

# Treatment of Vesico-ureteric Reflux

## Preliminary Report of A Retrospective Study

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### SUMMARY

*Twenty two children and four adults with obstructive and non-obstructive Vesico-ureteric reflux (VUR) treated in Shaikh Zayed Hospital over a period of 3½ years were studied retrospectively. Preliminary results in 22 children and 4 adults with 43 refluxing ureters are presented. Majority of children with reflux Grade I-III were treated conservatively with antibiotic prophylaxis. Reimplantation was carried out in 12 ureters, antibiotic prophylaxis treatment in 9 ureters and 22 ureters were treated by preliminary minor surgical procedures and then conservative chemoprophylaxis. Conservative management of reflux Grade IV and V seems to be less successful than surgery. The results of conservative, non-surgical treatment of reflux Grade I to III are satisfactory, but for Grades IV and V reflux surgery seems to be the treatment of choice, if detrusor instability can be excluded.*

### INTRODUCTION

During the last 30 years an increasing volume of clinical and experimental data has been reported on the clinical management of vesico-ureteric reflux (VUR)<sup>1</sup>. When VUR in children was discovered through cystography, it was believed that the surgical cure of reflux was a promising way of treating urinary tract infection and its complications<sup>2</sup>. Re-implantation of refluxing ureters was therefore considered to be the best form of treatment. In the last 10 years however, the management of VUR has become more controversial and it is difficult to decide on the best form of treatment.

Scott (1972)<sup>3</sup> appraised the management of VUR and suggested that management should depend on an immediate and in many cases a continuing assessment of the clinical and radiological features presented by each individual patient. Features such as the sex of the child, the age at onset of symptoms, duration of symptoms, pyelographic appearance of the kidneys, extent of the reflux, presence of other urinary tract abnormalities, state of the urine and the renal function should all be taken into account in the immediate analysis. When there is reflux with severely dilated and tortuous ureters, gaping ureteric orifices and evidence of pyelonephritic scarring in a child whose symptoms began at an early age, surgery should be

seriously considered, but the children who do not fall in this category should be given a trial of antibacterial treatment in the first instance.

In 1980 the International Reflux Study Committee (IRSC) started a prospective clinical trial in which a random comparison was made between the surgical and non-surgical treatment of Grades-II and IV reflux<sup>1</sup>.

Conservative management was advocated in Grades I and II. However, with the critical appraisal of Scott (1972)<sup>3</sup> and the knowledge that spontaneous cessation of VUR has been documented in many series as background, we preferred non-surgical treatment not only in international Grade I and II but also in Grade III where primary obstructive causes can be managed by minor surgical procedures. This retrospective study was performed to evaluate the results of different treatments in patients with VUR treated over 3 1/2 years.

### SUBJECTS AND METHODS

Between June, 1987 and December 1990, 22 children (15 boys and 7 girls aged between 2 years and 12 years; mean age 6.3 years) and 4 adults (age between 18 years and 42 years; mean age 25 years) were treated. 10 patients had obstructive VUR and non-obstructive VUR was present in 16 patients as shown in Table 1. In 17 patients the reflux was

bilateral and in 9 patients there was unilateral reflux.

**Table 1: Obstructive and non-obstructive V.U.R.: 26 patients.**

Age group	Age (years)	No.	Male	Female	Refluxing Ureters
Children	2-12	22	15	7	37
Adults	18-42	4	4	0	6
Total		26	19	7	43

**Table 2: Mode of presentation.**

Symptoms	Number
Lower urinary tract symptoms	05
Upper urinary tract symptoms	18
Renal Failure	03

