

Outcomes of Incontinent Ileovesicostomy in the Pediatric Patient

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Purpose: Ileovesicostomy is a reconstructive option in complex urological cases but pediatric specific outcomes are lacking. We report our results with pediatric ileovesicostomy.

Materials and Methods: We retrospectively evaluated patients younger than 18 years undergoing incontinent ileovesicostomy at Vanderbilt University. History, urinary tract management and operative course were reviewed in the electronic medical record. Particular attention was given to immediate and long-term postoperative complications.

Results: Nine patients underwent incontinent ileovesicostomy between 2000 and 2013 at a mean age of 10.3 years (range 1.4 to 15.5). Surgical indication was sequelae of neurogenic or nonneurogenic neurogenic bladder (such as infection or worsening hydronephrosis) in 5 patients, reversal of vesicostomy in 3 and closure of cloacal exstrophy in 1. All 9 patients were thought incapable of reliable clean intermittent catheterization due to family unwillingness, poor social support or patient refusal. Median followup was 11.5 months (mean 48.2, range 1.3 to 144.8). Immediate postoperative complications included ileus requiring total parenteral nutrition and a wound infection in 1 patient. Long-term complications included urinary tract infection in 2 patients (febrile in 1 and positive culture for foul smelling urine in 1), stomal issues in 2 and temporary urethral leakage in 1. Constipation affected 3 children in long-term followup (all with neurogenic bowel preoperatively). Postoperative creatinine was stable or improved in all patients.

Conclusions: Ileovesicostomy is a viable approach in children left with few other options, particularly those who are noncompliant or physically/socially unable to handle catheterization. This operation can help keep such patients out of diapers.

Key Words: pediatrics; surgical stomas; urinary bladder, neurogenic; urinary diversion; urinary tract infections

ILEOVESICOSTOMY was first described in the 1950s.^{1,2} The procedure has been reported in the adult literature as a form of urinary diversion to address devastatingly inadequate bladder emptying.

Although often seen as a last resort due to its incontinent nature,

ileovesicostomy has certain benefits where an incontinent diversion may be desirable, especially in the pediatric population. It allows a low pressure urinary conduit with a DLPP as low as 8 cm H₂O in a population at increased lifetime risk for upper urinary tract damage from

Abbreviations and Acronyms

BMI = body mass index
CIC = clean intermittent catheterization
DLPP = detrusor leak point pressure
MACE = Malone antegrade continence enema
RBUS = renal bladder ultrasound
TPN = total parenteral nutrition
UTI = urinary tract infection

Accepted for publication August 5, 2013.

Study received institutional review board approval (No. 130242).

The use of REDCap and the Synthetic Derivative was supported by CTSA Award No. UL1TR000445 from the National Center for Advancing Translational Sciences. Its contents are solely the responsibility of the authors and do not necessarily represent official views of the National Center for Advancing Translational Sciences or the National Institutes of Health.

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high pressure voiding.³⁻⁵ It is also noncatheter dependent, which is ideal for those children who may have not only physical, but also emotional, social and cognitive barriers to compliance with clean intermittent catheterization.⁶ In addition, this approach avoids an indwelling urethral catheter in a population with a whole lifetime for complications to develop, as well as undesirable sequelae such as career from long-term indwelling catheterization. Furthermore, it allows suprapubic urinary diversion, enabling those dependent on diapers to use a stomal appliance for urine collection with resultant social ramifications and thus improved quality of life.⁷ Self-esteem may also be improved as these children are able to wear real underwear, and social acceptance may be strengthened as the nidus for strong odor is removed. Suprapubic diversion also helps to avoid perineal breakdown and infection. Finally, given that the bladder is left in situ, the procedure is reversible and still enables revision to incontinent diversion.

We reviewed our experience with ileovesicostomy as a form of bladder management in children. There are no known studies published specifically regarding ileovesicostomy in children. We were interested in the population of children in whom this approach has been used at our institution and the postoperative outcomes.

MATERIALS AND METHODS

After receiving institutional review board approval we performed electronic medical chart reviews on patients identified as potentially having undergone ileovesicostomy at Monroe Carell Jr. Children's Hospital at Vanderbilt University, using ICD codes for urinary reconstruction (ie ileal conduit, appendicovesicostomy, enterocystoplasty) such as 50820, 50845, 51590, 51595 and 51960. We only included in the study patients younger than 18 years who had an operative note documenting incontinent ileovesicostomy procedure as described by Cordonnier,¹ using a segment of ileum with 1 end anastomosed to the bladder and the other matured as a stoma to the lower abdominal wall, leaving the native ureters attached to the native bladder or bladder plate. The length of ileum was tailored to patient size but was roughly measured as the distance from bladder to abdominal wall without redundancy so as to promote adequate drainage. The location of the stoma was determined and marked preoperatively in conjunction with a stoma therapist. The stoma was discussed with the patient and placed in a location that would avoid clothing waist bands and abdominal wall folds. Efforts to promote drainage postoperatively included teaching postural drainage, such as the patient rolling to the ipsilateral side of the stoma at least once daily.

Charts were reviewed for patient history, including indication for surgery, prior urinary tract treatment, imaging, urodynamics, intraoperative and postoperative

care, preoperative and postoperative renal function, complications or subsequently required interventions as a direct result of the ileovesicostomy. Our followup protocol consists of a postoperative office visit at 1 month, 3 months and 6 months, and then yearly if the patient is stable. Serum creatinine, B12 level and renal ultrasound are checked at the 1-month visit and then yearly. Length of followup was defined as time from surgery to last documented clinical contact with pediatric urology.

Data collected from the medical chart were recorded and managed using REDCapTM. REDCap is a secure, Web based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry, 2) audit trails for tracking data manipulation and export procedures, 3) automated export procedures for seamless data downloads to common statistical packages and 4) procedures for importing data from external sources.⁸

RESULTS

Patient Demographics

We identified 6 boys and 3 girls who had undergone incontinent ileovesicostomy at our institution between 2000 and 2013. Mean patient age at operation was 10.3 years (median 11.2, range 1.4 to 15.5). Patient characteristics are outlined in the table. Indications for incontinent ileovesicostomy were sequelae of neurogenic or nonneurogenic neurogenic bladder (such as infection or worsening hydronephrosis) in 5 patients, reversal of vesicostomy for neurogenic bladder in 3 and closure of cloacal exstrophy in 1. All 9 patients were thought incapable of reliable CIC, including 4 whose families were unwilling to help with catheterization, 4 who refused or were poorly compliant with prior CIC and 1 whose social situation precluded catheterization. Eight patients had urinary incontinence (3 from vesicostomy and 1 from unclosed cloacal exstrophy).

All 9 patients had preoperative RBUS available, of which 4 were abnormal. Seven patients underwent urodynamics preoperatively, with all 7 being abnormal. Average DLPP was 60.6 cm H₂O (median 72, range 29 to 97), and DLPP was greater than 40 cm H₂O in 4 patients.

Operative Procedure

Three surgeons performed the 9 ileovesicostomies. Mean operative time was 355.3 minutes (median 328.5, range 256 to 636). Seven patients underwent concomitant procedures, and the patient with exstrophy underwent multiple concomitant reconstructive procedures by pediatric general surgeons and pediatric orthopedic surgeons. Mean hospital stay was 9 days (median 6, range 4 to 27). Seven children had hospital stays of 8 days or less, while 2

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