Unilateral Ureteral Reimplantation and Management of Contralateral Low Grade or Resolved Vesicoureteral Reflux

William DeFoor* and Lori Hazelwood

From the Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio

Abbreviations and Acronyms

C-VUR = contralateral vesicoureteral reflux
LOS = length of stay
UR = ureteral reimplantation
UTI = urinary tract infection
VCUG = voiding cystourethrogram
VUR = vesicoureteral reflux

Accepted for publication May 6, 2014.

Study received institutional review board approval (No. 2008-1467).

* Correspondence and requests for reprints: Division of Pediatric Urology, Cincinnati Children's Hospital Medical Center, 3333 Burnet Ave., Cincinnati, Ohio 45229-3039 (telephone: 513-636-6758; FAX: 513-636-6753; e-mail: bob.defoor@cchmc.org).

Purpose: New contralateral vesicoureteral reflux after unilateral ureteral reimplantation is well described in the literature. Management of high grade vesicoureteral reflux with resolved contralateral reflux is less extensively studied. Most surgeons perform a bilateral procedure in these cases. We report the results when an open procedure was deferred on the contralateral side.

Materials and Methods: A retrospective cohort study was performed of all patients with unilateral vesicoureteral reflux undergoing ureteral reimplantation performed by 1 surgeon between 2003 and 2012. Resolved or low grade contralateral reflux was observed if the kidney was normal. Dextranomer/hyaluronic acid copolymer injection was also offered for persistent grade I contralateral reflux. Outcomes were abstracted from the medical record and compared to those in patients undergoing bilateral ureteral reimplantation.

Results: Of 78 patients undergoing unilateral ureteral reimplantation 15 met inclusion criteria. Median age was 5.5 years, and median followup was 7.6 years. Extravesical detrusorrhaphy was performed in all cases. The 15 study patients initially had contralateral reflux that either resolved (8) or persisted as grade I (7). Six patients had results on 2 cystograms that were negative for contralateral reflux before ureteral reimplantation. Length of stay was 1 day less and costs were 59% lower for patients undergoing unilateral vs bilateral ureteral reimplantation. Postoperatively 2 of 15 patients (13%) had an afebrile urinary tract infection. All 15 patients had normal contralateral kidneys on postoperative ultrasound.

Conclusions: Observation of contralateral resolved or low grade vesicoureteral reflux at unilateral ureteral reimplantation is feasible, with minimal morbidity and a shorter hospital stay compared to performance of bilateral ureteral reimplantation. This approach appears to be a reasonable option to discuss with parents during preoperative counseling.

Key Words: cystostomy, ureterostomy, urinary bladder, vesico-ureteral reflux

VESICOURETERAL reflux occurring de novo in the contralateral ureter following unilateral ureteral reimplantation has been well documented in the literature.[1–3] New vesicoureteral reflux in the contralateral moiety has been reported in 6% to 18% of patients after successful unilateral ureteral reimplantation.[4–6] The low incidence and generally benign course of new contralateral reflux have not warranted routine bilateral surgical intervention. However, when there is a history of resolved reflux in the

0022-5347/14/1925-1508/0
THE JOURNAL OF UROLOGY®

http://dx.doi.org/10.1016/j.juro.2014.05.025
Vol. 192, 1508-1512, November 2014
Printed in U.S.A.

contralateral kidney, many surgeons will routinely perform bilateral ureteral reimplantation. Outcomes in this clinical scenario have been less extensively reported.[7–9] We present outcomes in children with unilateral vesicoureteral reflux who had low grade or resolved reflux of the contralateral kidney that was not treated with an open surgical procedure at unilateral reimplantation. We hypothesized that contralateral ureteral reimplantation in this setting can be forgone safely.

MATERIALS AND METHODS

A retrospective cohort study was performed of all patients with unilateral primary VUR choosing open surgical intervention by a single surgeon between October 2003 and June 2012. Institutional review board approval was obtained to perform retrospective chart reviews. To be included in the study, patients had to have a diagnosis of primary VUR treated with unilateral ureteral reimplantation in the presence of contralateral low grade or resolved VUR. For the purpose of this study low grade reflux was defined as grade I. Exclusion criteria were diagnoses of secondary VUR due to posterior urethral valves, neuropathic bladder, Eagle-Barrett syndrome and ectopic ureteroceles. In addition, patients undergoing extensive ureteral tailoring (megaureter repair) were excluded. Patient demographics, preoperative evaluation, radiographic imaging, operative details and surgical outcomes were abstracted from the medical record.

