International Journal of Innovative Studies in Medical Sciences (IJISMS)

*ISSN 2457-063X (Online)* **www.ijisms.com** *Volume: 2 Issue: 4 | 2018*

# Ureteral Duplication and Vesicoureteral Reflux Retrospective Study

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**Abstract:**

**Purpose:** Reviewing the therapeutic options in treating *patients with vesicoureteral reflux(VUR) associated with duplicated urinary system, observing its indications according to the different clinical entity.*

***Material and Methods**: 12 patients of duplicated ureter with VUR were chosen during the period of four years, to revise the therapeutic options of the VUR in duplicity. The male to female ratio was: 1:5. Age ranged from 11 months to23 years. Median 10 years. Localization was Rt. Side 50% Lt. Side 25% Bil:25%. The grade ranged from11 to V degree.*

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

***Conclusions**: VUR is a frequent pathology in duplicities that presents its particularities in the treatment in function of the grade, age and renal functions.*

**Keywords**: *duplications, vesicoureteral reflux, treatment.*

## 1. INTRODUCTION

A duplex kidney is one that has two separate pelvicalyceal systems. The ureters may join at any point. If they join at the level of the ureteropelvic junction or more distally, the configuration is termed a bifid system. Double ureters are ureters that drains their respective poles and empty separately into the genitourinary tract. This represents a complete duplication. Incidence of ureteral duplication varies from0.8% in autopsy series (1), to approximately 40% in pyelogram review (2). Unilateral duplication is found six times more commonly than bilateral duplication (3).

The incomplete variety, or bifid system is most common. Duplication is more commonly found in females, and there is clearly a familial tendency in siblings up to one in eight (4). Most often it is discovered as an incidental finding associated with other symptoms. However, reflux, obstruction and ectopia are found commonly with duplicated systems. VUR is the most common abnormality associated with complete ureteral duplication typically follows the Weigert -Meyer rule (Weigert1877, Meyer1946) wherein the upper pole ureter enters the bladder distally and medially and the lower pole ureter enters the bladder proximally and laterally. It more commonly involves the ureter from the lower pole because of its lateral and cranial position and shorter submucosal tunnel, in contrast the upper pole orifice will assume a more medial and caudal position in the bladder and therefore will have a longer intramural tunnel and be less likely to reflux.

## 2. MATERIAL AND METHODS

Twelve patients of duplicated ureter with VUR were chosen out from 32 patients with secondary VUR during the period of four years, to revise the therapeutic options of the VUR in duplicity. Male to female ratio was 1:5. Age ranged from11 months to23 years. Median 10 years Localization was Rt. Side 50% Lt. side 25% Bil. 25%. The grade ranged from 11 to V degrees. Ureteral duplication was incomplete in 5 cases. Two cases were associated with ureterocoele. Patients were investigated by Ultrasound, Voiding Cysto- urethrogram, Urogram, Renal Isotops Scan and Urodynamic study.

Patients Classification

Complete duplication 7 patients

-Associated with ureterocoele(Fig.1-4) 2 patients
-Not associated with ureterocoele (Fig. 5-6) 5 patients

Incomplete duplication 5 patients

-Blind ending duplication of ureter(Fig.7-10) 2patients
-Duplex kidney with distal bifid ureter(Fig.11-13) 3 patients

## 3. TREATMENT

We indicate the conservative treatment in younger patients less than one year of age, whenever obstruction or pyelonephritis episodes do not occur, and in older than 1 year of age if the grade is 1-11-111, and if failed endoscopic or surgical correction is a valid option.

Different therapeutic options were performed

-Complete duplication with ureterocoele: Marsupialization of ureterocoele, tapering of ureter and reimplantation or marsupialization and heminephroureterectomy.

