



Long-term Follow up Patient with Primary Vesicoureteral Reflux after Ureteral Reimplantation with a New Modified Technique in Ramathibodi Hospital

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Abstract

Purpose: To describe the surgical procedure of Modified Glenn-Anderson Technique, a modified technique of ureteral reimplantation, and report our initial experience.

Methods: January 2007 and December 2014, 17 children with primary vesicoureteral reflux (VUR) underwent Modified Glenn-Anderson Technique. All surgical procedures were performed via an open intravesical approach. Postoperative outcome such as urinary tract infection (UTIs), resolved hydro-nephrosis, operative time and ranged of follow up were analyzed.

Results: Seventeen patients were treated with Modified Glenn-Anderson Technique, no patient had intraoperative complication. Mean follow-up time was 27 months. After ultrasonography follow up, VUR were completely resolved in 11 patients (64.7%) with 18 ureters and partially resolved in 6 patients with 8 ureters. Febrile UTI was developed in 2 of 17 patients (11.7%) after surgical correction. This technique demonstrate a success rate 100% for the correction of VUR.

Conclusions: Modified Glenn-Anderson is safe and feasible for correcting primary VUR.

Keywords: Vesicoureteral reflux, surgical correction

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Introduction

Vesicoureteral reflux (VUR) is the common urinary tract abnormality in pediatrics. The treatment of VUR has evolved over the past half-century from primarily surgical to nonoperative treatments in most cases.⁽¹⁾ The main aim in treating VUR is to prevent progressive renal injury and UTI.⁽²⁾ Surgical correction is considered in patients with failure of antibiotic prophylaxis or worsening renal function. Ureteral reimplantation (UR) is a surgical procedure of choice to correct VUR. The reduction in incidence of febrile urinary tract infection (UTI) is one of the clinical benefits of UR that has been demonstrated in previous randomized controlled trials.⁽³⁾ Various surgical techniques have been described for UR. All of the techniques have specific advantages and disadvantages and have demonstrated excellent outcomes in terms of correction of VUR.^(1,4) Multiple studies have demonstrated its effectiveness, with success rates of 96% to 100%⁽⁵⁾, and low rate of complications.^(1,6) Intravesical approach with modified Glenn-Anderson technique is also an effective procedure for the correction of VUR. This procedure maintains the orthotopic position of the ureteral orifice and prevents post-operative urinary retention from nerve damage. In this study, we aim to determine the incidence of febrile UTIs and post-operative imaging after correct VUR with modified Glenn-Anderson Technique.

Materials and Methods

With approval of the institutional review board of Ramatibodi hospital, we performed a retrospective cohort analysis of 17 consecutive patients who underwent ureteral reimplantation, between January 2007 and December 2014.

1.1. Patients

Ureteral reimplantation with modified Glenn-Anderson Technique was performed in 17 patients by a single surgeon between January 2002 and December 2014. Surgery was considered in patients with failure of antibiotic prophylaxis, persistent high grade VUR, renal scar or worsening renal function. Patients with ectopic ureter, neurogenic bladder or history of previous ureteral reimplantation were excluded. Pre-operative evaluation included age, gender, voiding cystourethrography (VCUG) and ultrasonography were reviewed. Hydronephrosis and VUR were graded according to the Society for Fetal Urology guidelines and the system of the International Reflux Study in Children, respectively.^(7,8)

1.2. Surgical technique

We performed the operation with an open technique. The patient was placed in the supine position. The skin was opened with a Pfannestiel incision. When bladder was adequately exposed, intravesical space was approached with a vertical incision. Then superoposterior of bladder was packed with gauze and retractor was used to identify the ureteral orifice. Silicone tube No. 6 was cannulated over ureteral orifice into mid to distal ureter. The distal ureter was dissected by sweeping off connective tissues around the ureteral hiatus until free of ureter. Detrusor was cut and mobilized ureter to new position then the detrusor was repaired in an interrupted manner below the ureter. If ureter had a severely dilated, the ureter was tapered. The dilated ureter was folded over a 6 Fr. silicon tube then medial part was sutured in continuous manner using absorbable 5-zero Chromic. We reimplant ureter with maxon 5-zero. The ureteral catheter removed 1 week postoperatively. We

created submucosa tunnel with a length-to-ureteral diameter ratio of 5:1. The urethral catheter was generally removed on postoperative day 3 or 4.

