

# Pediatric Urology

## Gil-Vernet Antireflux Surgery in Treatment of Lower Pole Reflux

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### ABSTRACT

**Purpose:** Prevalence of ureter and kidney duplication is roughly 1 per 125 people, and is associated with vesicoureteral reflux to lower pole in about 45% of cases. From antireflux surgical principles viewpoint, standard antireflux surgeries can be performed in these kidneys without releasing ureters from each other. We studied the results of Gil-Vernet antireflux surgery in 12 patients with duplicated collecting system and lower pole reflux.

**Materials and Methods:** Between 1996 and 2000, 12 patients with unilateral duplicated system underwent Gil-Vernet antireflux surgery. There were 8 (67%) females and 4 (33%) males with a median age of 5.6 years. Of the patients, 50% had unilateral lower pole reflux in duplex system and 50% had bilateral reflux.

**Results:** Twelve patients with lower pole reflux in duplicated system, and overall, 18 refluxing renal units were treated, using Gil-Vernet antireflux surgery. In 11 (92%) patients, upper pole orifices were non-refluxing and without ureterocele. One (8%) patient had upper pole ureterocele that was treated by a small medial incision in the same session. Median hospital stay was 4 days, and median follow-up was 10 months, in 10 patients who were followed. Of patients, 80% and of refluxing units, 94% improved. Overall, success rate was 88%.

**Conclusion:** Gil-Vernet antireflux surgery is a simple technique, associating with minimum ureteral manipulation for releasing them. Accordingly, we recommend Gil-Vernet antireflux surgery as the first line surgical modality for duplicated ureters with lower pole reflux, without upper pole ureterocele.

**KEY WORDS:** duplicated ureter, vesicoureteral reflux, antireflux surgery

### Introduction

Duplication anomalies are seen in 1 per 125 people. The prevalence is twice as high in female gender. Unilateral duplication is six times as prevalent as bilateral duplication, and right and left side involvement are nearly equal.<sup>(1)</sup> Genetically, it is transmitted as an autosomal dominant disorder with incomplete penetrance. According to few reports, environmental factors

are considered to be implicated in its development. The position of ureteral orifices in duplicated ureters is usually inverse, in proportion to collecting system; the orifice of lower pole has a cranial and lateral position, and the orifice of upper pole is located in a caudal and medial position. This is nominated as Weigert-Mayer rule and applicable for nearly all cases of duplicated ureter.<sup>(2)</sup> Due to cranial and lateral position of lower pole ureteral orifice, lower pole reflux is a common finding in duplicated systems and is seen in 45% of cases. On the other hand, about 10% of antireflux

Received September 2003

Accepted January 2005

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surgeries are performed in duplicated systems.

Duplicated ureters have common blood supply. In consequence, avoiding extensive separation of ureters from each other, all antireflux surgical methods can be used in these patients. As less manipulation of ureters and minimizing tissue ischemia increase surgical success rate, it seems that Gil-Vernet is an appropriate antireflux technique in this type of reflux. We report the results of Gil-Vernet antireflux surgery in 12 cases of duplicated collecting system with lower pole reflux.

### Materials and Methods

Between 1996 and 2000, 12 patients with unilateral duplicated system and lower pole reflux, underwent Gil-Vernet antireflux surgery. Median patient age at time of surgery in 11 patients was 5.6 years (range 1 to 12). One patient was 26 years old. Of patients, 8 (7%) were female and 4 (33%) were male. Nine (75%) patients presented with urinary tract infection (UTI), fever and chills; one had UTI without fever; and in the two remainders, UTI was proved in screening tests. Four (33%) patients complained of bladder dysfunction symptoms in the form of frequency and enuresis. All of the patients had unilateral duplicated systems and all had lower pole reflux. Six (50%) patients had only reflux into lower pole ureter, but the other 6 (50%) patients had bilateral reflux (lower pole reflux with reflux in the normal contra-lateral ureter). One patient had upper pole ureterocele that was detected during surgery. Gil-Vernet antireflux surgery was performed in all the patients and data of postoperative outcomes, including primary improvement, hospital stay, complications, and follow-up records, were collected and assessed.

