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Results of Modified Gil-Vernet Antireflux Surgery in the Treatment of Vesicoureteral Reflux

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ABSTRACT

Purpose: To evaluate the efficacy of modified Gil-Vernet anti-reflux surgery in the treatment of patients with primary vesicoureteral reflux in a prospective historical controlled trial.

Materials and Methods: A total of 30 patients with 46 refluxing units underwent this surgery since February 1998 until September 2002, with the mean follow-up period of 18 (range 6 to 43) months.

Results: Vesicoureteral reflux was resolved completely in 44 ureteral units (95.6%, p<0001). In 2 refluxing units (4.3%) in spite of reflux improvement, hydroureter remained unchanged after the surgery. In respect to response rate, there was no significant difference between different grades, genders, age groups, and laterality of primary vesicoureteral reflux.

Conclusion: Our findings indicate that modified Gil-Vernet anti-reflux surgery which separately transfers each ureteral orifice to the tip of trigone with two fine absorbable suture on each side, is a completely successful procedure in the treatment of primary vesicoureteral reflux and produces a longer submucosal tunnel with a more suitable angel than classic Gil-Vernet procedure does.

KEY WORDS: Gil-Vernet, antireflux surgery, Vesicouretral reflux

Introduction

Vesicoureteral reflux is a common disease among general population, corresponding to a prevalence of %1.[1] Up to 70% of children with urinary infection have vesicoureteral reflux. It is more prevalent in the Caucasian, and young females are affected 10 times more than males. The most common cause of hypertension in children is urinary reflux. The more severe the reflux, the more probable scar formation in the kidney and scar development due to infection.[1-6]

Regarding its cruciality, early diagnosis and appropriate treatment of vesicoureteral reflux is necessary. However, choosing between medical and surgical approach is of high controversy. In some particular conditions surgical treatment is inevitable. Although conventional techniques have led to a high success rate, they are too invasive and associated with stricture of the operational area, displacement ureteral openings, difficulties in ureteral catheterization, injected material migration, confusion of primary anatomy bladder dysfunction, J-hook phenomenon, contralateral reflux, and long operation time and hospitalization.[1-6]

Gil-Vernet introduced a less invasive method in 1984 which was not associated with the above-mentioned complications and was successful in approximately 94% of cases.[3]

We performed Gil-Vernet's method with some modifications in order to construct a longer submucosal tunnel with a more appropriate angle

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than the one in this technique, using fine absorbable sutures in our patients.[1,2,3]

Materials and Methods

This study was designed as a prospective clinical trial with a historical control group performed from February 1999 to September 2002 at Shaheed Faghihi and Namazi hospitals. The study group was selected from among the patients with reflux shown in VCUG who had been referred for various complaints. Data and main chief complaints of the patients are shown in table 1.

TABLE 1. *patients' characteristics*

Patients	30
Male	6
Female	24
Mean age (year)	8.5
Bilateral reflux	16
Unilateral reflux	14
Refluxing unit	46
Fever, chills, dysuria	10
Flank and abdominal pain	7
Nocturia	2
Anorexia and failure to thrive	2
Incontinency	1
Positive urine culture	19
Recurrence (prophylaxis failure)	4
Recurrence (surgery failure)	4

Primary evaluation included history taking, physical examination, complete blood count, blood biochemistry, urine analysis, urinary system sonography, VCUG, and subject to be needed, intravenous pyelography. Patients with neurogenic bladder and secondary reflux were excluded.

Transverse incision (Pfannenstiel) of abdominal wall preceded longitudinal opening of bladder in our method. Two 6 F ureteral catheters were inserted into the ureter and fixed to the bladder wall with sutures.

Mobility of ureters were checked and a symmetric incision of bladder mucosa was performed towards the bladder neck (fig. 1). Mucosa was separated from muscle and then the internal muscle of the ureter was grasped in its posteriomedial and posteriolateral sides, each side with two 5.0 vicryl or polydexan sutures and ureteral orifices were transferred proximately to the tip of trigone triangle symmetrically (fig. 2,3). Afterwards, mucosa was repaired longitudinally with 6.0 chromic and catgut sutures and finally the ureteral catheters were removed. Eventually, a submucosal tunnel 2 to 3 cm long was achieved.

