



## Foley Y-V Plasty in the Management of the Lower Pole Pelvi-ureteric Junction Obstruction in Incomplete Duplicated System

Authors

**Shanky Singh, Priyabarta Das, Vaibhav Vikas, Jatin Soni**

Department of Urology, Government Medical College, Trivandrum, India

Corresponding Author

**Shanky Singh**

RNRA-27, Rajiv Gandhi Nagar, Medical College PO, Trivandrum-695011

### Abstract

**Background:** Pelvi-ureteric junction obstruction (PUJO) is a relatively common finding during urological investigation.<sup>1</sup> Duplex kidney is the most common congenital abnormality of the urinary tract, with an incidence of around 2%.<sup>2</sup> The combination of duplex kidney and PUJO is a rare association and mostly affects the lower pole. Surgical treatment can be challenging in such cases. We report our experience with the foley y-v pyeloplasty for the treatment of the lower pole PUJO in incomplete duplex systems.

**Materials and Methods:** In between July 2014 and April 2017, seven patients were identified with the lower pole PUJO associated with incomplete duplicate system. Their demographic, diagnostic, and procedural data were recorded. Investigations included renal ultrasonography, renal scintigraphy, micturating cystography, cystoscopy and retrograde pyelography. All had foley y-v pyeloplasty surgery. Treatment outcome was assessed in terms of quality of life, recurrence and complications.

**Results:** At a mean follow-up of 23 months all were symptomatic free. Their median age was 11.28 yrs (range 5-23 yrs). Incidental hydronephrosis was detected in 3 patients, and 4 had a recurrent febrile urinary tract infection. Foley y-v plasty was performed in all patients. No complications were detected during follow-up and all had a good quality of life.

**Conclusion:** Foley y-v plasty is a good surgical option in the management of the lower pole PUJO associated with incomplete ureteral duplication but it should be individualized for every patient.

**Keywords:** Pelvi-ureteric Junction Obstruction (PUJO); Incomplete Duplicated System; Lower Pole; Foley Y-V plasty.

### Introduction

The most common anomaly of the upper urinary tract is the duplication of collecting system, and it can be either incomplete or complete. In the literature, the incidence of the duplicated collecting system has been reported as 0.8%. Other frequently associated urinary tract anomalies with it includes vesicoureteric reflux (VUR), ureterocele, and ectopic ureter.<sup>3</sup> The most

common site of obstruction in the urinary tract is pelviureteric junction (PUJ). Although PUJO and duplicated collecting system are common anomalies in pediatric urological practice, they are rarely together. The lower renal moiety is usually affected with PUJO in the incomplete ureteral duplication.<sup>4,5</sup> The diagnosis and management of such cases can be difficult and complicated because of the high anatomic variability, the

degree of obstruction and clinical aspects. Surgical management of the lower pole PUJO includes various techniques of the surgical reconstruction, such as pyeloplasty, pyeloureterostomy (PU), or ureteroureterostomy.

### **Aim and Objectives**

To evaluate the feasibility and efficacy of foley y-v plasty in treatment of lower pole PUJO in incomplete duplicated system.

### **Material and Methods**

#### **Study design:**

A case series.

#### **Study sample**

Between July 2014 and April 2017, seven patients with a mean age of 11.28 years (range 5 to 24) underwent Foley y-v plasty for lower pole PUJO in incomplete duplicated system at our institution.

#### **Inclusion criteria**

All patients of lower pole PUJO in incomplete duplicated system having:

1. Poor function of involved lower moiety,
2. Worsening of the hydronephrosis during the follow-up period
3. Recurrent urinary tract infection.

#### **Exclusion criteria**

1. Very poor renal function (split renal function < 10%).

Patients demographical, diagnostic and procedural data were recorded. Initial evaluation was done with ultrasonography, voiding cystourethrography (VCUG) and diethylene triamine pentaacetic acid (DTPA) scintigraphy. Intravenous urography (IVU) was required in all patients to demonstrate the precise anatomy before the open surgical procedure. Retrograde uretero pyelography was done in selected complex cases.

Full written informed consent was obtained from each patient after explanation of all the available techniques and risk for lower pole PUJO in incomplete duplicated system.

