



Pediatrics

Retroperitoneoscopic bilateral nephrectomy and extraperitoneal ureterocystoplasty in a child on peritoneal dialysis

Marianne Alam^{*}, Pauline Abou Jaoudeh, Smart Zeidan, Nabil Diab

University of Balamand, Faculty of Medicine and Medical Sciences in Association with Saint George Hospital University Medical Center, 166378, Achrafieh, Beirut, 1100 2807, Lebanon

ARTICLE INFO

Keywords:

Nephrectomy
 Retroperitoneoscopy
 Extraperitoneal
 Peritoneal dialysis
 Augmentation ureterocystoplasty
 Continent diversion

ABSTRACT

A 4-year-old boy with posterior urethral valves and end stage kidney disease on peritoneal dialysis presented with high pressure non-compliant bladder with left ureterohydronephrosis. Inability to perform hemodialysis due to patient's weight exclusion, imposed the necessity to preserve peritoneal dialysis. A bilateral nephrectomy by retroperitoneoscopy with extraperitoneal augmentation ureterocystoplasty using left ureter and pelvis associated with continent diversion using right ureter as umbilical stoma was performed followed by kidney transplantation. An excellent outcome with voluntary voiding without CIC is reported eighteen months later. This treatment modality is the best option to manage End Stage Kidney Disease on peritoneal dialysis in those patients.

Introduction

Posterior urethral valves remain the principal cause of bladder outflow obstruction in male newborns and infants.¹ The existing uropathy, strongly related to significant bladder dysfunction, may result in chronic renal failure, end stage renal disease and subsequent need of dialysis-renal transplant.¹ In the setting of preserving existing peritoneal dialysis as a bridge to renal transplantation, retroperitoneoscopic bilateral nephrectomy and extraperitoneal ureterocystoplasty seems the best means to achieve adequate and safe bladder dynamics.

Case report

We report a case of a 4-year-old boy weighing 15 kg, with a history of posterior urethral valves resected in the neonatal period, bilateral dysplastic kidneys, left ureterohydronephrosis and end stage kidney disease on peritoneal dialysis since the age of 6 months. He presented for pre-transplant workup as preparation for paternal kidney allograft. Kidney Ultrasound showed bilateral dysplastic kidneys with markedly dilated bilateral pelvicalyceal systems and tortuous ureter (Fig. 1-A, B, C). Urodynamic studies revealed a bladder of small capacity to age, many uninhibited contractions and elevated detrusor pressures exceeding 40 cm H₂O at 33 ml of infusion reaching 120 cm H₂O at 150 ml of infusion. The post void residue was 84ml and 53ml at the first and

second filling respectively. No residual valves were found on cystoscopy. Intraoperative cystography showed no vesicoureteral reflux.

Patient underwent bilateral nephrectomy by retroperitoneoscopy. A minimal manipulation of the ureter was done in order to preserve its vascularization. The ureter was carefully dissected with minimal handling until reaching the crossing of the iliac vessels. The nephrectomy specimens on each side were toggled into the pelvis. With the patient supine, an extraperitoneal approach of the bladder was performed through a pfannenstiel incision. Augmentation ureterocystoplasty with the left ureter and pelvis was done with Mitrofanoff using the right ureter (Fig. 2). Patient tolerated the procedure well and was transferred to the pediatric intensive care unit for post op care monitoring. Patient was transferred to the floor on day 2 post op, and bladder irrigation was started through the Mitrofanoff catheter. Peritoneal dialysis was done day 2 post op. Bilateral retroperitoneal drains were removed and patient was discharged D7 post-op with urethral catheter, Mitrofanoff catheter and perivesical catheter. Parents instructed to do daily infusion of 50 cc into the bladder for bladder cycling.

One month post op, VCUG was done. The bladder capacity is estimated to be 171 ml without leakage (Fig. 3).

Patient received parental kidney transplant. Post op, patient is voiding volitionally without the need of CIC with a post void residue of zero. Follow up urodynamics was done showing normal capacity for age

^{*} Corresponding author.

E-mail address: marianne.alam@gmail.com (M. Alam).

<https://doi.org/10.1016/j.eucr.2020.101198>

Received 29 March 2020; Received in revised form 5 April 2020; Accepted 6 April 2020

Available online 10 April 2020

2214-4420/© 2020 The Authors.