-Complete duplication with reflux: Reimplantation

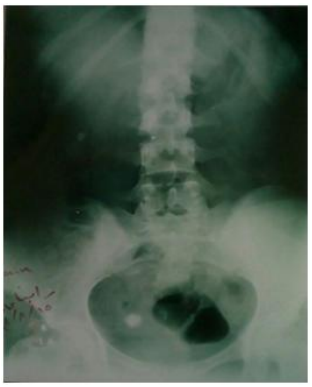
 

-Incomplete duplication with blind ending ureter: Ureterectomy of blind segment in duplicity and reimplantation.

-Duplex kidney with distal bifid ureter: Electrocoagulation treatment of VUR( 2 patients), Uretero -pyeloplasty in lower pole obstruction (1 patient)

## 4. RESULT

Good result was achieved in almost all cases.



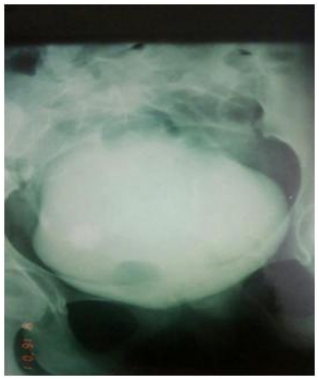
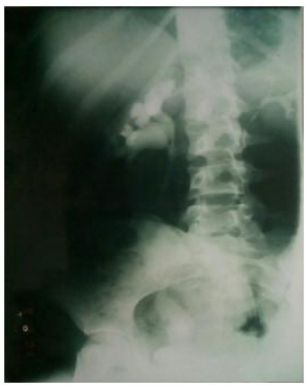