#### **Surgical technique**

Under general anesthesia, foley y-v plasty were performed with open technique via flank incision. The narrow segment in the PUJO of the lower

moiety was identified. The V flap was outlined. The base of the V was positioned on the dependent, medial aspect of the renal pelvis and the apex at the UPJ. The incision from the apex of the flap, which represents the stem of the Y, was then carried along the lateral aspect of the proximal ureter well into an area of normal calibre. The flap was developed with fine Pott's scissors. The apex of the pelvic flap was brought to the inferior most aspect of the ureterotomy incision. The posterior walls were approximated utilising interrupted or running fine absorbable sutures. A guide wire was then passed through the proximal ureter into the bladder. A 6 Fr multi-length double pig-tail catheter was passed over the guide-wire into the bladder. The proximal end of the double pig-tail stent was then placed within the renal pelvis. The anastomosis was completed with approximation of the anterior walls of the pelvic flap and ureterotomy. Post-operatively the drain was removed once the drainage was less than 5 cc/24 h. The catheter was removed the next day. Oral fluids and feeds were started on the appearance of peristaltic sounds. Patients were followed up for urinary infection and any recurrence. Ultrasonography and DTPA renal scintigraphy was done at 6 months after removal of the stent. A successful outcome was defined as the subjective and objective improvement in symptoms. All variables were categorical and percentage and proportions were calculated manually.

### **Results**

Lower pole PUJO, associated with an incomplete collecting system, was noted in 7 patients (4 female and 3 male). Their median age at surgery was 11.28 yrs (range 5-23 yrs). Incidental hydronephrosis was detected in 3 patients, and 4 had a febrile urinary tract infection. Whereas PUJO was demonstrated in 5 patients on the left side, only 2 had a right side involvement. Hydronephrosis was shown in all patients by ultrasonography. One patient had a contralateral incomplete duplication. PUJO of the lower pole was clearly demonstrated by intravenous

urography. DTPA renal scintigraphy showed the presence of the obstructive pattern or the delayed clearance in the involved moiety in all patients. Postoperative ultrasonography showed significant improvement in hydronephrosis in all patients. Recurrence of the obstruction at the anastomosis

level was not detected in any cases, and the postoperative renal scintigraphy findings demonstrated that the renal function of the lower moiety was improved in all patients with a mean follow up period of 23 months (range 16-34 months) (Table 1).

**Table 1**

Patient	Age (yrs)	Sex	Presentation	Side	Operative findings -PUJ	DTPA(%)	
						Preoperative	Postoperative
1	5	F	UTI	L	Narrow	37	45
2	10	F	UTI	L	Narrow	38	42
3	5	M	IH	R	Narrow	40	45
4	20	M	UTI	L	Narrow	37	43
5	10	F	IH	R	Narrow	35	43
6	6	M	IH	L	Narrow	39	44
7	23	F	UTI	L	Narrow	37	45

UTI-urinary tract infection; IH-incidental hydronephrosis ; L-left ;R-right ; PUJ- pelviureteric junction.

## Discussion

PUJO and duplicated collecting system are common congenital anomalies of the urinary tract, but seldom occur in combination. Larger series report an incidence of 2%-7% of PUJO in duplex systems.<sup>4,6,7</sup> However, true PUJO of the upper moiety is a very rare occurrence, involving both complete and incomplete duplicated systems. In a recent study, whereas eight (73%) of the 11 cases were associated with the PUJO at the lower pole ureters, the PUJO at the upper pole ureters was reported only in 3 patients (27%).<sup>4</sup> The lower segment of duplicated system is anatomically the analogue of a single renal system, which usually corresponds to two-third of the parenchyma, and at least 2 calyces and a true renal pelvis. This may explain the fact that PUJO of the lower pole in duplex systems is more common. In our series, the PUJO was identified only at the lower pole in all patients, together with incomplete duplicated systems. The clinical presentation of the PUJO is similar to other obstructive uropathies. Ultrasonography is a common and important modality for the diagnosis of hydronephrosis. It allows an early decision and constitutes a background for postoperative evaluation. In 3 patients in our series, the diagnoses were made using ultrasonography. The important decision of surgical approach is based on the function of the

affected renal moiety and the detailed radiological evaluation. Renal ultrasound is a simple method to demonstrate the hydronephrosis in obstructed duplicated systems. If there is a hydronephrosis in the lower pole, VCUG is necessary to exclude the lower pole reflux. Intravenous urography may provide the information of the anatomy of the collecting system.<sup>7</sup> This imaging technique has been performed in all patients among our series, and it helped to demonstrate the anatomical relationship between both ureters. Retrograde ureteropyelography is a helpful way to determine the relationship between in both ureters with incomplete duplicated systems in which the anatomy of the region remains unclear. A diuretic renogram may show the renal function level and the degree of the obstruction.<sup>6</sup> As all patients in our series had a lower moiety with reasonable renal function, we preferred to salvage it with reconstructive surgery.