Mode of presentation in these 26 patients is given in Table 2. These patients were evaluated with voiding cystourethrogram, ultrasonography, Tc<sup>99</sup> DMSA isotope renal scan and intravenous urography. Routine laboratory investigations including hemoglobin, total leukocyte count, urine analysis/culture, blood urea nitrogen, creatinine and serum electrolytes were done. These investigations were repeated at 1, 3 and 6 months. In a few of these patients these investigations were also done at 18 months and 3½ years if the reflux was still present. Cystourethroscopy was performed in all cases. The first voiding cystourethrogram was done at presentation, after one month and then after the last urinary tract infection. A 10 Fr Foley's catheter or 8 Fr. infant feeding tube was used for instillation of contrast into the bladder in children and 18 Fr Foley's catheter for voiding cystourethrogram was used in adults. The patient was awake, in supine position and contrast material at room temperature was instilled with a bladder syringe. The bladder was filled, then catheter/infant feeding tube was clamped. Three films were usually taken, the first immediately at complete filling of the bladder, the second during voiding and the third after voiding. In the very small children VCUG was performed in operation theater under general anaesthesia, using

image intensifier. Contrast material in these children was put in either using the supra-pubic cystostomy catheter or per urethra using the infant feeding tube.

Reflux was graded according to the IRSC system<sup>4</sup>.

- Grade I:** The reflux into ureter only  
**Grade II:** Reflux into upper tract (pelvis and calyces) without dilatation.  
**Grade III:** Mild to moderate dilatation, but minimal blunting of calyces.  
**Grade IV:** Moderate dilatation. Loss of angles of fornices. Papillary impressions in calyces still present.  
**Grade-V:** Gross dilatation and tortuosity, and the impression of papillae no longer visible.

Kidney function was also evaluated in some patients with renal scan and intravenous urography.

Grade V reflux was treated primarily by reimplantation, when the general physical condition of the child allowed such surgical management. Grade IV reflux in the majority of our patients was treated by preliminary minor surgical procedures, to treat the obstructive element initially and then by prophylactic antibiotics. Reflux grade I, II and III were treated primarily by non surgical methods.

## RESULTS

The age and sex distribution of the 26 patients included in the study is shown in Table 1. There were total 22 children, 15 male and 7 female, with 37 refluxing ureters. All 4 adults were male patients. Their modes of presentation are depicted in table 2. Majority of patients (18) presented with clinical features of acute pyelonephritis. These patients had fever loin pain dysuria and vomiting. 3 patients with grade V reflux presented with advanced chronic renal failure. Five patient had lower urinary tract symptoms like poor stream, dribbling, frequency and dysuria. Different treatment modalities performed and their results are depicted in Table 3. In 5 children with 9 refluxing ureters, the primary treatment was conservative anti-bacterial management. Anti-bacterial treatment led to the complete disappearance of reflux in 7 (77.7%) of 9 ureters with reflux Grades I & II and in 2 (22.2%) of 9 ureters the reflux diminished from Grade-II to Grade-I. There was no break through symptomatic urinary tract infections noted in any of these children. On follow-up investigations their renal functions remained stable.

**Table 3: Results of different treatments in 43 refluxing ureters.**

Treatment	Pre-treatment Reflux Grade	No. of Ref. Ureters	Follow up Post-treatment Ref. grade					
			0	I	II	III	IV	V
Conservative	I	1	1	0	0	0	0	0
	II	8	6	2	0	0	0	0
Minor Surgery Antibiotics	I	0	0	0	0	0	0	0
	II	2	2	0	0	0	0	0
	III	10	5	3	2	0	0	0
	IV	4	2	1	1	0	0	0
	V	6	0	0	0	0	0	6
Primary Surgery	IV	9	9	0	0	0	0	0
	V	3	2	0	0	0	0	1*

\*underwent nephro-ureterectomy.