None of the patients was managed by urethral or ureteral catheter. Whereas, a 12 F cystostomy tube was inserted for all of them. Cases with unilateral reflux underwent bilateral operation. Twenty-six point six percent of the patients were under 5 years, 40% were 5-10 years, and 33.3% were over 10 years.

Urinary output from the ureteral orifices was

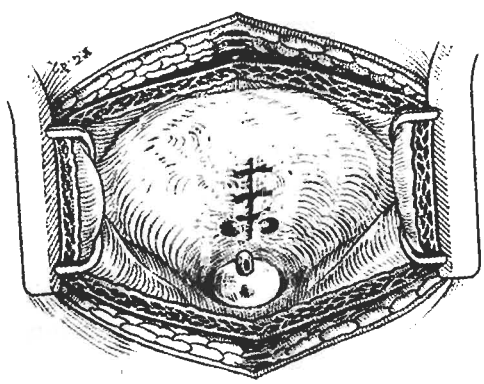

FIG. 1. incision of bladder mucosa towards the bladder

fig. 2

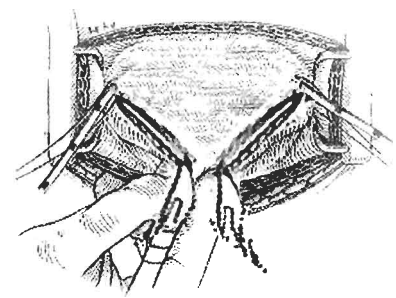

fig. 3

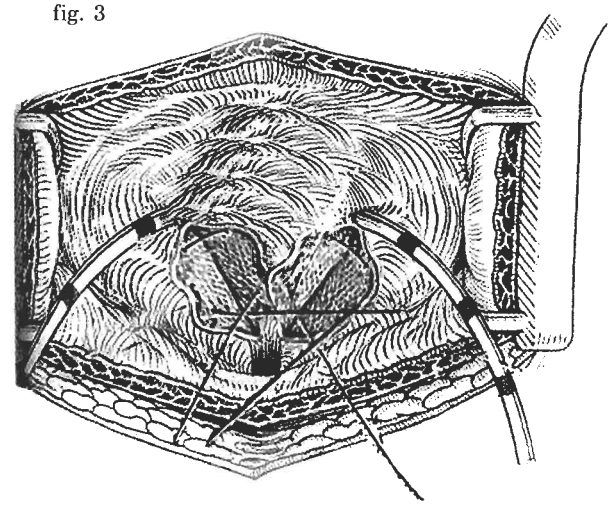

FIG. 2,3. Mucosa was separated from muscle and then the internal muscle of the ureter was grasped in its posteriomedial and posteriolateral sides, each side with two 5.0 vicryl or polydexan sutures and ureteral orifices were transferred proximately to the tip of trigone triangle symmetrically.

checked. Other parts of the operation were similar to the other methods. Patients were usually discharged after the 3rd postoperative day with drain removed and cystostomy tube remained until a week later if urinary residue was not significant. Ultrasonography was done one or two weeks after the surgery to rule out any obstruction and to be compared with the preoperative sonography, both performed by a single radiologist. Urinary analysis and culture were taken monthly and cystography was performed 3 to 6 months and 1 year after the surgery.

Results

A total of 30 patients who were 24 girl and 6 boys underwent surgery with the mentioned modified technique. Mean age was 8.5 (range 3 to 23) years and mean follow-up was 18 (range 6 to 43) months. There were 46 refluxing units according to the international classification, consisting of grade I in 4 (8.6%), grade II in 10(21.7%), grade III in 17(36.9%), grade IV in 14(30.4%), and grade V in 1(2.2%).