Minimum grade of reflux was II, though it was associated with a contra-lateral grade III or IV reflux. Of 18 refluxing units, 15 (83%) had grade III to grade IV reflux and three had grade II reflux.

#### *Surgical method*

A transverse incision was made between lower pole and contralateral ureteral orifices, and ureteral sheaths were released. Ureteral sheaths were approximated with 4.0 or 5.0 Vicryl suture materials and mucosa was repaired with 4.0 chromic catgut. Bladder and abdominal wall were repaired with the conventional method.

### Results

All of the patients had complete unilateral ureteral and renal duplication. Six (50%) patients had simultaneously contralateral reflux. Eleven patients (92%) had non-refluxing upper pole orifice without ureterocele. One (8%) patient had upper pole reflux and ureterocele, which was treated concurrently with a small incision in medial and distal portions of the ureterocele. One of the four patients with frequency and fever had moderate bladder trabeculation. Interureteral sutures were made with 4.0 or 5.0 Vicryl. Median operative time was 64 (range 45 to 90) minutes. Five patients underwent surgery without using ureteral stent, urethral catheter, and drain. In six patients, surgery was done without ureteral stent, but with urethral catheter and drain. One patient had cystostomy and drain. Median hospital stay was 5 (range 2 to 14) days. Only one patient was hospitalized for 14 days. Ten patients were followed up, 4 with voiding cystourethrography (VCUG) and six with radionuclide cystography. They were followed for 4 to 16 months. Reflux was improved completely in 8 (80%) patients and 94% of refluxing units. Recurrence of reflux was seen in two patients. In one who had undergone ureterocele incision, grade II upper pole reflux developed. In one patient suspected to have neurogenic bladder, grade III reflux had been reduced to grade I to II, which was treated medically.

### Discussion

Gil-Vernet antireflux is a simple and effective surgical technique. Primary reflux improvement in non-duplicated kidneys is over 95% in various grades. We have previously reported the results of Gil-Vernet antireflux surgery in 60 and 100 refluxing units, and also without using ureteral stent, urethral catheter, and drain.<sup>(3)</sup>

In this study, we reported the results of Gil-Vernet antireflux surgery in 12 patients with duplicated ureters within 4 years. Of the patients, 10 were followed up, and the improvement rate was over 90%. Reflux improved in all of the normal ureters. Recurrence or development of reflux was seen only in patients with suspected neurogenic bladder or those with ureterocele incision and Gil-Vernet antireflux surgery in the same session. Generally, patients with lower pole reflux without upper pole ureterocele or neurogenic bladder had the highest rates of

improvement.

Indications for surgery in these patients are similar to those in other patients with reflux, and surgical methods with minimum ureteral manipulation are recommended in these patients. Today, even Teflon and polydimethylsiloxane injections are also reported for the treatment of lower pole reflux with 80% success rate.<sup>(4,5)</sup> Also, double-ureter reimplantation has been used in these patients with success rates of 94% and 96%.<sup>(6,7)</sup> In one report of ureterocele detected intraoperatively, reimplantation of both ureters was successful.<sup>(8)</sup> In one case, we encountered an unexpected ureterocele, which was treated with incision and Gil-Vernet antireflux surgery in the same session, but it was complicated with upper pole reflux development. Therefore, Gil-Vernet antireflux surgery is recommended only in duplicated systems with lower pole reflux and not with upper pole orifice ureterocele. Cases of developing bladder stone following Gil-Vernet antireflux surgery using nylon suture have been reported.<sup>(9)</sup> We used Vicryl suture material, so that we did not encounter bladder stone during the follow-up period. Overall, success rate in our study was 94% and taking the one postoperatively developed reflux into account, it was 88%.

### Conclusion

For ureteral reimplantation in duplicated ureters, surgical methods with minimum manipulation are recommended. Gil-Vernet antireflux surgery is a simple technique with minimum ureteral manipulation. We recommend this method as the first choice of surgical intervention for lower pole reflux without upper pole ureterocele in duplicated systems. However,

in cases that reflux is associated with neurogenic bladder, the most suitable surgical intervention is a matter of controversy.

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