

Urodynamic evidence of successful rehabilitation of a severely contracted bladder after renal transplantation

doi:10.1111/j.1432-2277.2007.00549.x

Because of high incidence of postoperative urine leakage, high-grade ureteral reflux and/or obstruction, implantation of the donor ureter into a very small defunctionalized bladder is a major technical difficulty during renal transplantation [1–4]. Despite previous promising results with the implementation of pre-operative augmentation cystoplasty, hydrostatic bladder dilation, and urinary diversion, urodynamic evidence showing the restoration of bladder function has not yet been reported. Herein, we report with urodynamic evidence the successful rehabilitation of a severely contracted small bladder of $<30\text{ cm}^3$ capacity after renal transplantation using a stented ureteroureterostomy.

A 42-year-old female patient who has been dependent on maintenance dialysis for 16 years received a renal allograft from a younger brother. During the pre-operative urodynamic evaluation, patient complained of low abdominal discomfort at 26 cm^3 filling and urinary leakage was observed. Bladder margins were smooth on the cystogram (Fig. 1a). Voiding was possible by abdominal straining only at a maximal cystometric capacity of 36 cm^3 . A grade I vesicoureteral reflux into the left native ureter was observed during the voiding phase. Concomitant uroflowmetry revealed a tower shape curve with a maximal flow rate (Q_{\max}) of 16.1 ml/s. The graft was implanted in the right iliac fossa as usual. The bladder was fibrotic and contracted. Because it has been reported that the native ureter may be safely ligated in patients with anuria or oliguria [5], we performed ureteroureterostomy between the donor ureter and distal native ureter over a double-J stent after ligation of the proximal native ureter. Immunosuppression was maintained with cyclosporine micro-emulsion and low-dose steroids. Starting from postoperative 14th day, indwelling urinary catheter was clamped until the patient developed an urge to void and then released. At postoperative 19th day, a voiding cystogram (Fig. 1b) was performed and the stent was removed after confirming the bladder volume to be more than 130 cm^3 . Urinary catheter was removed the next day. Postoperative ultrasonogram showed no abnormal findings. There was no acute rejection or surgical complication. After 2-months of transplantation, the patient

complained of daytime frequency, urgency and urgency incontinence, nocturia, and stress urinary incontinence. Voiding diary revealed polyuria with a functional bladder capacity of 300 cm^3 . Detrusor pressure at voiding was 36 cm water column, after 279 cm^3 filling. Previously noted daytime frequency, urgency and urge incontinence and left vesicoureteral reflux were diminished after 3 months of transplantation. Although much improved, nocturia (more than two times per night) because of polyuria and stress urinary incontinence remained. The functional bladder capacity was now increased to 420 cm^3 . Maximal cystometric capacity was checked to be 440 cm^3 and detrusor pressure at voiding was 44 cm water column. Concomitant uroflowmetry revealed a bell-shaped curve with Q_{\max} 73.2 ml/s and residual volume of 30 cm^3 . After 14 months of transplantation, urinary symptoms, voided diary, and uroflowmetry findings remained unchanged (Fig. 2).

After bladder augmentation or diversion, renal recipients having contracted bladder are known to be at increased risk for morbidities and complications [1–4], and these can lead to reluctance in undergoing renal transplantation in these patients. The use of the native defunctionalized bladder, if possible, should not be overlooked. In 1974, Tanagho [6] reported that defunctionalization of a normal bladder does not limit its ability to recover its function. Serrano *et al.* [7] reported that continuous bladder cycling before transplantation remains the best way to rehabilitate, artificially, the prolonged defunctionalized bladder. Salvatierra *et al.* [8] introduced the intravesical implantation of the transplant ureter into the small, defunctionalized bladder. However, most of the proposed techniques are time-consuming, complex and show increased morbidity and surgical complications. Our stented ureteroureterostomy is more physiologic, technically convenient and appears to guarantee success against both ureteral reflux and obstruction. Moreover, both bladder capacity and contractility returned to a normal state as early as 2 months after transplantation. These results suggest that it may be unnecessary for recipient with small and defunctionalized bladder to pre-operatively perform the procedures