Published by Elsevier Inc.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

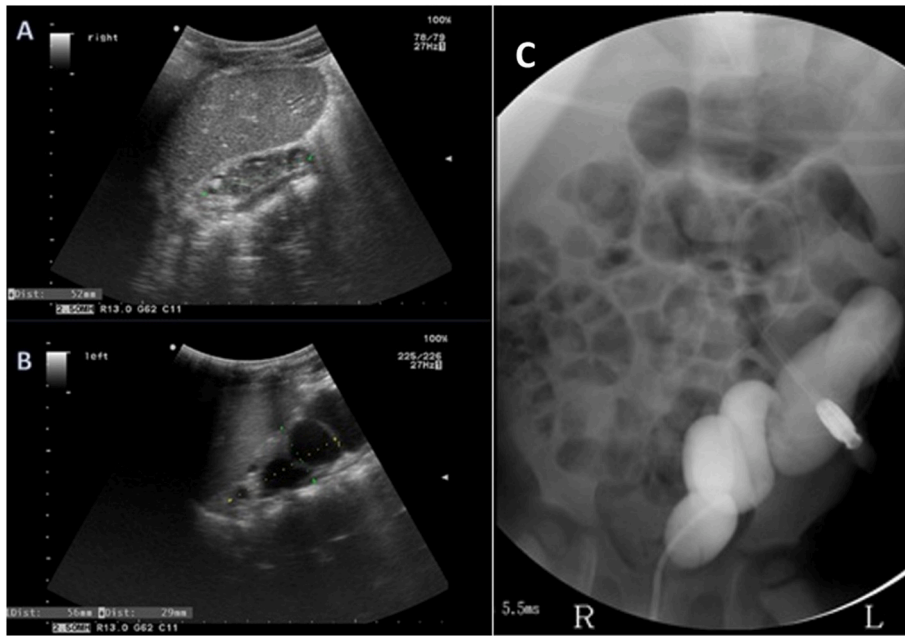


Fig. 1. A and B: Ultrasound of the kidneys showing hypotrophic kidneys that are not well differentiated with dilated pelvicalyceal system on the left side. C: Opacification showing markedly dilated left ureter.

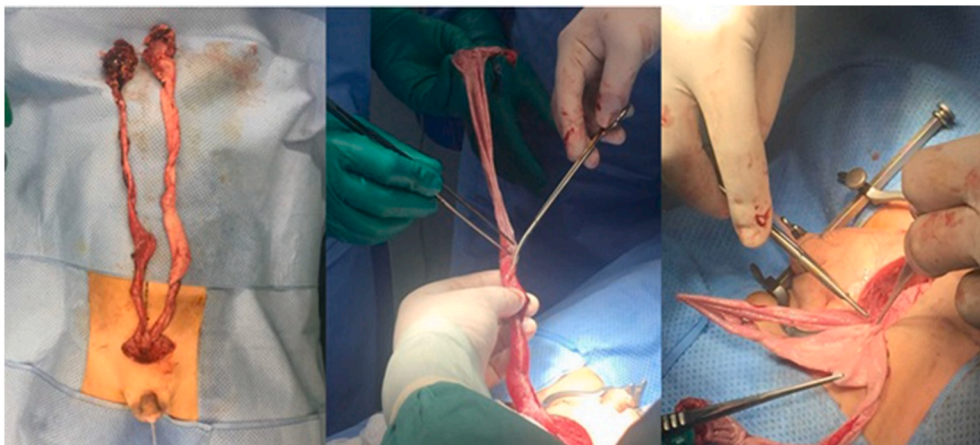


Fig. 2. Patient was placed in supine position and a Pfannenstiel incision was done. The ureters with kidneys were reached and exteriorized. The left ureter was opened anterolaterally along its length sparing the distal 2cm at the UVJ. The ureteral patch was folded and sutured into a U configuration including the renal pelvis. The bladder was incised into a T fashion and the harvested patch was sutured. The right ureter was used for constructing the Mitrofanoff channel. The right ureter was fixed to the anterior abdominal wall exiting beneath the umbilicus into a V shaped incision and secured to the skin.

