraureteral diverticulum, and another associated anomaly in the urinary tract.*

***Material and Methods**: Seven patients of both sexes (male:5, Female: 2) with VUR of different grades(II-V) associated to congenital primary paraureteral diverticulum were chosen from a period of seven years duration to revise the therapeutic options of this uncommon entity. Age ranged from 1.5- 10 years. Median:5 years. Localization was right side43%, left side 43%, bil. 14%. The grade ranged from II to V degree.*

***Results**: Good results achieved in all cases.*

***Conclusions**: Surgical intervention for congenital bladder diverticulum may be required when recurring infections, persistent vesicoureteral reflux, bladder outlet obstruction or significant ureteral obstructions is present.*

Keywords: congenital, bladder diverticulum vesicoureteral reflux

1. INTRODUCTION

Bladder Diverticulum is an outpouching of urothelium through the muscular wall of the bladder and may be congenital (primary) or acquired (secondary). The peak incidence in the congenital is less than 10 years old and is more common in males than in females (1). Congenital bladder diverticulum not associated with posterior urethral valves or neurogenic bladder is unusual (2,3). This entity usually occurs in a smooth walled bladder, is most often solitary and occurs without evidence of outflow obstruction. In children, the most common location for a bladder diverticulum is lateral and cephalad to the ureteral orifice. The cause of these diverticula is an inherent weakness in the bladder musculature and herniation of bladder mucosa between fibres of the detrusor muscle. As the diverticulum enlarges, it may incorporate the ureteral tunnel, and the ureter may drain into diverticulum with resultant reflux. These congenital diverticula are often larger than those associated with neurogenic bladder or lower tract obstructive anomalies and may have normal voiding dynamics and pressures. These structures may also cause outlet obstruction at the bladder neck or at urethral location (4), or ureteral obstruction (5). These bladder diverticula are uncommon but not rare and were found in 1.7% of 4084 children in one study (6). Acquired bladder diverticula are usually multiple and associated with infections, iatrogenic causes, bladder outlet obstruction (bladder neck or urethral obstruction with posterior urethral valves, anterior urethral diverticulum, urethral stricture, neuropathic bladder dysfunction or external sphincter dyssynergia are all known causes of bladder diverticula). Also, may be acquired iatrogenically, such as after anti- reflux surgery in which defects of the ureteral hiatal are not repaired adequately with a resulting bladder diverticulum.

The purpose of this study is to review our experience in treating such an uncommon entity and its associated anomalies in the urinary tract.

2. MATERIAL AND METHODS

A total of 7 patients of primary paraureteral diverticulum with VUR of different grades(II-V), were chosen out of 38 patients with secondary VUR during the period of seven years duration, to revise the therapeutic options of the VUR associated with congenital paraureteral diverticulum. Age ranged from 1.5 to10 years Median 5-years. Localization was Rt. Side:43%, Lt side 43%, Bil.14%. The grade ranged from II to V degree. Male to female ratio was: 5:2. Patients were investigated by ultrasound, voiding cystourethrogram, urogram, renal isotopes scan, urodynamic study and cystoscopy.

3. TREATMENT

Bladder diverticulum may cause VUR, ureteral obstruction and recurrent infection. We indicate the conservative treatment when the bladder diverticulum size is smaller than 1cm and the VUR degree is (I or II), whenever obstruction or pyelonephritis episodes do not occur to allow spontaneous cessation of reflux on prophylactic medical therapy, and if failed, surgical option is indicated. When the diverticulum size is bigger, and the VUR degree is higher, diverticulectomy with reimplantation of the ipsilateral ureter is performed, because the reflux is unlikely to cease here. We performed in our 7 cases, diverticulectomy and Politano Leadbetter reimplantation of the ureter. Also, the associated anomalies were corrected in three cases,

pyeloplasty (Andersen Hynes in pelvi-ureteric junction stenosis. MAGPI repair in coronal hypospadias and bilateral ureteral reimplantation (Politano Leadbetter technique) in the same setting.

4. RESULTS

Good result was achieved in all cases.

5. DISCUSSION

Bladder diverticula are mucosal herniations through areas of weakness in the muscular bladder wall. They were initially thought to occur only with bladder outlet obstruction and secondary detrusor hypertrophy and trabeculation. Hutch was the first to recognize that bladder diverticula, were also congenital abnormality that occurred primarily in smooth walled normal bladders in children (7). Bladder diverticula also commonly occur with Ehlers Danlos syndrome and Menkes syndrome causing an increased incidence of reflux in these conditions (8,9). The most common location for diverticula is lateral and cephalad to the ureteral orifice (10). These occasionally expand within Waldeyer,s Fascia to cause ureteral obstruction or project intraluminally to obstruct the bladder neck or urethra. Usually, however, they prolapse outside the bladder at the expense of paraureteral mucosa. This alters the anatomy of the uretero-vesical junction (UVJ) and allows either transient or permanent reflux. The management of reflux associated with diverticula differs from that of primary reflux depending on the degree of anatomic distortion that results. Reflux associated with small diverticula resolve at rates similar to primary reflux and can be managed accordingly. In contrast, reflux found with paraureteral large diverticula is less likely to resolve and usually requires surgical correction, as in our 7 cases. In any case, when the ureter enters the diverticulum, regardless of size, surgery is recommended (11,12). Our cases were referred from the paediatric department of our hospital seeking further surgical treatment because of recurrent urine tract infection and persistent VUR. A full investigation was done for them in the course of physical examination, blood and urine analysis, ultrasonography, urography, voiding cystography and a urodynamic study. All of them were treated by diverticulectomy and Politano Leadbetter reimplantation of the ipsilateral ureter. Two cases of the group were treated previously by electrocoagulation treatment of VUR but failed, because of associated congenital bladder diverticulum (13) and were treated surgically. One case in our group, was a child of 1.5 years old, diagnosed as a case of bilateral VUR associated with bilateral diverticulum and both ureters had entered the diverticulum, underwent bilateral diverticulectomy and Politano Leadbetter reimplantation at the same setting (Fig, 1-3).