1.3. Follow-up

Operation time from surgical incision was obtained from medical records. Postoperative evaluation included VCUG and ultrasonography were accessed. Clinical success rate was defined as resolving of VUR and improvement of hydronephro-ureterosis. Surgical outcome was evaluated in terms of renal units, clinical UTI, new renal scar. Patients with VUR were scheduled for U/S at 3, 6, 12 months after surgery.

1.4 Data Collection

Data collected to evaluate factors affecting post-operative ultrasonography, operative age, Post-operative UTI, Operative time, preoperative results of VCUG, VUR was graded according to the Society for Fetal Urology guidelines and the system of the International Reflux Study in Children. Postoperative UTI was review from medical record.

1.5 Statistical Analysis

Univariate analyses were performed using Fisher's exact test and Student's t test with SPSS, version 12.0.

Results

1. Patients

A total of 17 patients underwent ureteral re-implantation with modified Glenn-Anderson Technique. The mean age was 53 months (± 42 months) and 8 (47%) were male. Before surgical correction, 13 patients received Bactrim for prophylaxis, 3 patients received cephalixin where as one patient did not

receive antibiotic. Detail of patient characteristics are shown in table 1.

2. Perioperative outcomes

We performed 26 reimplanted ureters. One patient was performed ureteral plication for reflux megaureter. The median time of surgery was 128 minutes (ranged, 85-240 minutes). There were no intraoperative complications.

3. Surgical outcomes

Mean follow-up time was 27 months (± 16 months). Among 17 patients treated for VUR, follow-up VCUG was performed in 10 patients. Of these patients with follow up VCUG, VUR was completely resolved in 6 patients (60%). No patient treated for VUR exhibited worsening hydronephrosis that suggestive of obstruction on follow-up ultrasound. Surgical outcomes were assessed in terms of ureteral units. After ultrasonography follow up 11 patients (64.7%) with 18 ureters were completely resolved and 6 patients with 8 ureters were partially resolved. During a median of follow up of 27 months (range 3-55), febrile UTI developed in 2 of 17 patients (11.7%). One patient with persistent VUR, pre-operative VCUG demonstrated bilateral VUR grade IV after underwent surgical correction and performed VCUG. The result showed Rt side VUR grade III and grade II in Lt side but U/S did not demonstrate hydronephrosis. We close follow up and look forward for treatment if the patient has indication. In patients who partially resolved of hydronephrosis, 5 out of 6 patients had VUR grade V from pre-operative VCUG. Two patients of this group had recurrence UTI but no abnormal scarring detected in ultrasound. Details of surgical outcomes are displayed in table 2.

**Table 1** Patient characteristics are summarized.

Variables	N
Age, Mean+/- SD (months)	53 ± 42
Gender	
- Male	8
- Female	9
VUR laterality	
Unilateral	7
- Right	3
- Left	4
Bilateral	10
VUR grade	
- Grade I	3
- Grade II	2
- Grade III	9
- Grade IV	8
- Grade V	7
Indication	
- Break through infection	6
- Renal scar	4
- Other	7
ATB prophylaxis	
- Bactrim	13
- Cephalexin	3
- no	1

Table 2 Surgical outcomes

Variable	N (%)
Follow period (months)	27 (3-55)
Reflux resolution (VCUG)	
- Not perform	7
- Partial	4
- complete	6
Improved hydronephrosis	
- Partial	6 (35.3)
- complete	11 (64.7)
Plication of ureter	1
UTI	
- No recurrence	15 (88.2)
- Recurrence UTI	2 (11.8)
Operative time (min)	128.8 (85-240)

Discussion

The primary goal of this study was to determine the incidence of UTI after UR performed for primary VUR and success rate of modified Glenn-Anderson technique. Standard Glenn-Anderson are excellent with a 98% success rate.⁽¹¹⁾ There is no article report the success rate of this technique. We define success rate as improve of hydronephrosis and ureter from ultrasonography. This technique demonstrated a success rate of 100% for the correction of VUR and 85.7% free of UTI. Our results are same result to those reported in the published literature.⁽¹⁰⁾

The surgical objective of ureteral reimplantation is to create a passive flap valve mechanism that allows the ureter to occlude temporarily while the intravesical pressure rises within the bladder, therefore preventing VUR from occurring. A mucosal tunnel with a length-to-ureteral diameter ratio of 5:1 should result reliably in success rates that exceed 95%.⁽⁹⁾

The most of patients those have to surgical correction were children. They have to live with new ureteral orifice. The advantage of this technique are maintains the orthotopic position of the ureteral orifice. We can perform endoscopic management via ureteral orifice easier when compare with other technique.

