Cohen Transtrigonal Ureteric Reimplantation without Ureteric Splint or Cystostomy Drains

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Abstract

Objective: To review our experience in the outcome of children undergoing Cohen transtrigonal ureteric reimplantation without cystostomy tube or ureteric splint, just to keep urethral drain (Foley's) for 48 hours.

Material and Methods: Between July 2001 and July 2008, 67 patients who underwent ureteric reimplantation at King Hussein Medical Center and Queen Alia Military Hospital were included in this study. Those patients who needed extensive dissection, ureteric tapering, or had thickened bladder wall or neuropathic bladder were excluded. Data recorded included the procedure, operative and post operative pain, hospital stay, post hospital discharge problem and operative success.

Results: 67 patients 46 females, and 21 males, with mean age of 7.8 years (range from 1 to 14 years) there were 25 bilateral and 42 unilateral reimplantations, only Foley's catheter left in and no uretral stent or cystostomy drains were placed which was removed on the second post operative day. Caudal anaesthetic, oral and rectal analgesia were used for pain relieve, and all patients were discharged home within 48 hours of surgery.

Conclusion: Surgical repair of vesico-ureteric reflux can be successful with early bladder catheter removal and without ureteric splint or cystostomy drains and appears to be significant decrease in the hospital stay and discomfort after surgery.

Keywords: Cohen, Reimplantaion, Reflux, Cystostomy Drains.

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Introduction

Vesicoureteric Reflux (VUR) remains one of the most frequent conditions in pediatric urology, although the exact prevalence is largely unknown. VUR can be primary, secondary (e.g. to elevated bladder pressures in neurogenic bladders or dysfunctional voiding) and sometimes intermittent in nature, only disclosing itself when infection has possibly induced a degree of insufficiency of the ureterovesical junction.

It is generally assumed that VUR predisposes to urinary tract infections and that surgical treatment of reflux and prophylactic antibiotics are equivalent in terms of preventing infections and renal scarring. The relative merit of these interventions in the natural course of these conditions remains to some extent controversial. [1] Meanwhile, there are children who are reasonably managed with an open surgical procedure to reconfigure their vesico-uerteric anatomy. Since the 1950s, several surgical techniques have been developed for the correction of VUR.

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All techniques share the same basic principle of creating an anti-reflux mechanism by increasing the portion of the distal ureter lying in a submucosal tunnel between the detrusor muscle and the bladder mucosa. They offer comparable and very high success rates with few complications. [2] From a purely technical standpoint, these open techniques can basically be divided into two groups. There are those that involve mainly or entirely intravesical ureteral dissection (and hence a need for postoperative bladder drainage) and those that use a purely extravesical approach to the ureter without disconnecting it from the bladder. To the former group belong the techniques of Politano and Leadbetter (1958), Glenn and Anderson (1967), the psoas-hitch technique and the (most widely used) Cohen technique (1975). [3- 6] In these techniques, the ureter is disconnected from the bladder and reimplanted in a new and longer submucosal tunnel from the luminal side of the bladder. In the Cohen technique, a cross-trigonal tunnel is created bringing the ureter to the contralateral side, the other techniques result in a more natural course of the ureter, but are somewhat more prone to complications such as bowel injury or kinking of the ureter. The psoas-hitch technique is generally reserved for more complex situations as in mega-ureters or re-do surgery and is helpful in creating a longer tunnel. The conceptually different extravesical approach was popularized by Lich and Gregoir, reducing postoperative bladder irritation to insignificance, but predisposing to temporary bladder retention when performed bilaterally. [7, 8]

The more recent and certainly minimally invasive STING technique, where bulking agents are injected submucosally has gained wide acceptance. Undoubtedly, this is technically a very easy, relatively cheap and patient-friendly treatment modality, tempting many doctors into an increasingly pre-emptive approach to VUR, using it as first-line treatment in cases of (antenatally detected) high-grade reflux even in infants. [9] Success rates, even in low-grade reflux, are clearly lower than in open surgery and a second injection of bulking agent is often necessary. [10] Moreover, prospective randomized trials and long-term results are still not available.

