

Laparoscopic Undiversion in a Child with Sacral Agenesis into Augmentation Cystoplasty

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ABSTRACT

Introduction: In neurogenic bladder with compromised renal function or when complex reconstruction is not preferred, ileal conduit is considered. Undiversion is performed when the patient prefers the procedure, once the renal function improves, or when complications resulting from diversion are present.

Case Description: We present the case of a 10-y-old boy with sacral agenesis, who underwent laparoscopic-assisted ileal conduit diversion in 2006, because he had a grossly unstable, small-capacity bladder and was not compliant with intermittent self-catheterization. At present, he preferred not to have a conduit.

Discussion: Laparoscopic undiversion with ileal augmentation cystoplasty was performed. The postoperative course was uneventful, and he is now on intermittent self-catheterization with healthy renal function. Laparoscopic undiversion is technically challenging, yet feasible, and is an effective option in children. To our knowledge, this is the first such case reported.

Key Words: Laparoscopy, Undiversion, Sacral agenesis, Ileal conduit, Augmentation cystoplasty.

INTRODUCTION

Ileal conduit is a temporary option in neurogenic bladder with compromised renal function or as a last option in neurogenic bladders when complex reconstruction is not preferred or possible.¹ Undiversion is performed when the patient prefers the procedure or when there are complications resulting from the diversion. In patients with compromised renal function, the ileal conduit can be undiverted once the renal function improves.² We present the case of a 10-y-old boy who underwent laparoscopic undiversion. To our knowledge, this is the first such case reported.

CASE REPORT

A 10-y-old boy with sacral agenesis, ventricular septal defect, and bilateral ureteric stricture (after ureteric reimplantation for bilateral vesicoureteric reflux in childhood) presented, in 2006, with constant dribbling resulting from gross instability and a small-capacity bladder. He was not compliant with intermittent self-catheterization in 2006, and various options were discussed with the parents. The parents preferred an ileal conduit (which could care for the leak and avoid complex reconstructive surgery), with an option of reconstruction later.³ Laparoscopic-assisted ileal conduit was performed.³

In 2011, the patient and his parents were keen to be relieved of the conduit and have an option of urethral voiding. Hence, undiversion (augmentation cystoplasty), along with self-intermittent catheterization, was discussed. His bladder was reassessed with a urodynamic study, which revealed a bladder capacity of 50 mL and compliance of 4 mL/cm H₂O. Renal parameters were normal. Isotope renogram showed a glomerular filtration rate (GFR) of 54.4 mL/min and 14.1 mL/min in the right and left kidney, respectively, and there was no obstruction. Imaging (computed tomography [CT] urogram) revealed bilateral residual hydronephrosis with healthy parenchyma on the right side and thinned out parenchyma on the left side (**Figure 1**). The length of the ileal conduit was approximately 10cm. The boy and his parents were counseled regarding the need for lifelong clean intermittent catheterization. The boy was trained to do self-inter-

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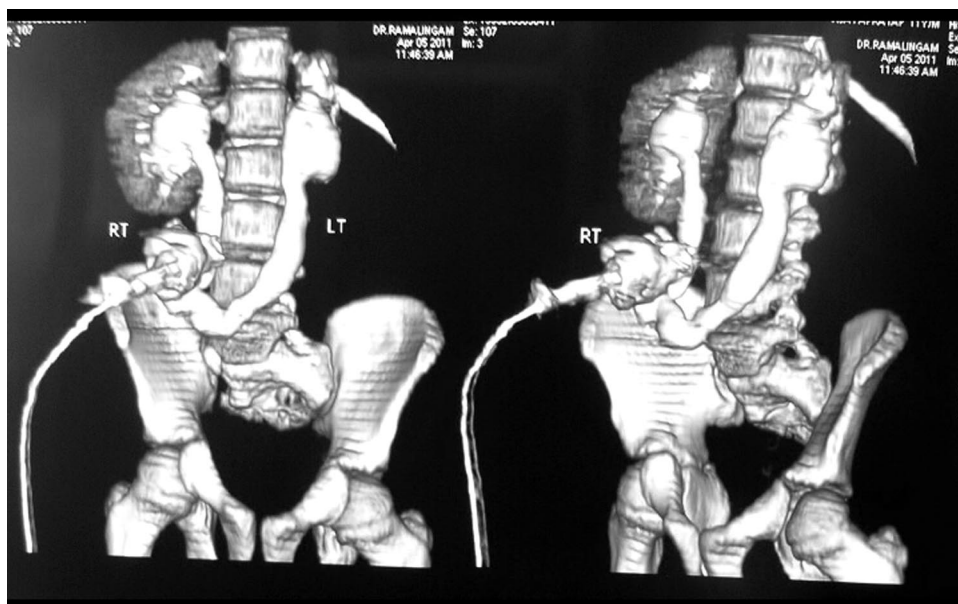


