Caution in Employing DEFUX FOR REFLUX

THE THINKING BEHIND OUR APPROACH

Boston Children's Hospital

Urology

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AS ONE OF THE FIRST DEFINING CONDITIONS in the field of pediatric urology, vesicoureteral reflux (VUR) occupies a unique space in the history of our specialty. Though the optimal management of VUR in children has evolved, treatment — specifically the endoscopic injection of dextranomer/hyaluronic acid copolymer (Dx/HA) — remains a source of controversy. It is our opinion is Dx/HA should not be considered the preferred treatment option for children with VUR due to:

1. the failure rate of Dx/HA
2. the high need for retreatment after Dx/HA
3. the cost of Dx/HA
4. the significant complication rate of Dx/HA

Failure rate
Open ureteroneocystostomy (UNC) is the current gold standard of treatment. To the contrary, Dx/HA injection has a significantly reduced success rate compared to UNC. Multiple systematic reviews and meta-analyses have shown the average Dx/HA failure rate 3 months after injection is 25 to 30 percent. Long-term failure rates are even higher, exceeding 50 percent 1 year after injection in some studies.

Retreatment
An increase in failure rates inevitably leads to an increase in retreatment rates. In a recent study, our group found the odds of retreatment increased >12-fold (OR 12.5) after Dx/HA injection compared to UNC. In short, Dx/HA injection is not as reliable as open surgery and its use results in increased treatment failure and repeat injections.

Increased cost
Dx/HA injections have repeatedly been shown to be less cost-effective when compared to UNC or antibiotic prophylaxis due to factors mentioned. Utilizing increased volume of Dx/HA drives up costs.

Complication rates
Complications from Dx/HA injections are increasingly reported, with some patients requiring open surgery. In some cases, Dx/HA has caused renal functional impairment. Dx/HA frequently cause large calcifications. These calcifications are often misinterpreted as ureteric stones, and may lead to unnecessary testing or procedures.

Based on an increase in treatment failure rates, the increased need for retreatment, increased costs and long-term complication rates, the significant risks associated with Dx/HA use far outweigh the limited benefits in a majority of patients.

Alan B. Retik, MD
Executive Chair/Medical Director, International Health Services; Former Urologist-in-Chief; Senior Associate in Urology Boston Children’s Hospital
CASE STUDY
Obstructive Effects of Deflux

AK, A 7.5 YEAR-OLD GIRL with recurrent urinary infection (UTI) since age 5, was found to have normal kidneys on renal ultrasound but right-sided Grade 3/5 reflux on a PIC cystogram (not shown) performed at an outside institution. She had Deflux injected into that orifice as well as into the opposite ureteral orifice in January 2013. Postoperatively, she continued to experience UTIs and eventually was evaluated at Boston Children’s Hospital.

Follow-up renal ultrasounds demonstrated mild hydronephrosis on the right but a substantially dilated distal ureter (Figs. 1a & b). Repeat voiding and nuclear cystograms (on 2 separate occasions) did not reveal any postoperative reflux (not shown).

In May 2014, a Mag 3 renal scan confirmed delayed drainage from that collecting system into the bladder but without compromised renal function in the right kidney (Fig. 2). Serial renal ultrasounds demonstrated the mounds of Deflux had increased with considerable amounts of calcification in the bladder wall on coronal views, and in the right ureteral wall on the transverse image (Fig. 3).

Given the progressive nature of the newly acquired ureterovesical junction obstruction, presumably secondary to the Deflux, it was elected to remove the Deflux as the calcified mass appeared to impinge on the distal ureter’s function to properly drain that right kidney.

At surgery, the distal right ureter was encased in Deflux. It appeared to have been injected into several peri- and intra-ureteral locations. The distal ureter with all the Deflux and intense inflammation had to be excised with the more proximal ureter requiring excisional tapering for 5 cm before it could be reimplanted into the bladder.

This necessitated an intra-ureteral stent and suprapubic catheter to drain the ureter and bladder, respectively, for 5 days before each could be safely removed. AK remained hospitalized for a total of 6 days before being discharged in very satisfactory condition. A follow-up renal/bladder ultra-sound and voiding cystogram are planned in the coming months to insure the drainage from that right kidney has now improved and no reflux has reappeared following this subsequent operation.

Stuart B. Bauer, MD
Senior Associate in Urology
Boston Children’s Hospital
PATIENT KM PRESENTED AS A 3 YEAR OLD GIRL with a history of febrile urinary tract infection occurring at 1 year of age. An ultrasound of the urinary tract was normal and a VCUG documented bilateral grade 3 reflux (Fig. 1).

She was treated with antibiotic prophylaxis and at 14 months of age underwent bilateral Deflux injection to correct her reflux endoscopically. At her post-operative follow-up, KM was noted to have progressively worsening right-sided hydroureteronephrosis (Fig. 2).

A post-operative VCUG documented correction of reflux. As a result of her progressive hydroureteronephrosis, a MAG-3 renal scan performed at age 2 (10 months post-operatively) demonstrated 43% right-sided renal function with delayed drainage. She underwent right-sided double J ureteral stent placement for 3 months of drainage. After stent removal, the right-sided hydroureteronephrosis returned to its pre-stent severity. A follow-up MAG-3 renal scan was repeated at 18 months post-operatively, documenting 25% renal function on the right side with a t 1/2 of 25 minutes. A renal ultrasound at this point demonstrated worsening right hydronephrosis with thinning of the renal parenchyma. KM was referred to Boston Children’s Hospital at this point.

After review of KM’s clinical course and imaging studies, we recommended excision of the irregular, obstructing calcified Deflux material on the bladder base and bilateral ureteral reimplantation. Peri-operatively, extensive reaction to the Deflux was encountered. It was technically impossible to separate the Deflux from the ureters and therefore distal ureteral transection was performed bilaterally. Post-operatively, KM was noted to have markedly diminished right-sided hydronephrosis with no evidence of hydroureter (Fig. 3). Reflux was resolved on radionuclide cystogram.

We will plan to follow KM with the anticipation of improvement in her right-sided hydronephrosis over time.

**David A. Diamond, MD**

*Urologist-in-Chief; Associate Clinical Ethicist; Senior Associate in Urology Boston Children’s Hospital*