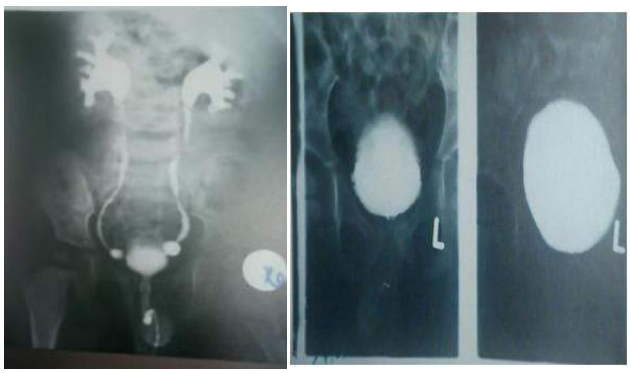

Fig.1) MCUG::Bil.VUR,+Bil.Diverticulum.

Fig.2)Postdiverticulectomy+Reimplantation:VURcorrected.

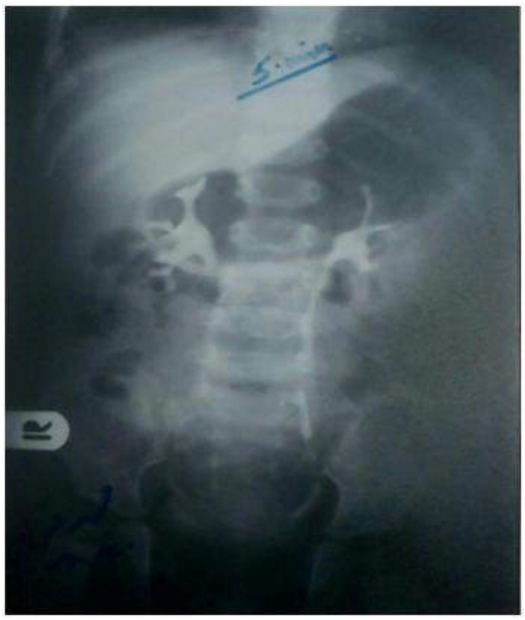

Fig.3)IVUpostdiverticulectomy+Reimplantation:-Normal urogram

We noted association of some anomalies in the urinary tract in three cases and resolved surgically, as pelviureteric junction stenosis, treated previously by Andersen Hynes pyeloplasty, seated in the same side of VUR and the diverticulum (Fig.4-7).

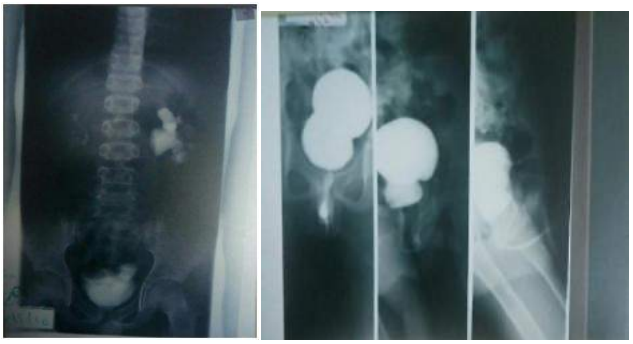

Fig 4) IVU: Lt PUJ stenosis+ Diverticulum.
Fig 5) MCUG: Big Diverticulum in Bladder and Lt VUR

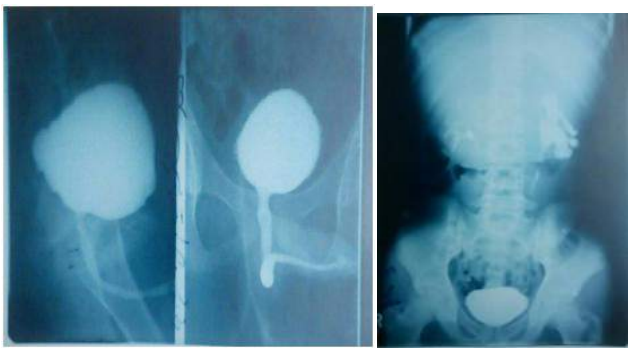

Fig6)Postdiverticulectomy+Reimplantation:VUR corrected

Fig 7) IVU: postpyeloplasty: Normal urogram.