The tendency to use this endoscopic technique as an alternative to medical treatment is underscored by the fact that since the Food and Drug Administration (FDA) approval of DefluxR the total number of procedures for reflux has increased, while open surgery rates have remained stable. [11]

All these facts and tendencies mentioned above in turn suggest that, at least for the foreseeable future, there will remain a group of patients in whom STING is deemed-or proves to be-insufficient. Open surgery on the other hand has its drawbacks as well due to its invasiveness. In an ideal world, physicians would be able to define very precisely and at the earliest possible point in time which group of patients with VUR is at increased risk for the complication of pyelonephritic scarring and which group is not. This would in turn allow a very tailored approach to each individual child with pre-emptive surgical measures in the group at risk. Failing this knowledge, the next best thing to aim for is to combine the superior results of time-honoured open procedures like a Cohen reimplantation or Lich-Gregoir operation with the much sought after minimal invasiveness of laparoscopy, possibly with the added ultra-precise tissue handling and dexterity of robotic surgery. These considerations are the driving force of the developments described in this text.

The duration of hospital stay after surgery is apparently directly related to the duration of catheterization. [12, 13]

Furthermore, the catheter is frequently responsible for bladder spasms, which are both painful and difficult to control, and thus a significant cause of morbidity associated with ureteric reimplantation. [14]

There have been previous attempts to promote the early discharge of patients who have undergone ureteric reimplantation, particularly by modifying the approach, the lich-gregoir extra-vesical procedure is considered to be possible with no bladder catheterization, although not so confidently with bilateral procedure. [15]

Patients and Methods

Between July 2001 and July 2008, 67 patients underwent ureteric reimplantation by the senior author in pediatric surgical department at King Hussein Medical Center and Queen Alia Military Hospital using the Cohen transtrigonal technique with Foley's catheter for 48 hours post operatively without any other suprapubic bladder drains or ureteric stent, but those patients who needed extensive dissection, ureteric tapering, or had thickened bladder wall or neuropathic bladder were excluded from the study because these cases need more drains and staying more time in the hospital. Data recorded, Table (1) included the procedure, operative and post operative pain, hospital stay, post hospital discharge problem and operative success.

Table (1): The details of the patients.

No.	Age (years)	Sex	Diagnosis	Surgery	Stay after surgery, (days)
1	1	F	VUR	Left	2
2	3	M	VUR	bilateral	2
3	10	M	VUR	left	2
4	8	F	VUR	bilateral	2
5	2	M	VUR	left	2
6	5	F	VUR	left	2
7	2	F	VUR duplex	Right 2	2
8	1	F	VUR	right	2
9	8	F	VUR	bilateral	2
10	1	M	VUR	right	2
11	6	M	POM	left	2
12	2	F	VUR	bilateral	2
13	7	F	VUR	left	2
14	7	F	VUR	bilateral	2
15	6	F	VUR	bilateral	2
16	5	F	VUR	right	2
17	6	M	VUR	left	2
18	5	F	VUR	right	2
19	4	M	VUR duplex	Bilateral 4	2
20	7	F	VUR	right	2
21	7	F	VUR	Bilateral	2
22	11	F	POM	left	2
23	3	F	VUR duplex	Bilateral 4	3
24	2	M	POM	right	2
25	10	F	VUR	left	2
26	11	F	VUR	bilateral	2
27	5	M	VUR	bilateral	2
28	1	F	VUR	left	2
29	3	M	POM	bilateral	2
30	10	F	VUR	left	2
31	9	F	POM	bilateral	2
32	2	M	VUR	left	2
33	5	F	VUR	left	2
34	2	F	VUR	right	2
35	5	F	VUR	right	2
36	8	F	VUR	bilateral	2
37	12	F	VUR duplex	Right 2	2
38	9	M	VUR	left	2
39	2	F	VUR	bilateral	2
40	7	F	VUR	left	2
41	8	F	VUR	bilateral	2
42	6	F	VUR	right	2