Primary surgery (Re-implantation of ureters) was carried out in 10 patients with 12 refluxing ureters. 9 of these had grade IV and 3 had grade V reflux. Reimplantation surgery was successful in all patients with grade IV reflux and 2 patients with grade V reflux. In one refluxing ureter with reflux Grad V, because of poor renal functions and persistent reflux on the same side, secondary nephro-ureterectomy was performed. The different surgical procedures done in these patients are shown in table 5. The results of 11 patients (22 refluxing ureters of Grade II to V) treated by preliminary minor surgical procedures and then followed by conservative antibacterial therapy are also given in table 3. The minor surgical procedures done in these patients are given in table 4. Endoscopic resection of posterior urethral valves was necessary in 7 patients (14 refluxing ureters with reflux Grade-II & V). Suprapubic cystostomy in 2 patients (4 refluxing ureters of reflux Grade-III). Vesico-lithotomy in one patient (2 ureters of reflux Grade IV), and bilateral percutaneous nephrostomy in one patient (2 ureters of reflux Grade V). Among these 11 patients, 3 patients (6 ureters reflux Grade V) presented initially with chronic renal failure and were not fit for any major surgical procedure. Two of them died in hospital due to septicemia. The third child with reflux Grade V and CRF is still alive. Out of remaining 16 refluxing ureters, reflux resolved completely in 9 (56.25%) and partially in 7 (43.75%) after a period of further conservative anti-bacterial therapy for 12 weeks to 72 weeks. None of these 16 ureters with reflux Grade II to IV needed re-implantation surgery (Table 3).

**Table 4: Preliminary minor surgical procedures.**

Procedure	Number of patients
Endoscopic resection of posterior urethral valves	7
Suprapubic Cystostomy	2
Vesicolithotomy	1
Bilateral percutaneous nephrostomy	1

### I.V.U. Findings

Renal scars were found on the initial I.V.U. in only five of the 26 patients and during follow-up new scars developed in only 2 patients. In the conservatively managed group of 5 children the I.V.U. deteriorated slightly in one case with reflux grade II and a single scar developed. During the follow-up period slight dilatation of ureters were noted but later on reflux diminished to grade-I.

**Table 5: Primary surgical procedure.**

Procedure	Number of patients
Anti-reflux uretero cystostomy of vertex of bladder	6
Cohen Technique	1
Led Better Politano Technique	3



In the surgically treated group (10 patients), a single new parenchymal scar was noted in one patient with reflux grade V. Initially there were 9 greatly dilated and 2 moderately dilated ureters. Post-operatively slight dilatation was seen in only three ureters and moderate dilatation in 2 ureters

**Renal scan and serum creatinine**

The renal scan showed changes only in 4 kidneys. Slight deterioration in function up to 10% was seen in 2 kidneys while slight improvement was noted in the remaining 2 kidneys. 2 patients showed slightly elevated serum creatinine levels initially but during follow-up after treatment, the values became normal. In 3 patients the serum creatinine levels remained elevated throughout, as they were in CRF. In another case the slight elevation in serum creatinine level persisted post-operatively, together with poor function on the renal scan and persistent Grade V reflux. This patient underwent nephroureterectomy of the poor functioning kidney

**Urinary infection and hypertension**

In the conservatively managed group, the urinary tract infections were successfully treated in all. In the surgically treated group there was only one case with post-operative urinary tract infection and persistent grade V reflux in the same ureter. In most of these cases the anti-bacterial prophylaxis was stopped. No hypertension was noted in either group at the initial examination or during follow-up.

**DISCUSSION**

At the present time the results of conservative treatment of refluxing ureters of grades I, II and III are satisfactory and we feel that they justify conservative management, since reflux disappeared in 77.7% of these ureters in the majority of our patients within 18 months of treatment and a new renal scar developed in only one case. Persistent urinary tract infection was not noted in any of these cases treated conservatively. The findings of the renal scan provided little useful information. For reflux Grade-IV and V surgery seems to be the treatment of choice, since in all 12 operated ureters with reflux grade IV & V, the reflux was cured in 11 ureters and anti-bacterial treatment was stopped after 12 weeks of treatment. In only one case a new renal scar was seen on follow-up IVU. Our results

are comparable with the other reports.(Tables 6, 7). The success or failure of the results of reflux surgery will also depend upon the status of the caliber of ureter and bladder functions.

**Table 6: Literature review.**

**Distribution of grades of reflux and spontaneous resolution among 844 refluxing ureters**

Grade of Reflux	Occurrence (%)	Spontaneous Resolution (%)
I	7	83
II	53	60
III	32	16
IV	6	00
V	2	00

(Data from the Children's Hospital National Medical Center Washington DC, Presented by S.J. Skodg and Belman at the 55th Annual Meeting of the American Society of Paediatrics.

