Results of Surgical Repair of Primary Obstructive Megaureter

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Surgical treatment of primary obstructive megaureter is generally recommended when ureteral dilatation is likely to contribute to symptoms such as pyelonephritis or calculi. The authors' objective for this study was to present the surgical results performing ureteral reimplantation, combined with modified Lich-Gregoir antireflux procedure (using anchoring stitch) over a 10 year period. The average operative time for ureteral reimplantation was 259.64 minutes. The authors' success rate was 92% and all patients had no postoperative ureteral obstruction from intussusception of reimplanted ureter. Follow-up postoperative renal sonography at 22 weeks showed a decrease in hydronephrosis in 92%. The authors concluded that the surgical results were comparable with surgical results of other techniques and an anchoring stitch should be considered to prevent postoperative ureteral obstruction from ureteral intussusception.

Keywords: *Ureteral reimplantation, Modified Lich-Gregoir, Primary obstructive megaureter, Surgical results*

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Primary obstructive megaureter has a congenital intrinsic form of obstruction at the ureterovesical junction or at a higher level. The obstruction can be caused by ureteral stenosis or stricture, segmental atresia, ectopic orifice, and distal adynamic segment[5]. The majority of primary obstructive megaureter, especially in neonatal patients, can be managed conservatively[7,8]. Surgical treatment is generally recommended when the dilation is likely to contribute symptoms such as breakthrough pyelonephritis, calculi or pain and when dilatation is increasing or associated with impairment of renal function or worsens with time[3]. Poor drainage on nuclear renography was highly correlated with the eventual need for surgical correction. Various surgical techniques of ureteral reimplantation have been described for correction of this disease. The authors would like to present the results after performing ureteral reimplantation combined with modified Lich-Gregoir antireflux procedure.

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Material and Method

A retrospective study was reviewed of 40 children, who had ureteric reimplantation for a primary obstructive megaureter from January 1994 to January 2004. Patients who had ureteropelvic junction obstruction, bladder diverticulum, and vesicoureteral reflux at the same side of the lesion were excluded from the study. All patients were operated on by 4 surgeons, using the same surgical techniques. Operative techniques included excision of stenotic distal ureter segment with or without tapering, reimplantation of ureter, anchoring suture, and antireflux procedure using modified Lich-Gregoir technique (Fig. 1)

The results of clinical presentation, associated urological diseases, indication for the operation, operative time, postoperative hospital stay and complications, and post operative follow up renal sonography, renogram and VCUG were presented.

Results

Demographic data:

There were 40 children. The most frequent clinical presentation was according to prenatal sono-