**Fig.1)** KUB: Big Stone in RtUreterocoele **Fig.2)** MCUG::Rt VUR in ipsilateral ureter



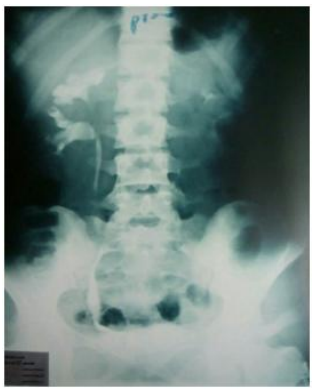


**Fig3)** IVU Hydronephrosis in duplex Rt kidney **Fig4)** IVU post reimplantation Rt ureter Normal urogram

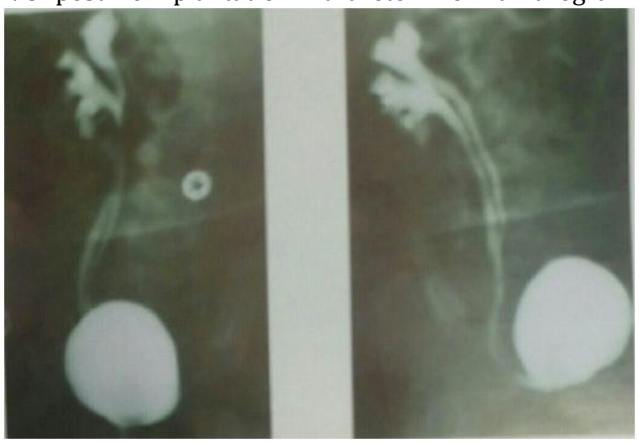


**Fig .5)** MCUG: VUR in Rt Complete Duplicated ureter

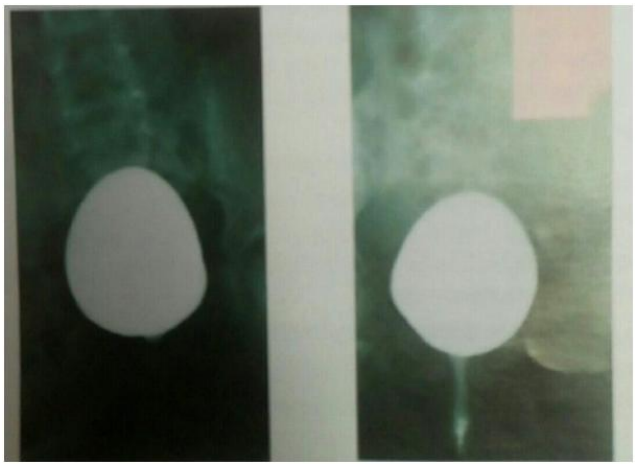
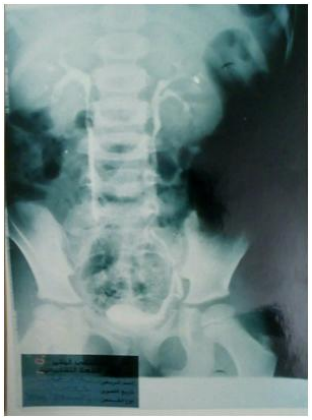


**Fig 6)** MCUG After Reimplantation of duplicated Rt ureter: Reflux corrected



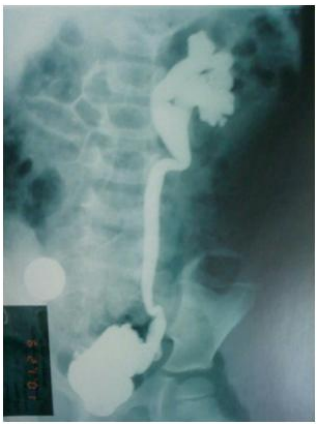
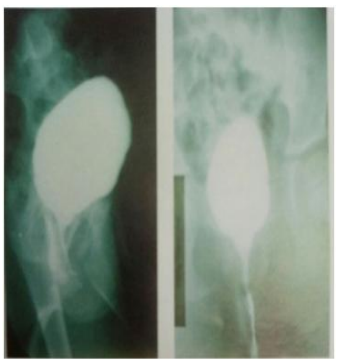