Figure 1. CT urogram showing the conduit and both kidneys (note the thin parenchyma in the left kidney).

mittent catheterization of the native bladder and was compliant.

While under general anesthesia, the patient was placed in the supine position with head low, and laparoscopy was done using 5 ports (**Figure 2**). As a result of the previous surgery, dense adhesions were present around the bladder and laparoscopic dissection was difficult. Adhesiolysis was done. Bladder was mobilized, dissected, and prepared for cystoplasty. Circumferential incision was made around the ileal conduit stoma, and the conduit was re-

leased from the abdominal wall (**Figure 3**). The ileal stoma edges were freshened and closed in 2 layers using a 3-0 Vicryl suture. The conduit could not be brought out for detubularization, because of previous surgery and also because pulling it out could jeopardize the vascularity of the previous ureterointestinal anastomosis. Further, the detubularization was to be planned according to the lie of the ileal loop and the cystotomy. The conduit was pushed back into the peritoneum. The stoma site was closed to prevent gas leak. The ileal loop was opened along the

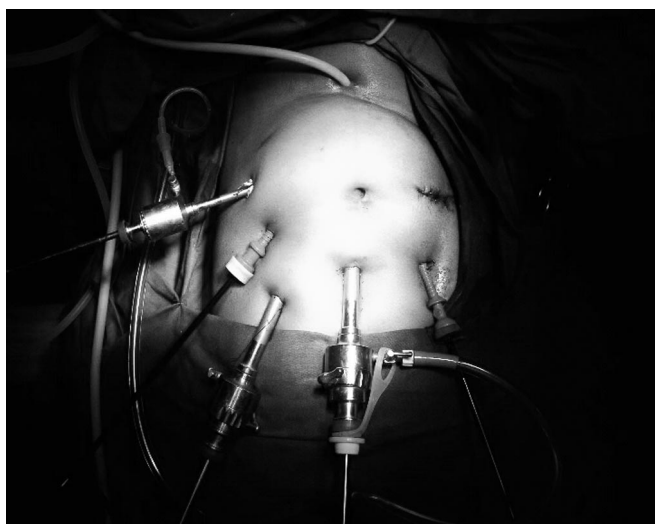


Figure 2. Image showing port positions.



Figure 3. Stoma being released.

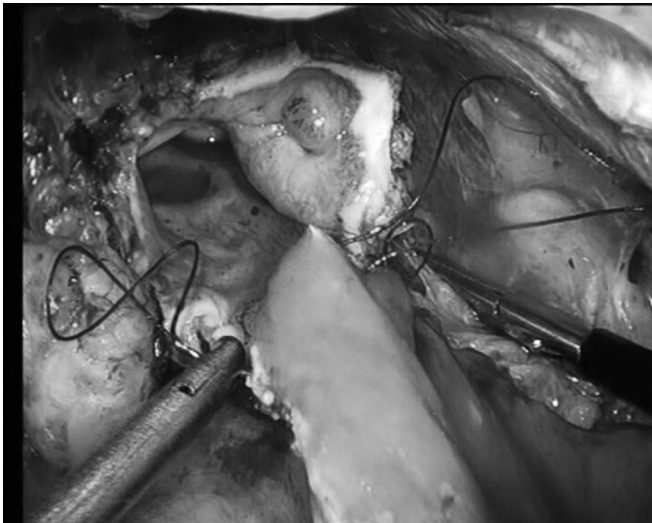


Figure 4. Ileo cystoplasty (anastomosis in progress).