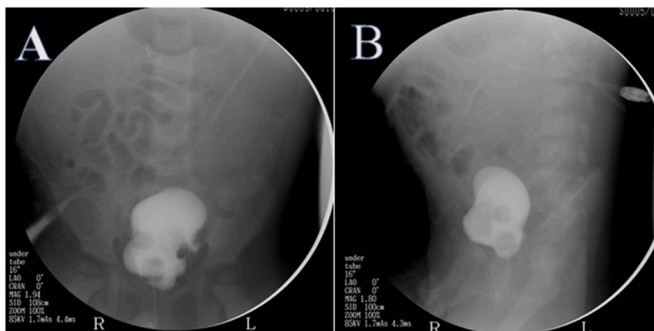


Fig. 3. VCUG through the ureteral stoma showing a good bladder capacity without evidence of leak.

with low detrusor pressures.

Discussion

Secondary to the deleterious effects caused by chronic obstruction, many children with posterior urethral valves progress to chronic renal failure and end stage renal disease requiring dialysis and renal transplantation.¹ Prior to transplantation, bladder dynamics must be evaluated to provide adequate bladder filling at low pressures, ensure continence and achieve complete bladder emptying.² When conservative medical management (multiple voids, anticholinergics, botulinum toxin injections, clean intermittent catheterization, overnight indwelling catheter...) fail, augmentation cystoplasty should be considered.²

In the setting of later need for kidney transplant, ureterocystoplasty appears to be a safe option since it offers urothelial lined bladder with no metabolic disturbances compared to enterocystoplasty and gastrocystoplasty.^{2,3} Furthermore, ureterocystoplasty using the entire ureter and pelvis appears to offer a larger and more compliant reservoir compared to enteral augmentations.² Various tissues such as the

appendix, ileum, cecum and ureter were used as channels for catheterizable stomas.⁴ While studies fail to correlate the choice of channel to complications (incontinence, stenosis, necrosis, fibrosis, false passage, perforation, kinking ...),⁴ the use of ureter as a continent stoma appears to be a good choice in this patient on peritoneal dialysis avoiding the entry to the peritoneum.

With advent of minimal invasive techniques, the tendency to use laparoscopy in children is expanding.⁵ Laparoscopic-assisted transperitoneal unilateral nephrectomy and ureterocystoplasty have been previously reported in a very limited number of cases.⁵ To our knowledge, our case is the first case of bilateral retroperitoneoscopic nephrectomy with augmentation ureterocystoplasty and ureterovesicostomy. Whenever the integrity of the peritoneal cavity is respected, the risk for adhesions and small bowel obstruction is reduced. This method is preferred whenever there is presence of peritoneal dialysis catheter³; as in the case of our patient. The extraperitoneal approach is accompanied by less post-operative pain and superior cosmesis.³ The continence outcome achieved in our patient is probably secondary to multiple factors including the use of ureter for augmentation and the minimal handling of the ureteral tissue during retroperitoneoscopic nephrectomy. More studies are needed to confirm this effect.

Conclusion

In the setting of bladder dysfunction, end stage renal disease dependent exclusively on peritoneal dialysis, the best management option seems to be retroperitoneoscopic nephrectomy and augmentation ureterocystoplasty with or without continent diversion using ureter. The minimally invasive extraperitoneal approach appears to be effective and safe preserving concomitant peritoneal dialysis awaiting renal transplantation. In this setting, although promising, the use of ureter in improving continence is yet to be defined.

References

1. Caione P, Gerocarni Nappo S. Posterior urethral valves: long-term outcome. *Pediatr Surg Int.* 2011;27:1027–1035.
2. Youssif M, Badawy H, Saad A, Hanno A, Mokhless I. Augmentation ureterocystoplasty in boys with valve bladder syndrome. *J Pediatr Urol.* 2007;3(6):433–437.
3. Zargar-Shoshtari M, Mehravaran K, Salimi H. Retroperitoneal ureterocystoplasty in bilaterally functioning kidneys. *Urol J.* 2008;5(2):123–125.
4. McAndrew H, Malone P. Continent catheterizable conduits: which stoma, which conduit and which reservoir? *BJU Int.* 2008;89(1):86–89.
5. Basiri A, Maghsoudi R, Shadpour P. Laparoscopic-assisted ureterocystoplasty. *Urol J.* 2004;2:123–125.