43	*1*	*F*	*VUR*	*bilateral*	*2*
44	*6*	*M*	*POM*	*left*	*2*
45	*9*	*F*	*VUR*	*right*	*2*
46	*10*	*M*	*VUR duplex*	*Bilateral 4*	*2*
47	*7*	*F*	*VUR*	*left*	*2*
48	*3*	*F*	*VUR*	*bilateral*	*2*
49	*1*	*M*	*VUR*	*left*	*2*
50	*3*	*F*	*VUR duplex*	*bilateral*	*3*
51	*2*	*M*	*VUR*	*right*	*2*
52	*10*	*F*	*VUR*	*left*	*2*
53	*11*	*F*	*VUR*	*bilateral*	*2*
54	*5*	*M*	*VUR*	*right*	*2*
55	*7*	*F*	*VUR*	*left*	*2*
56	*8*	*M*	*POM*	*bilateral*	*2*
57	*10*	*F*	*VUR*	*left*	*2*
58	*8*	*M*	*VUR*	*bilateral*	*2*
59	*4*	*M*	*VUR*	*Left 2*	*2*
60	*5*	*F*	*VUR duplex*	*right*	*2*
61	*5*	*F*	*VUR*	*right*	*2*
62	*6*	*F*	*VUR*	*bilateral*	*2*
63	*8*	*F*	*VUR*	*Right 2*	*2*
64	*12*	*F*	*VUR duplex*	*Right 2*	*2*
65	*9*	*M*	*POM*	*left*	*2*
66	*2*	*F*	*VUR*	*bilateral*	*2*
67	*7*	*F*	*VUR*	*left*	*2*

Results

The total number of the patients were 67, 46 females (68.7%), and 21 males (31.3%), with mean age of 7.8 years (range from 1 to 14 years) there were 25 bilateral (37.3%) and 42 unilateral (62.7%) reimplantations, eight patients had ureteral duplication (five unilateral and three bilateral) only Foley's catheter left in and no uretral stent or cystostomy drains were placed which were removed on the second post operative day, table (1). Caudal anesthetic, oral and rectal analgesia were used for pain relieve, and sometimes we used Ditropan for bladder spasm, all patients were discharged home within 48 hours of surgery, except two patients (2.9%) needed one day more in the hospital because they were unable to void after removal of the Foley catheter and had no further complication. We keep all of our patients on prophylactic oral antibiotics for three months till proved by MCUG there is no more vesico-ureteric reflux, but follow up pelvic U\S were performed four weeks and DMSA scan six months after surgery.

We followed all of our patients for (1-2 years) post surgery, three female patients (4.4%) developed urinary tract infection and they were treated successfully by oral antibiotics.

Recurrence of vesic-ureteric reflux was found in one patient (1.4%) requiring re-operation, so the success rate was (98.6%).

Discussion

There are few reports on managing ureteric reimplantation with minimal bladder catheterization, even though the first report was published in 1981. [16] For the 82 patients in that report, the postoperative stay was reduced from a median of 8 days to a median of 4 days.

The authors concluded that the patients appeared to have less discomfort, which allowed for a markedly shorter hospital stay. We did not use ureteric stents in any of the present patients but we advocate their use when the ureter is 'tailored'. [16]

Of the 87 ureteroneocystostomies 82 were successful, with reflux persisting in five ureters of four patients. In the present series, all those who had sufficient follow-up had resolution of either obstruction or VUR and, apart from the need for urethral catheterization, no patient had a complication attributable to not using a suprapubic catheter.

To achieve these results, it is obviously important to close the bladder meticulously, for which we used a double-layer closure of 3/0-polyglycolic acid.

More recently, Brandell and Brock [17] reported a series of 34 patients managed with minimal bladder catheterization with no complications, reducing their length of stay for VUR surgery from 5.4 days to 2.7 days. Also, analgesic doses were reduced from 16.4 to 8.2 per patient, with a cost saving of 20%. They concluded that urethral catheters are not only unnecessary but may also increase morbidity. They had originally intended to conduct a randomized control study investigating the use of catheters in reimplantation surgery, but abandoned this trial stating 'we could no longer continue randomization because of remarkable improvement in the postoperative course'. [17] A further study of minimal catheter use after reimplantation was conducted by McCool and Joseph. [18] They undertook transvesical ureteric reimplantation in 145 girls and 41 boys, with a trend to shorter urethral catheterization, with removal after 2.71 days in the first year of the study, declining to 1.18 days during the last year. Their protocol varied from the present in the use of a short duration of urethral catheterization and in the use of a Penrose drain in the prevesical space, which seems unnecessary. [18] Their patients had similar analgesia use to the present, with either continuous or single-dose caudal anesthesia. [19] Lapointe et al. [15] reported the use of the extravesical Lich-Gregoir procedure for 256 children in whom they used a Foley urethral catheter for only 12-36 h. That study comprised of 385 units with VUR, including 41 duplex systems, and resulted in retention in 12 children (with bilateral reimplants).

