Percutaneous colonoscopic cecostomy for management of chronic constipation in children

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Background: Chronic constipation and encopresis are common problems in children with spina bifida and anorectal anomalies. Commonly used therapies include complicated bowel regimens and antegrade continence enemas delivered via surgically placed appendicostomies and radiologically placed cecostomies.

Methods: A technique is described for percutaneous placement of cecostomies for the delivery of continence enemas or venting.

Results: Percutaneous cecostomies were placed in 12 patients. Improvement in bowel management occurred in all patients.

Conclusions: Percutaneous endoscopic cecostomy is a safe and effective method for the treatment of intractable constipation.

Chronic constipation with or without encopresis may be difficult or impossible to treat in children with spina bifida, anorectal malformations, and neurologic handicaps. Traditional management with diet modifications, laxatives, enemas, and biofeedback is often unsuccessful.1,2 The antegrade continence enema (ACE) delivered through a surgically placed appendicostomy or cecostomy was first described by Malone et al.3 in children with spina bifida and anorectal anomalies. This procedure entails a major surgical operation. Shandling et al.4,5 described the successful insertion of percutaneous cecostomies under fluoroscopic guidance for the delivery of the ACE in a group of children, most of whom had spina bifida. With the use of ACE through either an appendicostomy or cecostomy, most children develop continence.3-10 There are case reports that describe the colonoscopic placement of percutaneous cecostomies in adults for colonic decompression in Ogilvie’s syndrome, left-sided colonic obstruction due to malignancy and pseudo-obstruction.11,12 Percutaneous endoscopic cecostomy (PEC) for the delivery of ACEs in the management of intractable constipation and encopresis has not been previously reported.

PATIENTS AND METHODS

Twelve patients with chronic constipation with or without encopresis or with encopresis alone in whom medical management with laxatives, enemas, and dietary modification was unsuccessful or who required colonic venting for Hirschsprung’s disease or Ogilvie’s syndrome had PECs placed. The underlying medical problems were spina bifida (3), imperforate anus (3), nemaline myopathy (1), cerebral palsy (1), colonic pseudo-obstruction (1), and neurofibromatosis with segmental colonic dysmotility (1). In 1 patient with Hirschsprung’s disease and recurrent enterocolitis and in 1 patient with cystic fibrosis and recurrent distal intestinal obstruction syndrome and Ogilvie’s syndrome, the PECs were placed for venting.

After a bowel cleansing, colonoscopy was performed to the cecum with the patient under general endotracheal anesthesia (11) or conscious sedation (1). The standard
pull technique for percutaneous gastrostomy was used. The anterior abdominal wall was transilluminated, prepared, and draped. A small incision was made and a trocar was passed into the cecum under direct vision. A guidewire was passed, grasped with a snare, and pulled out through the anus. The guidewire was tied to a 20F pull-type PEG tube (Bard, Bellarica, Mass.) and pulled retrograde through the colon and out the abdominal wall (Fig. 1). Antibiotics (e.g., metronidazole and gentamicin) were administered prophylactically to all patients for 24 hours.

The cecostomy tube was flushed with 20 mL of tap water twice a day for the first 7 to 14 days. As reported by Shandling et al., ACES were then given by using Fleet’s PhosphoSoda (CB Fleet Co., Lynchburg, Va.) (0.3-0.6 mL/kg) followed by tap water or polyethylene glycol solution (0.5-1.5 L) daily or every other day. The regimen was individualized so that the patient would pass a stool 30 to 45 minutes after the ACE and remain clean for the rest of the day.

This review was approved by the Research and Publications Committee/Human Rights Review Board of our hospital. Informed consent was obtained from the patient or the parent or guardian of each patient.

**OBSERVATIONS**

PEC was attempted in 13 patients (7 males) with an age range of 17 months to 22 years. The procedure was successful in 12 of 13. In the 1 patient in whom the PEC could not be placed, attempts by 3 endoscopists to colonoscopically intubate the cecum were unsuccessful because of the length and tortuosity of the colon. This patient underwent surgical cecostomy.

The duration of the procedure was typically 20 to 30 minutes (range 15 to 90 minutes). The hospital stay after PEC averaged 2 days (range 2-7 days).