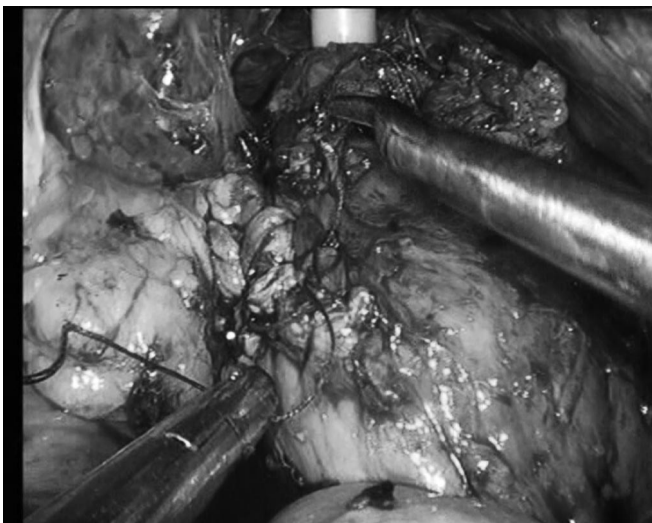


Figure 5. Completed augmented cystoplasty (note the suprapubic Foley catheter).

antimesenteric border (for detubularization), except at the site of ureteric reimplantation. Transverse cystotomy was done from one ureteric orifice to the other, and the detubularized ileum was sutured to the cystotomy using continuous 3–0 Vicryl sutures (**Figures 4 and 5**). The posterior layer was sutured first. Omental wrapping was done. The ureteroenteric anastomosis was left undisturbed. A suprapubic catheter, urethral catheter, and drain were placed, and the port sites were closed. Operative time was 250 min, and approximate blood loss was 180 mL.

The child had an uneventful postoperative recovery. He was on analgesics for 3 d postoperatively. Oral feeding

was started on the second postoperative day. The analgesic requirement was minimal, considering the major procedure undertaken.

The drain was removed on the fifth postoperative day, and he was discharged on the same day. A cystogram done on the 14th postoperative day showed no leak, and the suprapubic catheter was removed. The urethral catheter was removed on the 21st postoperative day. The boy was able to empty his bladder by self-intermittent catheterization comfortably. At 1-y follow-up, the child has healthy renal parameters with no clinical urinary tract infection.

DISCUSSION

Ileal conduit urinary diversion is a temporary option in neurogenic bladder with compromised renal function or as a last option in neurogenic bladders when complex reconstruction is not preferred or possible. Undiversion (refunctionalization) can be undertaken electively when the patient prefers the procedure.²



Figure 6. Postoperative cystogram.

This child with sacral agenesis had static neurological status and was doing well 5 y after ileal conduit diversion. However, management of ileal conduit with an external urinary collection device (urostomy bag) was difficult, and the parents and the boy sought alternative methods to get rid of the urostomy. His renal parameters were stable. Isotope renogram showed no obstruction and improved GFR on the left side. The boy was older at this point and was more receptive to intermittent self-catheterization, and hence an option of undiversion was discussed. Because laparoscopy is associated with less morbidity, laparoscopic undiversion (refunctionalization) was carried out.

The cystogram taken after 1 y showed improvement in the bladder capacity to 150 mL (**Figure 6**). Urodynamic study showed increase in the compliance to 10 mL/cm H₂O. He is comfortably emptying his bladder by intermittent self-catheterization.

Urinary undiversion is predominantly performed in pediatric patients with myelodysplasia and other neurogenic bladder dysfunctions.⁴ Laparoscopic undiversion was first reported by Wolf et al.⁵ in 1998 in a patient with bladder and rectal injuries. Laparoscopic-assisted undiversion to orthotopic neobladder was reported in 2006 by Castillo et al.⁶ The laparoscopic approach is postulated to reduce ileus resulting from less bowel handling and less pain because of avoidance of abdominal wall retractors.⁶ Our report is the first case report of laparoscopic undiversion with augmentation in a child.

CONCLUSION

Laparoscopic undiversion with augmentation is a feasible, effective, and less-morbid procedure in a child and is possibly a better alternative to open undiversion.

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