**Fig 7)** IVU: Incomplete blind ending duplicated Lt Ureter

**Fig.8)** MCUG:VUR in incomplete blind ending Duplicated Lt ureter



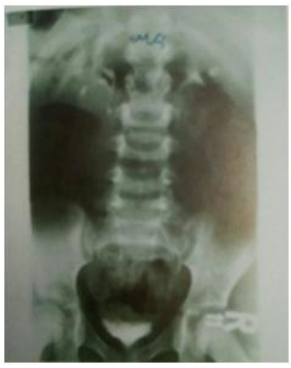


**Fig.9)** MCUG after Ureterectomy of blind segment of Lt ureter and Reimplantation: VUR Corrected

**Fig.10)** IVU: after ureterectomy of blind segment and reimplantation: Normal Urogram

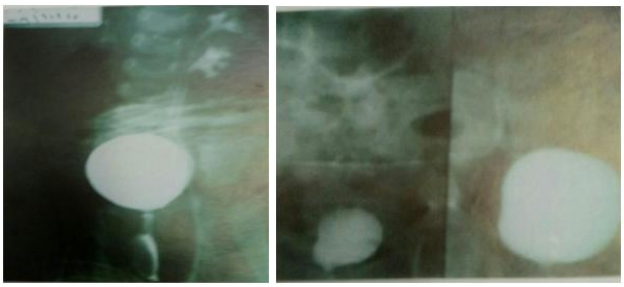


**Fig.11)** MCUG: VUR in duplicated Lt Ureter

**Fig.12)** MCUG after Electrocoagulation : VUR corrected

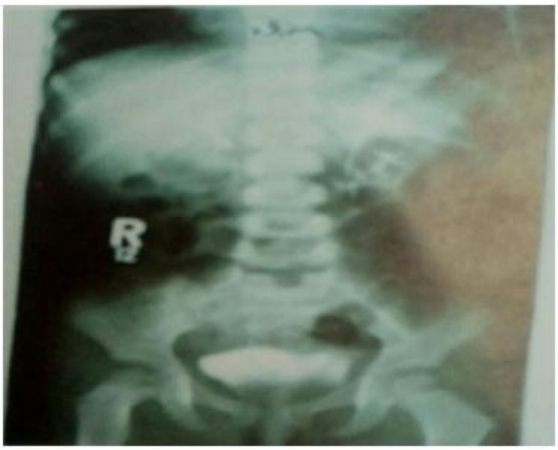


**Fig 13)** IVU after Electrocoagulation: Normal urogram

## 5. DISCUSSION

The VUR usually seats in the ureter of the inferior moiety. The embryologic basis for the anomaly is presumably attributable to bifurcation of the ureteral bud above its junction with the mesonephric duct(5).When two ureteral buds sprout from the mesonephric duct and one ureter fails to unit with the metanephric blastema or fails to induce development of renal parenchyma, a blind ending ureter results. At times however, the blind ending segment can extend for a great distance and are more likely to be associated with reflux and require surgical correction (6).A ureterocoele is a cystic dilation of the terminal intravesical ureter and is most often associated with the upper pole ureter of a completely duplicated system(80%), and reflux is present in about half of the cases, because of an abnormal placed lower-pole orifice or distortion of the trigone by the effect of ureterocoele(7,8).Because ureterocoeles have a broad spectrum of presentation, anatomy and pathophysiology, each child must be treated individually . No single method of surgical repair suffices for all cases. Kaplan clearly established the need for judging each ureteral orifice and its potential for spontaneously ceased on prophylactic medical therapy, because the reflux is likely to cease with further linear growth of the child and lengthening of the intramural tunnel (9). Other reports had shown less spontaneous cessation rate in duplex ureter than in non-duplex ureter (10). Higher grades of reflux associated with ureteral dilatation, absence of a submucosal tunnel, break through upper-tract infections while the patient is complying with prophylaxis or progressive renal scarring will likely require endoscopic or surgical correction. The paediatric group of our cases were referred from the paediatric department of our hospital seeking further surgical treatment. A full investigation was done for them in the course of physical examination, blood and urine analysis, ultrasonography, urography, voiding cystogram, renal isotopes scan and a urodynamic study. Among them there were two cases of obstructive ureterocoele in complete duplicated ureter (11,12), one of them was an 11-month-old female. The child was treated by marsupialization of huge ureterocoele and hemi- nephroureterectomy of the upper pole ureter because of dysplastic upper pole segment (13,14). The other case was an 18-year-old female patient with ureterocoele, complicated by urolithiasis and VUR in the ipsilateral ureter, treated with excision of ureterocoele, extraction of big stone and tapering of dilated ureter with reimplantation of both ureters (Politano Leadbetter technique) (15).Fig.(1-4) Two other cases were incomplete duplication with blind ending ureter treated by ureterectomy of the blind segment and reimplantation of the ureter using Politano -Leadbetter technique.Fig. (7-10). Another two cases of incomplete duplication, duplex kidney with distal bifid ureter were treated with electrocoagulation treatment for VUR. (16) Fig. (11-13). Another case of duplex kidney with distal bifid ureter associated with lower pole obstruction was treated with uretero-pyeloplasty, performing an end-to-side anastomosis of the lower pole pelvis to the upper-pole ureter, eliminating the short lower- pole ureter and avoiding ureter-ureteral reflux (17).The remaining cases were treated by reimplantation of both ureters in a common sheath using Politano Leadbetter technique because they had both renal segments functioning well and were salvageable (18,19,20). Fig. (5-6). Two cases of low grade reflux were followed up conservatively with the consent of patient and parent's. Good results were achieved in almost all the patients

## 6. CONCLUSIONS

VUR is a frequent pathology in duplicities that present its particularities in the treatment in function of the grade, age and renal function.

Each child must be treated individually, no single method of surgical repair suffices for all cases.

The goals of therapy should be clearly defined and factored into the clinical decisions.

Preservation of renal function, elimination of infection, obstruction and reflux is a goal that must be included in consideration of the treatment.

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