The retention was managed with urethral catheterization of less than one week. The hospital stay after surgery was 1-3 days, which we achieved with both unilateral and bilateral reimplantation using the Cohen operation. Similarly, Marotte and Smith [12] described 44 patients undergoing extravesical reimplantation as an outpatient procedure. A urethral catheter was only used in patients with bilateral reimplantation (22 of 23 bilateral reimplants). Seven patients went home with a catheter in situ.

They reported a 92% resolution of reflux and found that the hospital stay was significantly longer in patients with catheters (20.3 vs 12.0 h). They attributed the low incidence of bladder spasm and pain to the extravesical approach being a 'less morbid surgical procedure compared to intravesical reimplantations'. [12] We would suggest that the reduction in morbidity was rather a result of minimal catheter use and that comparable results are possible with an intravesical approach, taking advantage of the higher reflux resolution rates afforded by the Cohen procedure. [20] In contrast to those attempting brief urethral catheterization, Kennelly et al. [20] reported on the crosstrigonal reimplantation of 182 renal units, with a mean operative duration of 180 min and hospital stay of 5.6 days. They used a urethral catheter in most patients and a suprapubic tube in 20%, mainly boys (17 of 18), leaving the catheter until gross haematuria had cleared. [20] It is possible that haematuria is related to the presence of the catheter and the resultant bladder spasms.

In conclusion, surgical repair of vesico-ureteric reflux can be successful with early bladder catheter removal and without ureteric splint or cystostomy drains and appears to significantly decrease the hospital stay and discomfort after surgery.

Indeed, it is possible that the patient is more comfortable not having a bladder catheter. To validate this approach, a prospective study to compare a catheter-less procedure with urethral catheterization for 12-36 h would be appropriate.

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إصلاح كوهين بإنشاء نفق أورترل وتوجيهه أفقيا عبر تريغن نحو الحالب المقابل دون نزيف المثانة

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الملخص

الهدف: لمراجعة خبراتنا في نتائج الأطفال الذين أجريت لهم عمليات إصلاح كوهين بإنشاء نفق أورترل عبر تريغن دون نزيف المثانة ونزيف الحالب واستخدام قسطرة فوليس لمدة ثمان وأربعين ساعة.

المرضى والطرق: تم مراجعة سبعة وستين ملفاً لمرضى أجريت لهم عمليات إصلاح كوهين في مستشفى مدينة الحسين الطبية ومستشفى الملكة علياء العسكري في الفترة ما بين أيلول 2001 وأيلول 2008 وتم استثناء المرضى الذين كانوا بحاجة إلى إعادة تقييف الحالب والمرضى الذين يعانون من مثانة عصبية أو تضخم في جدار المثانة، وتضمنت المعلومات نوع العملية وشكوى المرضى من الألم أثناء العملية وبعدها وكذلك فترة بقاء المرضى في المستشفى ومضاعفات العملية ونجاحها.

النتائج: عدد المرضى الإجمالي سبعة وستون منهم ستة وأربعون من الإناث وواحد وعشرون من الذكور حيث بلغ متوسط المرضى(7,8) سنة، (25) مريضاً أجريت لهم عمليات إصلاح كوهين على الجانبين و(42) (على جانب واحد بإنشاء نفق أورترل عبر تريغن دون نزيف المثانة ونزيف الحالب واستخدام قسطرة فوليس لمدة ثمان وأربعين ساعة، تم استخدام بنج موضعي في منطقة العجز مع استخدام مسكن عن طريق الفم او الشرج، جميع المرضى غادروا المستشفى خلال يومين بعد العملية.

الخلاصة: عملية اصلاح الجزر المثاني الحالبي بواسطة الجراحة تتم بنجاح دون استخدام نزيف المثانة ونزيف الحالب وازالة قسطرة فوليس بعد ثمان وأربعين ساعة من العملية مع تقليص فترة بقاء المرضى في المستشفى وتخفيف معاناتهم بعد العملية.

الكلمات الدالة: كوهين، إعادة زراعة الحالب، ارتداد، نزيف المثانة.