The surgical technique for the treatment of the PUJO should be individualized for every patient.<sup>4,5,8,9,10</sup> The anatomical features and the degree of the renal function in the affected segment are the important factors on which the surgical management depends. Heminephrectomy of the affected pole is indicated when there is a massive hydronephrosis with no function in the parenchyma.<sup>7,8,9</sup> The most appropriate option in

the complete or nearly complete duplex systems is standard dismembered pyeloplasty.<sup>4,9,11</sup> In the lower pole PUJO, associated with incomplete duplicated system, the length of the lower pole ureter is the major determinant factor for the selection of the surgical technique. If the lower pole ureter is short, the pyeloureterostomy may be considered.<sup>8</sup> Foley y-v plasty is also one of the available surgical techniques to manage the duplex systems with the lower pole PUJO. Rajendra et al. reported that foley y-v plasty was a successful technique with a low complication rate in children with primary PUJO.<sup>12</sup> All patients in our study who underwent operation with foley y-v plasty had good postoperative outcomes. No immediate or long-term recurrence and complications were noted, and no further surgical procedures were needed.

### Conclusion

Management of lower pole PUJO with duplicated collecting system should be individualized for every patient as they rarely occur together. This requires a careful preoperative evaluation to understand the anatomy of the anomaly for the surgical treatment regimen, which also varies according to the anatomical features of the pathology. We believe that the foley y-v plasty is a safe and effective surgical technique in the management of the lower pole PUJO associated with incomplete ureteral duplication.

### References

1. Dahnert W. Urogenital tract. In: Radiology Review Manual. 5th ed. Philadelphia, PA: Lippincott Williams and Wilkins; 2003.;p. 977–978.
2. Wah TM, Weston MJ, Irving HC. Lower moiety pelvic-ureteric junction obstruction (PUJO) of the duplex kidney presenting with pyonephrosis in adults. *Br J Radiol.* 2003;76:909–912.
3. Schluskel RN, Retik AB. Ectopic ureter, ureterocele, and other anomalies of the ureter. Vol 2. In: Wein A, ed. Campbell-Walsh Urology. 9th ed. Philadelphia, PA: Saunders Elsevier; 2007: p.3383-422.
4. Horst M, Smith GHH. Pelvi-ureteric junction obstruction in duplex kidneys. *BJU Int.* 2008;101:1580-4.
5. Vander Brink BA, Cain MP, Gilley D, Meldrum KK, Rink RC. Reconstructive surgery for lower pole ureteropelvic junction obstruction associated with incomplete ureteral duplication. *J Pediatr Urol.* 2009;5:374-7.
6. Gonzalez F, Canning DA, Hyun G, Casale P. Lower pole pelviureteric junction obstruction in duplicated collecting systems. *BJU Int.* 2006;97:161-5.
7. Snyder HM, Lebowitz RL, Colondy AH, Bauer SB, Retik AB. Ureteropelvic junction obstruction in upper and lower pole moiety of duplex systems. *Urol Clin North Am.* 1980;7:273-90.
8. Joseph BJ, Stuart BB, Colondy AH, Mandell J, Lebowitz RL, Retik AB. Lower pole ureteropelvic junction obstruction and incomplete renal duplication. *J Urol.* 1989;141:896-9.
9. Fernbach SK, Zawin JK, Lebowitz RL. Complete duplication of the ureter with ureteropelvic junction obstruction of the lower pole of the kidney. *AJR Am J Roentgenol.* 1995;164:701-4.
10. Amar AD. Congenital hydronephrosis of lower segment in duplex kidney. *Urology.* 1976;7:480-5.
11. Ho DS, Jerkins GR, Williams M, Noe HN. Ureteropelvic junction obstruction in upper and lower moiety of duplex renal systems. *Urology.* 1995;45:503-8.
12. Nerli RB, Reddy MN, Jali SM, Hiremath MB. Preliminary experience with laparoscopic Foley's YV plasty for ureteropelvic junction obstruction in children. *J of Minim Access Surg.* 2014;10(2):72-5