**Table 7: Comparison of results of 4 antireflux procedures.**

Procedure	No. of Ureters	Satisfactory (%)	Failure (%)
Bischoff	15	70	30
Paquin-Williams	52	50	50
Politano-Lead Better	17	90	10
AUVB	824	96	4
This Study	12	91.6	8.4

In the remaining 31 ureters of reflux grade ranging from Grade I-II in 9 ureters and Grade II-V in 22 ureters who were managed conservatively. Reflux completely disappeared after a prolonged treatment of conservative management in a total of 16 refluxing ureters with 51.6% successful results. This was seen in 7 ureters of reflux Grad I-II and in 9 ureters of reflux grade II-V treated conservatively on antibacterial chemotherapy and after preliminary minor surgical procedures and then followed up with anti-bacterial therapy. While in 9 refluxing ureters treated conservatively, the reflux grade diminished to lower grades, (I-II) from higher grades (II-V) thus achieving a total of 80% success in 31 refluxing ureters. In the remaining 6 refluxing ureters (3

patients) all with reflux grades V and presented in CRF two patients died during conservative management in Hospital and one patient is still alive on this treatment. These results confirm that non-surgical management has a role in the treatment of VUR particularly in low grade reflux (international grades I-III) with a non-dilated ureters in which the chance spontaneous regression and cessation is greatest. If there are urinary tract infections, continuous anti-bacterial treatment is indicated, but trouble-some break-through infections or worsening reflux may be best treated by surgical intervention. In high grade reflux (international Grade IV and V), surgery must be seriously considered, assuming that the reflux is not caused or exacerbated by infection or urodynamic dysfunction of the bladder.

In recent years, attention has been focused on the investigation of reflux to have a video-urodynamic examination, in which filling and voiding cystometry is performed in standard way, while the urinary tract is visualized intermittently by fluoroscopy and recorded on video tape. All children with reflux grades I, II & III on this examination receive antibacterial treatment in the first instance<sup>5</sup>. Surgical treatment is adopted in reflux grades IV and V provided detrusor instability has been excluded. If there is detrusor instability however, anticholinergic drugs and antibacterial treatment are given in all grades of reflux and the video-dynamic examination is repeated after 3 and 6 months of therapy. In cases where reflux grades IV or V persist, surgery is considered. Ureteric re-implantation is the mainstay of surgical treatment. The cross trigonal advancement procedure devised by Cohen is the operation favoured by Paediatric Urologists. In a comparative study of 100 Led-better Politano operations (until recently the standard procedure) and 1200 Cohen operations it was concluded that the Cohen procedure was more effective in stopping reflux (97% Vs 91%) but, more importantly, none of the Cohen procedure resulted in obstruction at the uretero-vesical junction in contrast to 3% incidence of this complication in Led better Politano operations. In some instances, other operative procedures may be more appropriate, like cutaneous vesicostomy for the infant with gross reflux, nephro-ureterectomy to remove a grossly scarred refluxing unit or trans-uretero-ureterostomy for the failed re-implant.

An alternative to open surgery has recently been devised by O'Donnell and Puri<sup>8</sup>. Their

technique of endoscopic correction entails cystoscopy and the submucosal injection of a bolus of teflon paste beneath the ureteric orifice. Although the technique is relatively simple and highly effective, but some concern has been expressed, about the possible migration of teflon particles to the distant sites through lymphatics.

## CONCLUSION

Vesico-ureteric reflux can be identified in approximately one third of children during investigations for urinary infection. The symptoms of urinary infection in infants are often non-specific and difficult to distinguish from other causes of febrile illness. The evaluation of an infant with unexplained symptoms should always include urine microscopy and culture. Reflux in girls is most often associated with an underlying abnormality of bladder function. Renal scarring which is a cause of hypertension and chronic renal failure in later life is believed to result from intra-renal reflux of infected urine. Treatment is aimed at preventing recurring symptomatic infections and reducing the risk of renal scarring and this can take the form of surgery or medical measures to maintain a sterile urine. Prospective controlled studies have failed to identify a convincing advantage of one form of treatment over the other.

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