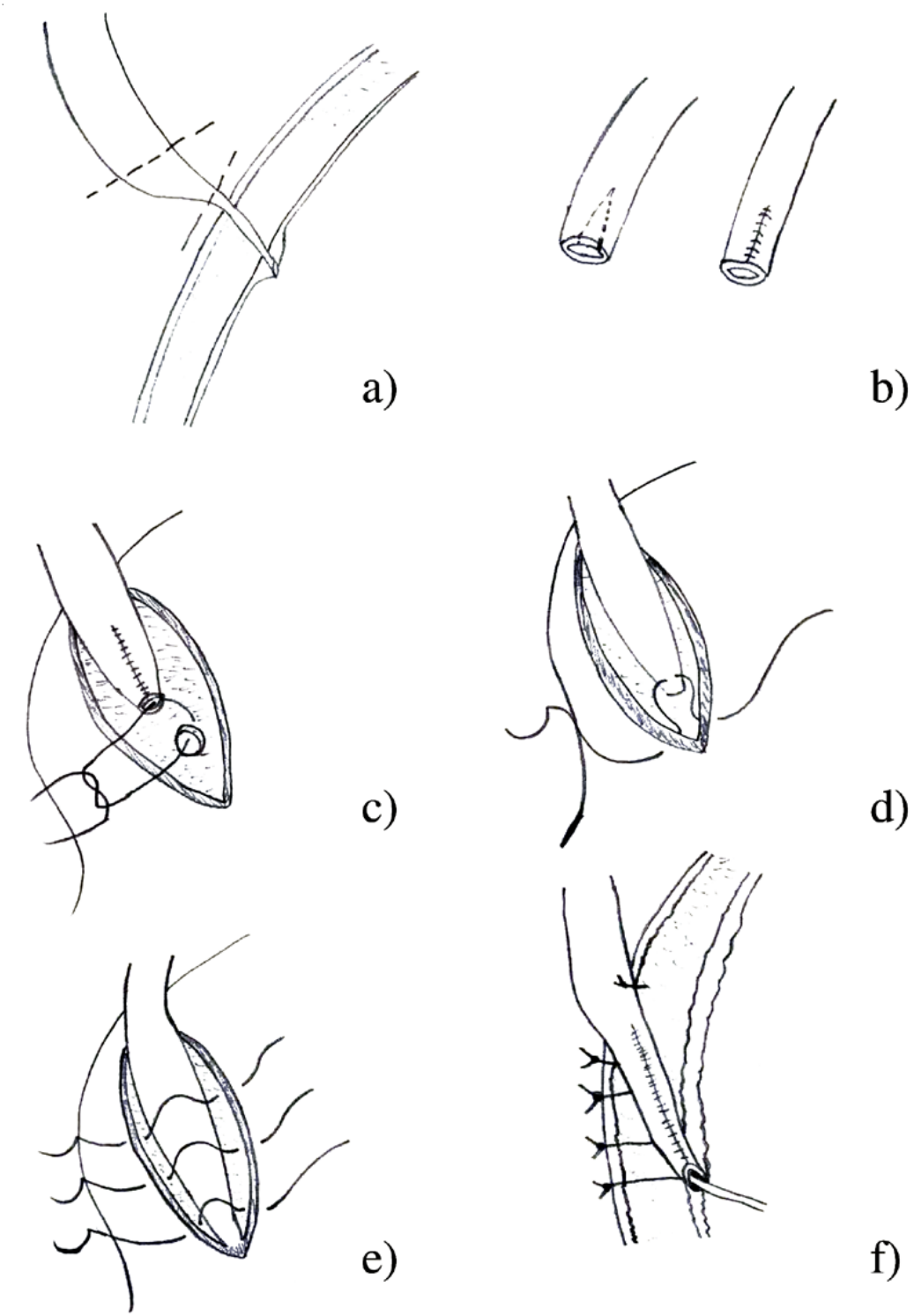

Fig. 1 Technique of ureteral reimplantation:
a) Resection of stenotic segment b) Tapering of ureter c) Ureter reimplantation d) Anchoring suture
e & f) Detrusorrhaphy:ureteral stent, suprapubic catheter and foley catheter are inserted via bladder incision

graphy diagnosis of hydronephrosis (34.6%), followed by routine postpartum sonography diagnosis of hydronephrosis (26.9%). Urinary tract infections were encountered in 23.1%, sonography diagnosis from other diseases, enuresis nocturna with abdominal cramp, and vomiting were found in 7.7%, 3.8%, and 3.8% respectively.

The authors found 31 children who had unilateral lesion, 13 on the right side and 19 on the left side and 9 children had bilateral lesions. Associated urological diseases were found in 11 patients (Table 1).

Perioperative and operative condition:

Preoperative renograms were performed at an average of 5.6 weeks before operation. 31 children had decompensate drainage situations. 3 children had relative renal function of the affected side less than 40%. Average MES (renal pelvis dilatation) from preoperative sonography was 14.03 mm.

The average age at the time of operation was 8.8 months (ranged from 1-53 months). All children were operated on by using the same surgical technique. Tapering of ureter was done in 34 children. Average time of operation was 259.6 minutes Indication for surgery is presented in Table 2.

Postoperative hospital stay was 20.1 days. Average time of retaining ureteral stent, suprapubic catheter, and foley catheter was 18.4 days, 19.0 days, and 12.9 days respectively. Wound drainages were taken off at the mean time of 7.7 days. Contrast studies via ureteral catheter were performed in 34 patients at the average time of 13.9 days. 22 children had rapid drainage, 4 children had normal drainage, 7 children had mildly delayed drainage, and 1 child had impaired drainage secondary to transient bladder mucosa edema. Perioperative complications are presented in Table 3.

Renogram was performed at an average of 12.1 months postoperatively. All children had compensate urinary drainage into the bladder, except one child whose renogram could not be interpreted due to impaired kidney function. In 3 children with primary obstructive megaureter with decreased preoperative renal function, 2 had improved renal function and 1 had worse renal function. Renal sonography at an average of 6.8 weeks postoperatively demonstrated reduced MES (renal pelvis dilatation) in 21 out of 25 patients. For the other 4 children, 2 demonstrated reduced MES in 22 weeks post operatively, the other 2 children had reduced MES at 22 weeks compared with MES at 6 weeks, but more than preoperative MES. In 1 child, however, renogram at 8 months postoperatively showed full compensate urinary drainage into the bladder with separate renal function 50:50.

Table 1. Associated urological disease

Associated urological disease	Number
Single kidney	3
Double collecting system	2
Posterior urethral valve	2
Vesicoureteral reflux (other side)	2
Ureterocele (other side)	1
Ureteropelvic junction obstruction (other side)	1
Multicystic kidney	1
Patent Urachus	1
Function loss kidney (other side)	2

Table 2. Indication for surgery

Indication for surgery	Number
Decompensate	30
Compensate with single kidney	2
Borderline compensate & single kidney	1
Compensate & function loss on the other side	1
Decompensate & impaired kidney function	2
Borderline compensate & impaired kidney function	1
Compensate & double collecting system	1
Borderline decompensate	2

Table 3. Perioperative Complications

Complication	Number
Accidental foley catheter lock off	9
Urinary tract infection	4
Transient ureter obstruction	2
Wound infection	1
Retained ureteral catheter segment	1

VCUG was performed at an average of 7.7 months postoperatively. VUR was found in 8 patients (22.9%) out of 35 patients. 7 children developed VUR at the same side of the operation. 3 VUR were treated successfully by conservative method. 2 patients received Deflux injection at 13 months postoperatively. 1 patient is waiting for follow up VCUG result. 2 children underwent nephroureterectomy at 14 months (VUR on the same side) postoperatively because of severe impaired kidney function and VUR. There was 1 child who developed VUR on the other side 6 years after the operation.

