

Ureteroureterostomy: An Alternative to Ureteroneocystostomy in Select Cases of Pediatric Renal Transplantation

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Purpose: Ureteroneocystostomy is the standard mode of establishing urinary drainage in renal transplantation. However, donor-to-recipient ureteroureterostomy may be considered in the presence of a challenging bladder or an augmented bladder, or when the donor ureter might be compromised or is too short. This approach also preserves a nonrefluxing system with an orthotopic ureteral orifice.

Materials and Methods: We retrospectively reviewed the records of all pediatric renal transplantations in which ureteroureterostomy was performed at a single tertiary care pediatric center over the 12-year period from 2004 to 2015. Ureteroureterostomy was performed in end-to-side fashion from donor-to-recipient ureter. Patients with a history of symptomatic vesicoureteral reflux were excluded from ureteroureterostomy. Parameters were reviewed, including age, gender, source of renal transplantation (deceased or living donor), indications for ureteroureterostomy and complications.

Results: Primary ureteroureterostomy was performed at 23 of the 213 renal transplantations (10.8%). At transplantation mean \pm SD age was 11.7 ± 4.9 years and mean weight was 33.5 ± 18.9 kg. Two secondary ureteroureterostomies were done to salvage the ureter due to complications after ureteroneocystostomy. Of the patients 60% and 40% underwent ureteroureterostomy during deceased and living donor renal transplantation, respectively. The most common indications included a challenging small bladder due to anuria, a valve bladder and a neurogenic augmented bladder. Two urinary leaks (8%) occurred and no allografts were lost.

Conclusions: Ureteroureterostomy is a safe alternative to standard ureteroneocystostomy in renal transplantation. Ureteroureterostomy should be considered a primary option in certain complex situations and secondarily as a salvage procedure when ureteral problems develop after ureteroneocystostomy in patients who undergo renal transplantation.

Key Words: ureter; kidney failure, chronic; kidney transplantation; ureterostomy; salvage therapy

URETERONEOCYSTOSTOMY is the most common approach to establish urinary drainage in RT.¹ In adults there is controversy as to whether UNC needs to be performed in a nonrefluxing

manner but in children the conventional approach remains an antirefluxing reimplant procedure. Despite this fact, certain conditions warrant consideration of alternative means of

Abbreviations and Acronyms

RT = renal transplantation
UNC = ureteroneocystostomy
U-U = ureteroureterostomy

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assuring urinary continuity. Donor-to-recipient U-U may be considered in certain bladder conditions (small size, thick detrusor, low volume), when the distal donor ureter is short or damaged, or in patients who have had long-term anuria.

In fact, in adults pyelo-ureterostomy and U-U have been described with good success as a primary and a salvage procedure for failed primary UNC, particularly when the transplant ureter is too short or there is ureteral necrosis of the collecting system of the allograft.²⁻⁴ Furthermore, pyelovesicostomy has also been described as an alternative to U-U, UNC and pyeloureterostomy with good success in transplant case in which ureteral necrosis has developed.⁵

The benefits of U-U include avoiding the challenging bladder (or augment) and minimizing the risk of urine leak or strictures due to tension or ischemia. It may also preserve a nonrefluxing system and facilitate subsequent endourological procedures, which can be performed more readily through a native ureteral orifice, potentially obviating the need for percutaneous access (fig. 1). For these reasons, we hypothesized that U-U would be safe and efficacious as a primary method of urinary diversion during renal transplantation in children rather than reserving it only as a salvage or secondary procedure. Certainly, there are inherent limitations as it should not be done in patients with a history of symptomatic vesicoureteral reflux.

We present what is to our knowledge the largest series of U-U as the primary method for urinary diversion during renal transplantation in children.

MATERIALS AND METHODS

We retrospectively reviewed the records of all pediatric RT at our center over the 12-year period from 2004 to 2015 in which U-U was performed. U-U was done in

end-to-side fashion from the donor to the recipient ureter. Patients with a history of symptomatic vesicoureteral reflux were excluded from U-U. Parameters such as patient age and gender, the source of RT (a deceased or a living donor), the etiology of end stage renal disease, indications for U-U and complications were reviewed. The mean \pm SD and p values were calculated.

Figure 2 demonstrates the upside-down donor kidney in the right iliac fossa, which is our preferred position for right side allografts, as well as the adjacent donor-to-recipient ureteroureterostomy. The upside-down placement can be helpful specifically when performing U-U. Figure 3 demonstrates end-to-side ureteroureterostomy from the transplant ureter to the native ureter.

Surgical Technique and Postoperative Care

After the arterial and venous anastomoses were performed from the allograft to recipient vessels, the native ureter was identified. Following careful mobilization and leaving its blood supply intact, the native ureter was mobilized to allow for a tension-free anastomosis to the allograft ureter. During end-to-side repair a longitudinal ureterotomy was made in the native ureter. The anastomosis was performed with a 6-zero monofilament absorbable running suture. The majority of the patient native kidneys produced urine and, the proximal ureter above the anastomosis was not routinely ligated.

A double J stent was routinely placed and remained in situ for 4 to 6 weeks. A Foley catheter was inserted intraoperatively and removed when clinically indicated. Postoperative studies included routine blood work, and renal and bladder sonography to ensure optimal allograft function.

RESULTS

Of the 213 patients with RT 23 (10.8%) underwent U-U. In 2 patients U-U was performed as a secondary procedure to salvage the ureter due to complications of UNC while the remaining 21 were performed primarily. The demographics of the U-U group vs the UNC group were comparable and not

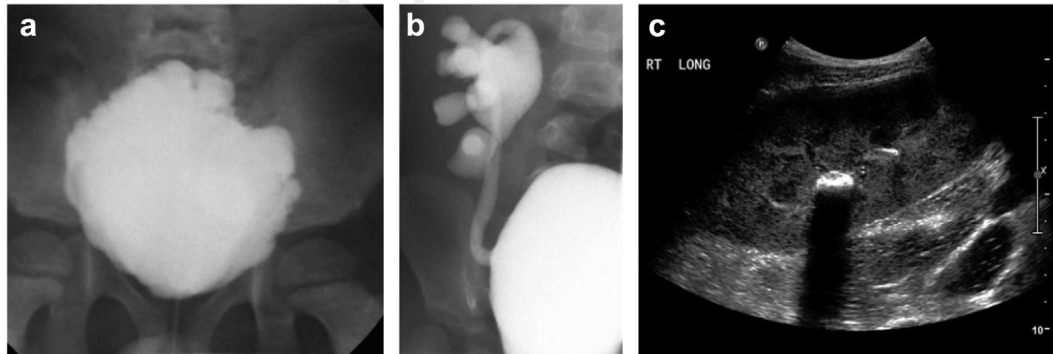


Figure 1. Clinical scenarios in which U-U may be or would have been beneficial. VCUG demonstrates markedly trabeculated valve bladder, which is example of challenging bladder (a). Posttransplantation VCUG reveals vesicoureteral reflux into transplant kidney after UNC in symptomatic patient with febrile urinary tract infection (b). Renal calculus in transplant kidney could be treated endoscopically via orthotopic ureteral orifice in patient who underwent U-U (c).

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