

Indications and Outcome of Cuff-Nipple Ureteroneocystotomy



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Introduction

Infants and children with obstruction or structural weakness of the uretero-vesical junction (UVJ) may require surgical repair. Re-implantation of a dilated ureter into a small capacity and/or scarred bladder following failed surgery, can represent a major surgical challenge. Herein a report on the outcome of the cuff-nipple method of ureteroneocystotomy in these difficult cases, and this represents additional experience with this previously reported technique (1).

Methods

From 1995 to 2016, 50 megaureters of 33 infants (3-10 months) and 12 abnormal ureters of 10 children (3-7 years old), underwent ureteroneocystotomy using a combination of a short submucosal tunneling and cuff-nipple methods. The primary indications were repeated break-through pyelonephritis while on prophylaxis and/or worsening hydronephrosis. The clinical abnormalities were: obstructed megaureters (21 megaureters/17 infants), reflux megaureters (29/16), and repeat surgery in 12 ureters of 10 children (6/5 failed reimplantation, 4/4 post renal transplantation, 2/1 bladder exstrophy). Radionuclide renal scans showed reflux nephropathy in 23/37 kidneys. Postoperatively ultrasound studies (US) and voiding cystourethrography (VCUG) were performed in 41/43 children.

Results

Follow up ranged between 6 months and 12 years. Post-operative VCUG (3-6 mos.) showed no evidence of VUR in 55/60 ureters (91.6%). US at 3, 6, and 12 months indicated improved or unchanged upper tract dilation in 51/60 (85%) kidneys, however, 7/43 (16%) developed recurrent bacteriuria.

Conclusions

The time-tested Paquin (2) dogma of tunnel:width ratio of 5:1 was challenged by Lyons et al. (3). Their contention was that the shape of the ureteral orifice (UO) is more important than tunnel length for correction of VUR. Recently Villanueva et al. (4) performed a parametric simulation study of ureteral collapse (LS-DYNA finite-element software). The changes in the pressure required to collapse the ureter were evaluated with each variable (tunnel length, ureteral diameter, and ureteral thickness/stiffness). Their studies showed that the pressure required to collapse the ureter was inversely related to the diameter of ureter and a 1 cm tunnel length would allow the ureter to collapse under a low pressure. They proposed the creation of a better UO, which the cuff nipple does, would contribute to an efficient ureteral collapse, i.e. reflux prevention. These observations would explain the high success rate which was achieved by the reported cuff-nipple technique.

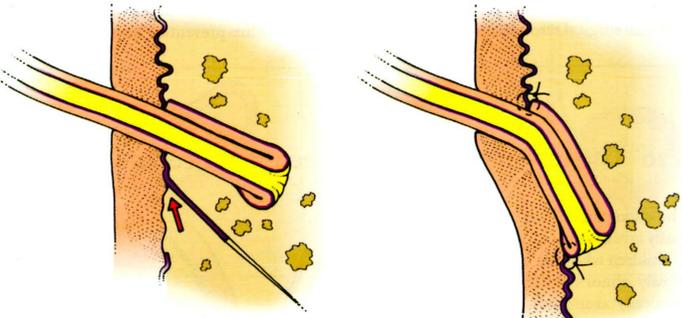


Figure 1. Diagrammatic representation of cuff nipple ureteral orifice with associated fixation to bladder wall.



Figure 3. A. Pre- and intra-operative ureterogram to confirm straightening of upper ureteral kink. B. Post-op retrograde pyelogram



Figure 5. Cystoscopy view of cuff-nipple, 5 weeks post-op



Figure 6. Post-op ultrasound cuff-nipple

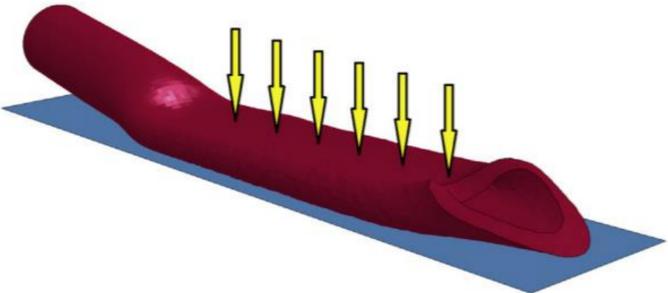


Figure 7. Computer simulation of ureteral collapse.

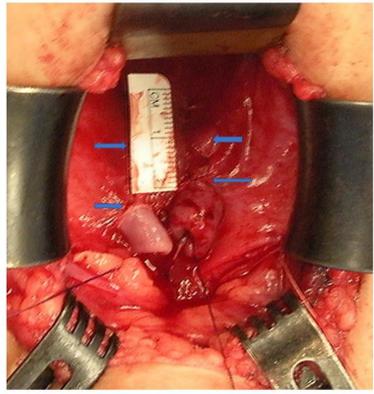


Figure 2. Bilateral cuff-nipple reimplantation and short submucosa tunnel

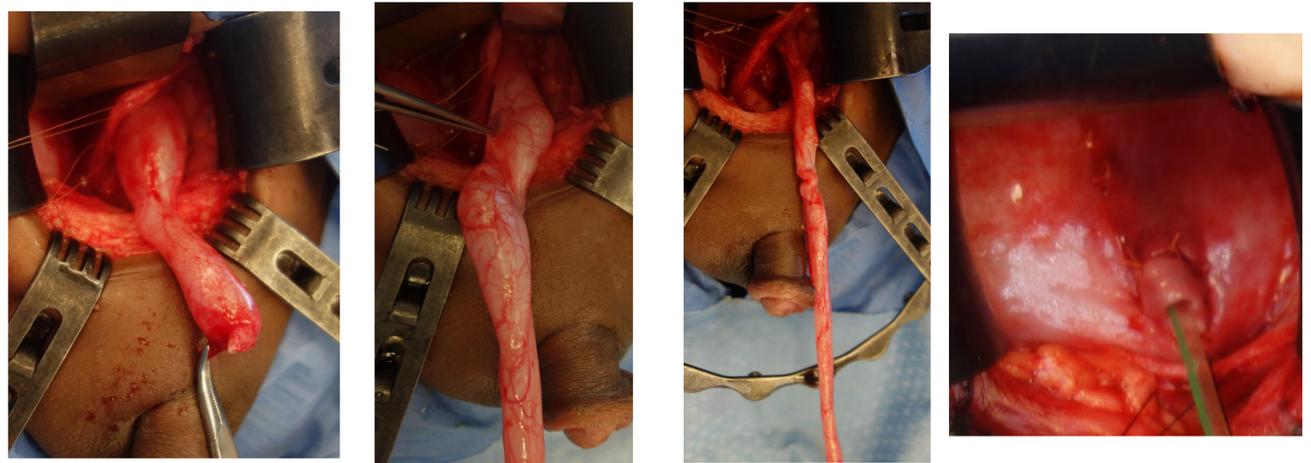


Figure 4. Re-implantation by short submucosal tunnel and cuff-nipple. Note Subtotal ureteral remodeling and straightening of an obstructed megaureter and the preservation of sub-adventital blood supply.

References

1. Friedman AA and Hanna MK. Split-cuff nipple technique of ureteral reimplantation in children with thick-walled bladders due to posterior urethral valves. *J Urol*. 2015; 85:199-204.
2. Paquin AJ Jr. Ureterovesical anastomosis: the description and evaluation of a technique. *J Urol* 1959;82:573-583
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