The primary outcome was the incidence of febrile urinary tract infections postoperatively as a proxy for recurrent vesicoureteral reflux. Secondary outcomes such as hospital costs and LOS data were obtained from administrative hospital databases and were compared to a cohort of patients undergoing bilateral extravesical ureteral reimplantation by the same surgeon during the same period. Descriptive statistics and univariate analyses were performed using Stata®. Comparisons of means were analyzed with a t-test, and statistical significance was considered if the p value was less than 0.05.

After diagnosis of VUR all patients were initially treated with antimicrobial chemoprophylaxis and watchful waiting. Semiannual renal and bladder ultrasounds and annual VCUGs were scheduled during the observation period. Careful tracking of renal growth and active surveillance for new renal scarring were conducted at each clinic visit. Renal cortical scans were ordered selectively if there was evidence of renal injury by ultrasound. Typically cases involving breakthrough febrile UTIs and progressive upper tract injury were considered to have failed medical management. Options for surgical treatment (open and endoscopic) were then presented to the patients. Open surgical intervention was also offered to those with higher grades of reflux (III to V) who had nonresolution following a period of conservative management or if there was strong parental preference. In addition, a small number of patients with grade II reflux were offered surgical correction if they had significant nephropathy as evidenced by renal cortical scan and/or ultrasound. Throughout conservative management, associated bladder and bowel dysfunction was addressed as needed.

A single surgeon performed all ureteral reimplantations using an extravesical detrusorrhaphy technique, as described previously.[10] Cystoscopy was performed at all procedures to assess for undiagnosed ureterocele or ectopic ureter and to rule out bladder inflammation. Briefly the procedure involved complete mobilization of the distal ureter from the peritoneal reflection to the vesicoureteral junction. A detrusorrhaphy incision was created in the bladder muscle along the expected line of the ureter, and bladder flaps were developed, leaving the underlying mucosa intact. A tunnel length-to-ureteral diameter ratio of 5:1 was planned. Two advancing vest type sutures were then placed with interrupted 4-zero polyglactin sutures, with careful attention to avoid angulation of the vesicoureteral junction. The detrusor defect was then closed with interrupted 3-zero polyglactin sutures. No ureteral stent or perivesical drain was used. Postoperatively patients were left with an indwelling urethral catheter for 24 hours. Patients were discharged home when tolerating oral intake and comfortable on oral analgesics.

Patients with contralateral resolved or low grade VUR were observed nonoperatively if 2 conditions were present, ie the contralateral kidney was normal by ultrasound and/or renal cortical scan (if performed), and there was no clinical history of pyelonephritis on the resolved side. For persistent contralateral grade I VUR a dextranomer/hyaluronic acid injection at UR was offered as an option if parents were uncomfortable with nonoperative observation. During the study period no patient in the bilateral UR cohort underwent surgical correction of a ureter with resolved or grade I C-VUR.

Renal and bladder ultrasounds were performed within 3 months postoperatively. All patients were maintained on antibiotic prophylaxis until stable imaging results were documented. Antibiotics were not reinitiated as long as the patient was free of infection. Bowel and bladder dysfunction was assessed at each clinic appointment and treated if indicated. VCUG was not routinely performed in asymptomatic patients due to our previous success rates with this procedure.[11,12] However, if a patient presented with a single febrile UTI or a cluster of afebrile UTIs postoperatively, cycled fluoroscopic VCUG was obtained. Further upper tract sonographic imaging was performed at 1 year postoperatively and then annually for 3 to 5 years postoperatively, depending on the clinical course and presence of renal scarring. No renal cortical scans were performed postoperatively.

RESULTS

During the study period 19 boys and 59 girls underwent unilateral ureteral reimplantation. Of these patients 4 boys and 11 girls with contralateral resolved or persistent grade I VUR met inclusion criteria. An additional 65 patients (54 females and 11 males) who underwent bilateral ureteral reimplantation were identified during the study period and served as a comparison group for cost and LOS