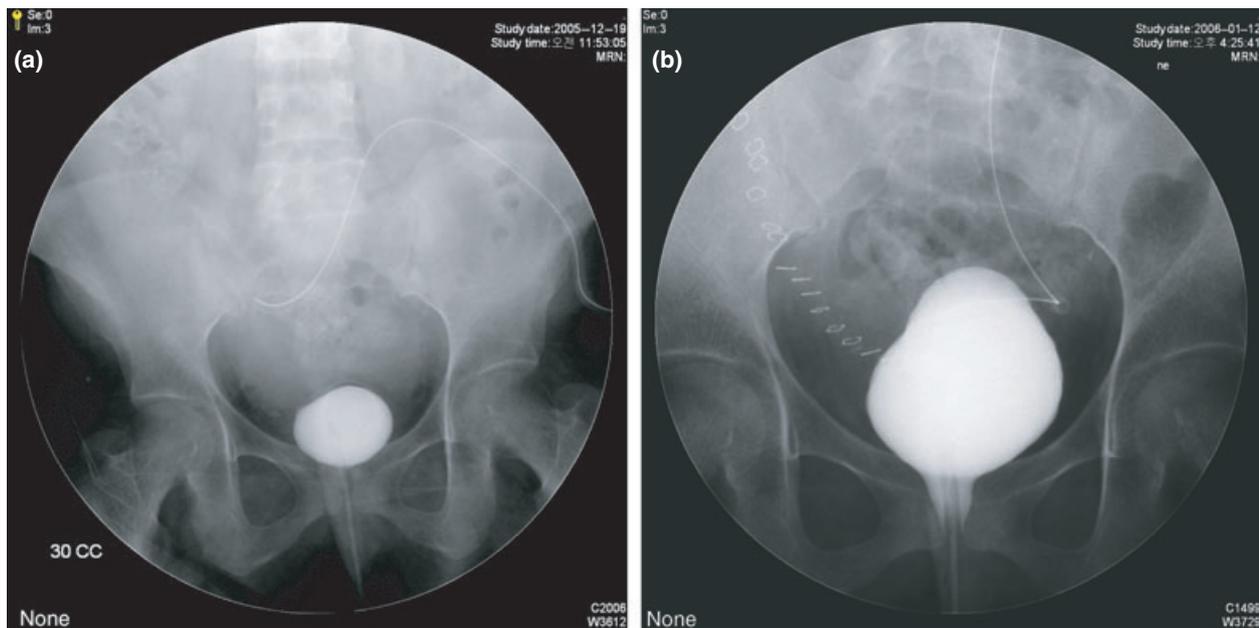


Figure 1 Pretransplant contracted bladder (a) and markedly increased bladder capacity at post-transplant 19th day (b).

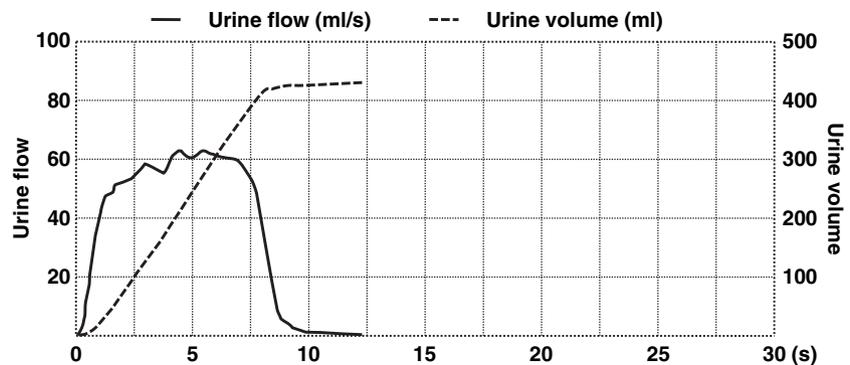


Figure 2 Uroflowmetry at post-transplant 14 months shows a bell-shaped curve with maximal flow rate of 62.9 ml/s at 426.5 cm³ voided and 49 cm³ residual volume.

such as augmentation cystoplasty and hydrostatic bladder dilation.

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Authorship

Y.S.K designed the study. Y.S.K, J.H.K performed the study. H.K.C, K.H.R collected the data. H.J.A, J.H.K analyzed the data. H.J.A wrote the paper.

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