Coronal hypospadias treated by MAGPI procedure after diverticulectomy and reimplantation (Fig. 8-11).

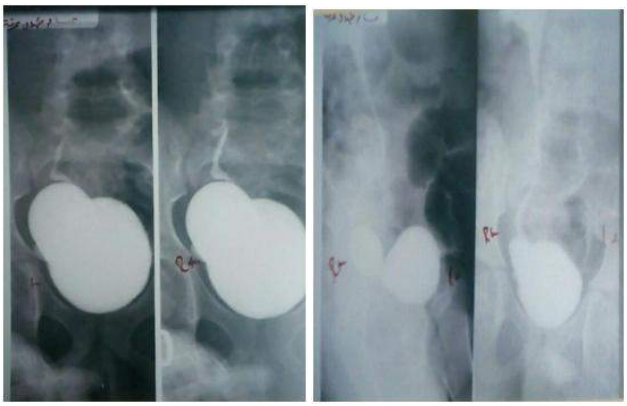

Fig8) MCUG: Big diverticulum+RtVUR

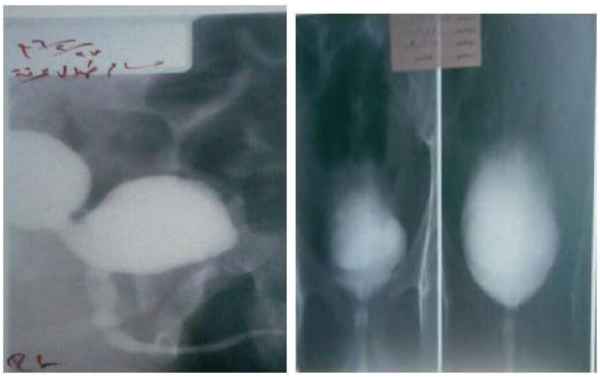

Fig 9) MCUG: Diverticulum+VUR

Fig10) Postdiverticulectoy and Reimplantation MCUG: VUR corrected

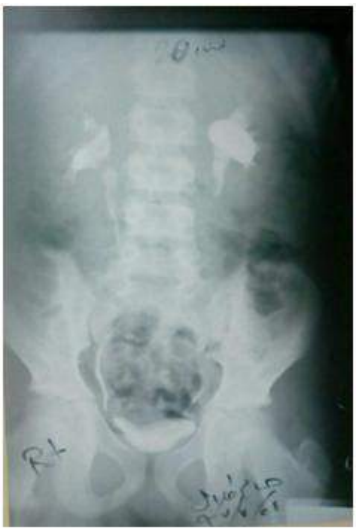

Fig11)IVU:postDiverticulectomy +Reimplantation: VUR corrected

Another case of a 5-year-old female patient, diagnosed with ectopic crossed kidney associated with bladder diverticulum with reflux was treated by diverticulectomy and Politano Leadbetter reimplantation of refluxing ureter (Fig.12-14).

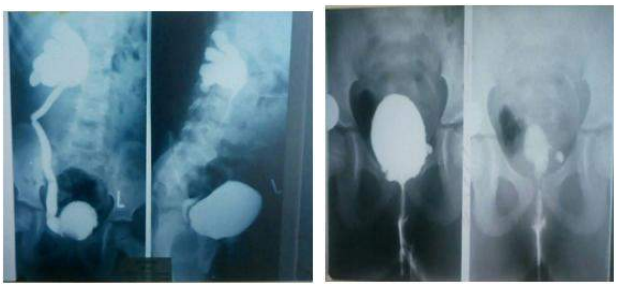

Fig 12) MCUG:Diverticulum + Lt VUR

Fig.13)MCUG:postdiverticulectomy+Reimplantation: VUR corrected

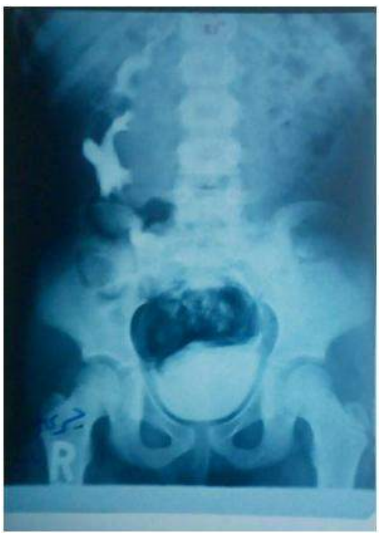

Fig 14) IVU postdiverticulectomy and Reimplantation: Normal+Crossed Lt kidney

Follow up performed for our patients, included echography, urography, and micturating cystogram, and all patients-maintained reflux free in the second revision after 3 years of the surgical treatment.

6. CONCLUSIONS

Reflux found with paraureteral large diverticula is less likely to resolve and usually requires surgical correction. In any case, when the ureter enters the diverticulum. Regardless of size, surgery is recommended. Surgical intervention for congenital bladder diverticulum may be required when recurring infections, persistent vesicoureteral reflux, bladder outlet obstruction or significant ureteral obstruction is present.

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