Discussion

Various surgical techniques have been proposed as therapy for primary obstructive megaureter. Patients with voiding dysfunction had a higher success rate if the ureteral reimplantation was performed through an intravesical approach[1]. From the presented data, the mean age at the time of operation was 8.8 months, that was less than other series[1,3], A high proportion of prenatal diagnosis of hydronephrosis from the present study could explain this difference.

The most common indication for surgery was decompensated obstructive megaureter, that is the T1/2 is prolonged more than 20 minutes from the renogram (after furosemide injection). This criteria corresponds with other authors[5,6]. However, children with impaired renal function or had only one kidney were admitted for earlier operation (borderline decompensated situation) to prevent renal damage. In 3 children who had a single kidney (2 had compensate renal function and 1 had decompensate renal function), postoperative urinary drainage into the bladder was improved (evidence from postoperative renogram), and there was no postoperative complication.

The operative time for ureteral reimplantation for this technique was 259.64 minutes. There are no previous reports about time of operation to compare with the present study[1,2,3]. However, our postoperative hospital stay was prolonged. The authors used suprapubic catheter, ureteral stent and Foley catheter instead of double J stent. Advantage for this approach is that, detection of ureterovesical junction obstruction can be done postoperatively and directly by measurement of pressure on ureteral stent and by contrast injection via ureteral stent. With this approach the authors could detect and early manage 2 children with transient bladder mucosa edema. Removal of these catheters needed no general anesthesia. However, the authors had 9 accidental locked off Foley catheter, and 1 suprapubic fragment retention that needed wound exploration.

In the authors' success rate, there was no postoperative VUR on the same side or VUR grade 1 that could be successfully treated by conservative treatment and no obstruction shown from the renogram, was 92%. This result can be comparable to other series[1,4]. The authors had no postoperative ureteral obstruction from intussusception of the reimplanted ureter, this should emphasize the importance of the anchoring suture.

Renal sonography at an average of 6.8 and 22 weeks demonstrated reduction in MES in 84% and 92% respectively. The authors' results also correspond with results from Aksnes, G et al[3] (about 70% reduction in hydronephrosis at 3 months). Renograms are also necessary to assess renal function and obstruction especially when renal sonography is equivocal.

Conclusion

Surgical techniques used in our hospital gave results comparable to other techniques previously described. Anchoring suture techniques is important to prevent ureteral intussusception that lead to postoperative ureteral obstruction. Renal sonography at 22 weeks (6 months) should show decreased in hydronephrosis if the operation was successful.

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ผลการรักษาของโรคท่อไตโป่งพองปฐมภูมิในเด็กโดยวิธีการผ่าตัด

อัครพล มุ่งนิรันดร์, ยูทา เซห์

การรักษาโรคหลอดไตโป่งพองปฐมภูมิโดยวิธีการผ่าตัดจะทำในผู้ป่วยที่มีอาการ เช่นติดเชื้อของไต หรือ มีนิ่ว จุดประสงค์ในการวิจัยคือ แสดงผลที่ได้รับจากการผ่าตัดในเด็กที่เป็นโรคท่อไตโป่งพองปฐมภูมิในระยะเวลา 10 ปี โดยวิธีเปลี่ยนตำแหน่งรอยต่อของท่อไตกับกระเพาะปัสสาวะ ร่วมกับการผ่าตัดป้องกันน้ำปัสสาวะไหลย้อน (โดยวิธีที่เปลี่ยนแปลงมาจากวิธีของลิช-กรีกรอย) ระยะเวลาการผ่าตัดเฉลี่ยคือ 259.6 นาที การผ่าตัดประสบผลสำเร็จร้อยละ 92 และไม่พบว่ามีท่อไตอุดตันหลังผ่าตัดจากการเกิดท่อไตกลืนกัน การตรวจด้วยคลื่นเสียงความถี่สูง ณ เวลาเฉลี่ย 22 สัปดาห์พบไตบวมน้ำลดลงร้อยละ 92 จึงสรุปว่าผลการผ่าตัดโดยวิธีดังกล่าวข้างต้นได้ผลดีใกล้เคียงกับผลการผ่าตัดโดยวิธีอื่น และการเย็บบริเวณรอยต่อของท่อไตและกล้ามเนื้อกระเพาะปัสสาวะจะสามารถช่วยป้องกันท่อไตกลืนกันได้