The Percutaneous Cecostomy Tube in the Management of Fecal Incontinence in Children

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ABSTRACT

Purpose: To retrospectively evaluate experience with percutaneous cecostomies and their long-term outcomes.

Materials and Methods: Between June 1994 and March 2009, 290 patients (mean age, 10.1 y) with fecal incontinence underwent percutaneous cecostomy tube placement and subsequent tube management. Technical success, procedural complications, and long-term follow-up until March 2012 were evaluated.

Results: A cecostomy was successfully placed in 284 patients (98%), and 257 of 280 patients (92%) underwent a successful exchange to a low-profile tube. A total of 1,431 routine exchanges to low-profile tubes were reviewed in 258 patients (mean, 1.6 $\pm$ 1.3 routine tube changes per 1,000 days). Eighty-five patients (29%) experienced one or more early problems after cecostomy, and 10 (3%) had major complications. In the total 463,507 tube-days, 938 late problems were noted: 917 (98%) minor and 22 (2%) major. Forty patients had the cecostomy catheter removed and 141 "graduated" to an adult health care facility.

Conclusions: The percutaneous cecostomy procedure provides a safe management option for fecal incontinence in the pediatric population.

ABBREVIATIONS

BMI = body mass index, RAS = retention anchor sutures, VP = ventriculoperitoneal

Bowel and bladder control is generally learned between 2 and 4 years of age. Medical conditions can impede this developmental milestone, including neuromuscular disorders, spina bifida, and imperforate anus (1). If left untreated, fecal incontinence can be medically, socially, developmentally, and emotionally disabling (2).

Multiple therapies have been used to manage defecation disorders, including dietary modifications, laxatives, suppositories, enemas, manual disimpaction, biofeedback, and electrostimulation (2–5). Despite these efforts, many patients do not achieve fecal continence (5). Intermittent fecal disimpaction and retrograde enemas are effective in partial emptying of the colon, but require a caregiver to administer. This inhibits independence and compliance as the child grows older (6). A surgically constructed appendicostomy is a method to deliver antegrade enemas and colonic washouts, but is associated with stomal stenosis and leakage, resulting in noncompliance (5,6).

In 1996, Shandling et al (2) described management of overflow incontinence by a catheter inserted

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percutaneously into the cecum under fluoroscopic guidance (2). The cecostomy tube allows for delivery of antegrade enemas to evacuate the entire colon at regular controlled intervals, thereby avoiding uncontrolled fecal soiling. It also avoids the pain associated with catheterization of appendicostomies, and favorable clinical outcomes have been reported in children with this approach (1–4,7–11). The purpose of the present study is to report our experience with the image-guided percutaneous cecostomy procedure and the long-term safety and outcomes of this intervention, with a focus on the lessons learned over the years.

MATERIALS AND METHODS

This is a retrospective single center case series review. All 290 patients who underwent a cecostomy procedure between June 1994 and March 2009 were reviewed until March 2012 (average follow-up, 11 y; range, 3–18 y). Patients who had a Malone antegrade continence enema were excluded, and institutional research ethics board approval was obtained.

Data Collection

Data were obtained from the hospital's picture archiving and communication systems, interventional radiology database (Esh-IGT, Toronto, Ontario, Canada), and electronic patient charts. These records provided inpatient and outpatient clinic details, emails, and telephone documentation between patient families and the interventional radiology clinic nurse.

Table 1. Patient Demographics (N = 290)

Characteristic	Value
Mean age (y) ± SD	10.1 ± 4.4
Sex	
Male	170 (59)
Female	120 (41)
Diagnosis	
Spina bifida with VP shunt	138 (48)
Spina bifida without VP shunt	27 (9)
Imperforate anus	64 (22)
Vater syndrome	19 (7)
Other	42 (14)
Weight	
< 3%	60 (21)
3%–25%	65 (22)
25%–75%	78 (27)
75%–97%	70 (24)
> 97%	15 (5)
NA	2 (1)

Values in parentheses are percentages.
NA = not available, SD = standard deviation, VP = ventriculoperitoneal.

Patient demographics (sex, age, underlying diagnosis, weight and height at primary cecostomy insertion, and tube exchanges) were obtained (**Table 1**). Each patient's course was divided into early and late. The early period extended from the periprocedural phase until the initial pigtail catheter was changed to a longer-term low-profile tube, approximately 8 weeks after insertion. Periprocedural data included type of bowel preparation, antibiotics, insertion technique, and technical difficulties during the initial and first low-profile tube placement. The late period included follow-up and tube maintenance until March 2012 or tube removal. Early and late problems included difficulties with tube changes, tube dwell times, and bowel irrigation problems. Late outcomes included patient status at final review: continence achieved, tube removed, "graduation" to an adult facility, or death.

Device

The initial device was an 8-F Mac-Loc pigtail catheter (Cook, Bloomington, Indiana). When the tract had matured (6–8 wk), it was replaced with a Chait Trapdoor cecostomy (Cook, Bloomington, Indiana), a low-profile purpose-designed device (8 F). There were three tube lengths available for different tract lengths: 0–6 cm (short), 3–9 cm (medium), and 6–14 cm (long) (11) (**Fig**).

Technique

Periprocedure Care. Bowel preparation regimens were employed to cleanse the bowel. An abdominal radiograph the morning of the procedure was used to assess residual fecal load. A previous contrast enema study was uncommonly employed to determine cecal position.

Intravenous sedation or general anesthesia was used, and antibiotic prophylaxis was given intravenously. Abdominal and pelvic ultrasonography identified organ positions and any fluid collections (eg, ventriculoperitoneal [VP] shunt fluid). Intravenous glucagon 0.5–1.0 mg

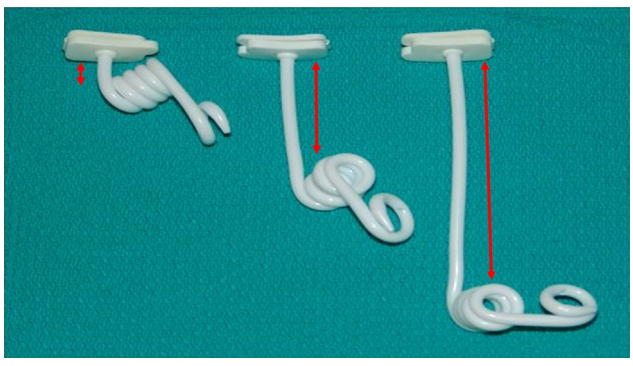

Figure. Permanent cecostomy tube. Trapdoor tube shown in different lengths called short, medium, or long according to the length of the straight component as highlighted by the arrows. Each tube comes with a unique adapter and connecting tube for use during irrigations. The low-profile tube lies flat against the skin, and the spring design provides its retention mechanism. (Available in color online at *www.jvir.org*.)