VCUG after 6 months showed that reflux was completely resolved in 44 out of 46 units (95.6%, $p<0.0001$). In spite of reflux improvement in the other two units, hydroureter was remained unchanged of which one was in a 5-year-old child with posterior urethral valve and another one was in a patient who had suffered from severe reflux megaureter and voiding dysfunction. In both cases ureteroneocystostomy was done using Paquin's method due to the suspected partial ureteral obstruction.

Three months after the operation 95.6% of the patients did not need any prophylactic medical treatment and ultrasonography showed no secondary obstruction. Also serum BUN and creatinine did not have any increase in those patients. One of the patients was a 13-year-old female with bilateral duplex ureter and grade III reflux in whom the operation was successful with the same method and reflux was resolved. Another patient was a 14-year-old female with right orthotopic ureterocele. Surgical approach was Paquin in the left unit and Gil-Vernet in the right one for a 10-year-old male who had bilateral urinary reflux, since the left ureter had been opened to diverticulum.

Reflux was also totally resolved in 4 patients who had undergone endoscopic reflux treatment with Teflon injection previously. All of the patients completed the study.

In one patient urinary leakage from the inserted drain occurred for 10 days because of cystostomy tube obstruction. However, it didn't lead to any complication and the patient was discharged after one week. Two patients experienced urinary retention after the removal of cystostomy tube which was improved by placing urethral catheter for three days.

Discussion

Surgical treatment of urinary reflux is of essence in some particular conditions. Commonly used methods are often invasive and develop many complications, though they have high success rate. This method is not only simpler with fewer complications, but also prevents J hook deformity phenomenon. It's a simple infrahital advancement and is based on sphincteric activity of longitudinal ureteral muscle fibers, adding muscular backing, and increasing the length of intravesical part of ureter.[2] To our experience, this method has a high success rate, corresponding to 95.6% complete improvement, comparable to other anti-reflux surgical techniques. Its advantage over conventional Gil-Vernet technique is the longer submucosal tunnel with a more tendency to the normal angle, as in contrast to classic Gil-Vernet, in which ureters may be transferred proximately to each other in the trigone base, ureters meet each other in the trigone tip.

This method is highly desirable when reflux is accompanied with abnormalities such as ureterocele and duplex ureter and the success rate is independent on primary reflux grade.

The overall success rate was 95.6% in the modified Gil-Vernet technique, comparable to 94% success achieved by Gil-Vernet and other anti-reflux methods. Moreover, mortality and complication was significantly less due to eliminating ureteral catheter and the absence of lower ureter ischemia risk.[1,2,3] However, the patients' characteristics in this study may be not identical to the Gil-Vernet's study.

Conclusion

Modified Gil-Vernet is a simple, rapid, and highly effective technique with few complications. In addition to prevention of J hook deformity phenomenon as Gil-Vernet does, it results in a longer submucosal tunnel and a more appropriate angle of intravesical ureter on the trigone. This technique is possible to be performed in cases with

any grade of primary reflux and even in patients with previous surgical management who have not been improved completely.

It seems that modified Gil-Vernet could be the method of choice in patients with primary urinary reflux and an intact bladder with normal compliance.

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Editorial Comment

Regarding the vast dissection in trigone area, it seems that irritative symptoms in the patients must be more than that in other anti-reflux surgeries including Gil-Vernet method. On the other hand, the results of this modified approach have not a significant difference with other approaches. Thus, its superiority the subject of dispute, though it has desirable outcome as a new technique.

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Reply by Author

Appreciating the editorial board's consideration, it should be noted that first, dissection of trigone area is limited to separation of mucosa from the underlying muscle, without manipulation of the muscle fibers. Furthermore, taking into account that foley catheter and cystostomy tube insertion was prevented, and Belladonna was prescribed, our patients did not complain of irritative bladder symptoms.

Second, the advantage of this technique is that ureteral orifices on the trigone will be in their natural position. Consequently, follow-up would be easier consisting of ureteroscopy and catheterization.

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