Postoperative complications included urinary tract infection (1), seizures (1), and fever with negative blood culture, abdominal distention, and pain with spontaneous resolution on the fifth day (1). The patient with repaired Hirschsprung’s disease and recurrent enterocolitis had enterocolitis develop 9 days after PEC placement, before use of his cecostomy tube. Severe abdominal distension led to
pressure necrosis from the external bumper. He was successfully treated with irrigation, venting of the PEC tube, and an antibiotic administered orally. One child died 9 months after PEC placement of his underlying disease. Five children had granulation tissue develop around the stomas, which was treated with silver nitrate or triamcinolone cream. Five of the 10 patients had ventriculoperitoneal shunts. None of these patients had cerebrospinal fluid infections develop after placement of the PEC.

All 11 surviving patients have improved on their ACE regimen after a follow-up period of 1.5 to 31 months (average 13 months). All patients and families were pleased with their cecostomy tubes and ACEs. For example, one 7-year-old boy with repaired imperforate anus who had never achieved continence was referred for evaluation for colectomy. After PEC placement and ACE, he has been continent for 20.5 months and no longer requires diapers. Four other patients (3 spina bifida, 1 nemaline myopathy) who required diapers have gained anorectal continence after PEC but have remained in diapers because of urologic problems.

**DISCUSSION**

Encopresis is humiliating and devastating to both the individual and family. Traditional management consists of one or a combination of the following: diet modification, laxatives, enemas, suppositories, and biofeedback. All of these therapies require patience and long-term compliance, which can be extremely frustrating both to patients and families. In children with spina bifida and anorectal anomalies, lack of control of the anal sphincter may lead to incontinence.

The ACE procedure, first described by Malone et al., is a highly successful method for dealing with this problem. The Malone procedure is performed by resecting the appendix with a cuff of cecum. The remaining cecum is then reversed and sutured to the skin. A modified Malone procedure is preferred by others. In this procedure, the appendix is left in situ and sutured to the skin. A circular flush stoma is created either at the appendiceal tip or the reversed cecum followed by an antireflux procedure. A 10F catheter is left in this conduit for 2 weeks. Unfortunately, the Malone procedure requires a laparotomy. It can be performed laparoscopically if the appendix is intact. Complications of surgical cecostomy or appendicostomy include stomal stenosis, stoma leakage, difficulty in intubating the stoma, and appendiceal necrosis.

Shandling et al. simplified the delivery of the ACE by inserting a percutaneous cecostomy under fluoroscopic guidance. After bowel cleansing, the location of the viscera is identified by US. Through a self-retaining catheter in the rectum, the cecum and the proximal ascending colon are insufflated with air. Access to the cecum is obtained with a trocar, a guidewire, a sheath with sutures, and a fascial dilator are used. A 10F 15 cm Cope catheter (Cook Inc., Bloomington, Ind.) with a retention loop is sutured against the anterior abdominal wall. The catheter is flushed with 10 mL of saline solution twice daily. Most of the patients are discharged on the second hospital day. The use of the ACE is begun 1 week after placement. The complications encountered were granulation tissue formation (treated with cautery), local infection, and dislodgement of the cecostomy tube into the subcutaneous tissue. One patient had his cecostomy tube placed in the terminal ileum but functioned well.

The technique of percutaneous placement of cecostomy was modified based on previous reports of PEC in adults and inserted cecostomies at colonoscopy. With regard to hospital stay and recovery time, our method is comparable to that used by Shandling et al. Placement at cecostomy offers the advantage of direct visualization of the cecostomy site, which avoids inadvertent placement of the cecostomy in the terminal ileum or other undesirable sites. Having the cecostomy tube in place at all times prevents the complication of stomal stenosis and difficulty in intubating the stoma encountered in a surgically placed cecostomy. The PEC tube is changed to a low profile gastrostomy device to decrease the possibility of pain and dilatation of the stoma as well as for aesthetic reasons.

Our patients and families have been extremely satisfied with both the procedure and the ease and efficacy of the ACE. Teenage patients have become more independent. Before PEC, most of our patients were following complicated home bowel regimens, which at times required several hours. After PEC placement, the home bowel regimen is reduced to 45 to 60 minutes several times a week. ACE through PEC has dramatically changed the quality of life of these patients and their caregivers.

This procedure is recommended for selected patients with spina bifida, spinal cord injury, anorectal anomalies, and severe neurologic handicaps. In children with Hirschsprung’s disease and recurrent enterocolitis or colonic pseudoobstruction, PEC can be used for irrigation and venting. ACE through the use of PEC is not recommended for normal individuals with constipation in whom medical management is unsuccessful because of noncompliance, because compliance is also required for a successful ACE program.
REFERENCES