Cross-trigonal (Cohen) reimplantation is one of the most popular techniques, a simple and reliable method for surgically correcting all grades of reflux. It is simpler to learn and perform than the Politano-Leadbetter reimplant, and therefore probably safer for less-experienced surgeons.^(1,10) Nevertheless, the

placement of the ureters out of their normal anatomic alignment. It may difficultly to perform retrograde catheterization.

Politano-Leadbetter technique is created ureteral orifice in a normal anatomical position. This technique is a safe and standardized procedure with an acceptable complication rate. The disadvantage is a potential risk for bowel injury, which might occur during transvesical ureterolysis and reimplantation of the distal ureter.⁽¹⁰⁾

Extravesical ureteral reimplantation is also an effective procedure. The extravesical approach is less invasive than the intravesical approach and has the advantage of simplicity and preservation of normal anatomic configuration. They also report about less pain, shorter hospital stay, and it avoids gross hematuria.⁽⁴⁾

There are various techniques of ureteral reimplantation, we believe that no single surgical technique is superior to other techniques. The selection of surgical technique depends on surgeon experience and conditions such as laterality, local anatomy or severity of disease.

Conclusions

We used modified Glenn-Anderson technique, which is a modified technique for ureteral reimplantation, and reported our experiences. This technique creates the same ureteric orifice in a normal anatomic position and does not produce urinary retention in bilateral cases. Modified Glenn-Anderson technique is a safe and effective surgical technique that could be performed in patients with VUR.



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รายงานการติดตามผู้ป่วยปัสสาวะไหลย้อน หลังจากได้รับการแก้ไขโดยการผ่าตัดพังท้อไต

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บทคัดย่อ

วัตถุประสงค์: เพื่อรายงานถึงความสำเร็จและการติดตามผู้ป่วยปัสสาวะไหลย้อนใน รพ.รามาธิบดี ด้วยวิธีการผ่าตัดพังท้อไต Modified Glenn-Anderson technique

วิธีการ: ผู้ป่วยปัสสาวะไหลย้อน 17 รายที่ได้รับการผ่าตัดด้วยวิธี Modified Glenn-Anderson ตั้งแต่ มกราคม 2550 ถึง ธันวาคม 2557 โดยนำข้อมูลต่างๆ มาวิเคราะห์ เช่น การติดเชื้อทางเดินปัสสาวะหลังการผ่าตัด ขนาดของ hydro-nephrosis ระยะเวลาการผ่าตัด และระยะเวลาการติดตามการรักษา

ผลการศึกษา: ผู้ป่วยปัสสาวะไหลย้อน 17 รายที่ได้รับการผ่าตัด ไม่พบปัญหาแทรกซ้อนระหว่างการผ่าตัด มีระยะเวลาการติดตามการรักษาเฉลี่ยที่ 27 เดือน เมื่อติดตามผลอุลตราซาวด์หลังผ่าตัด ผู้ป่วย 11 ราย (ร้อยละ 64.7) ซึ่งพังท้อไต 18 ท่อไต ไม่พบภาวะไตบวม ผู้ป่วย 6 ราย พังท้อไต 8 ท่อไต มีไตบวมลดน้อยลงจากเดิม พบผู้ป่วย 2 ราย (ร้อยละ 11.7) ที่มีการติดเชื้อทางเดินปัสสาวะ หลังผ่าตัดอัตราความสำเร็จจากการผ่าตัดด้วยวิธี modified Glenn-Anderson technique อยู่ที่ ร้อยละ 100 อัตราการติดเชื้อทางเดินปัสสาวะหลังจากการผ่าตัดร้อยละ 11.7 เวลาผ่าตัดเฉลี่ย 128 นาที

สรุป: จากการศึกษาพบว่าการผ่าตัดด้วยวิธี modified Glenn-Anderson technique เป็นวิธีที่ปลอดภัยและมีประสิทธิภาพในการแก้ภาวะปัสสาวะไหลย้อน

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