

Percutaneous endoscopic colostomy for adults with chronic constipation

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Percutaneous endoscopic colostomy for adults with chronic constipation: Retrospective case series of 12 patients

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Abstract

Background: Percutaneous endoscopic colostomy (PEC) is a technique derived from percutaneous endoscopic gastrostomy. When conservative treatment of chronic constipation fails, colon irrigation via PEC seems less invasive than surgical interventions. However, previous studies have noted high complication rates of PEC, mostly related to infections. Our aim was to report our experiences with PEC in patients with chronic refractory constipation.

Methods: Retrospective analysis of all patients who underwent PEC for refractory constipation in our secondary referral hospital between 2009 and 2016.

Key Results: Twelve patients received a PEC for chronic, refractory constipation. Short-term efficacy for relief of constipation symptoms was good in 8 patients and moderate in 4 patients. Two patients had the PEC removed because of spontaneous improvement of constipation. Three patients, who initially noticed a positive effect, preferred an ileostomy over PEC after 1-5 years. One PEC was removed because of an abscess. Long-term efficacy is 50%: 6 patients still use their PEC after 3.3 years of follow-up. No mortality occurred.

Conclusions and Interferences: PEC offers a technically easily feasible and safe treatment option for patients with chronic constipation not responding to conventional therapy. Long-term efficacy of PEC in our patients is 50%.

KEYWORDS

colonoscopy, colostomy, endoscopy, percutaneous endoscopic colostomy

1 | INTRODUCTION

A subgroup of up to 10% of patients with chronic constipation does not sufficiently respond to dietary changes, oral laxatives, rectal enemas, or retrograde lavage.¹⁻⁵ While retrograde colon lavage can be efficacious, it is time-consuming⁶ and often large volumes are needed, resulting in considerable patient discomfort. When all conservative measures fail, surgical treatments such as appendicostomy, ileostomy with colonic exclusion, or segmental or total colectomy are considered.^{1-3,5,7-9} Previous reports demonstrate variable efficacy of these surgical treatment entities, and morbidity of these procedures is

high.^{7,10-12} Less invasive and potentially reversible procedures such as sacral neuromodulation and tibial nerve stimulation have been disappointing with respect to efficacy.¹³⁻¹⁷ Therefore, exploration of potentially efficacious minimally invasive therapeutic alternatives for refractory constipation is warranted.

Percutaneous endoscopic colostomy (PEC), first described in 1986, is derived from percutaneous endoscopic gastrostomy (PEG).¹⁸ PEC enables antegrade lavage in case of chronic constipation, without the need for oral intake of large volumes of laxatives, and the procedure is reversible.¹⁸⁻²⁰ Remarkably, PEC is only rarely considered as an alternative treatment for chronic refractory constipation. Only few

studies have reported on efficacy and safety of PEC in chronic refractory constipation, mostly in case reports.¹⁸⁻²³ These data are in favor of PEC, with moderate-to-good efficacy. However, there appears to be a barrier among clinicians toward placement, probably due to the considerable number of complications that have been reported (e.g., severe infections including fecal peritonitis), given the fact that the colon is involved.

Therefore, it has not become a widely applied technique. We believe that the role of PEC in the treatment of chronic refractory constipation is underestimated and underreported while the complication risks appear to be overestimated. The place of PEC in the therapy of chronic constipation especially vs more invasive surgical techniques considering efficacy, risk, and reversibility should be determined. Over the past years, we have used PEC in patients in whom retrograde colon lavage was no longer effective or was not tolerated by the patient. In addition, we describe the pull placement technique that is a simple and possibly safer variation potentially decreasing risk for complications. Aim of this study was to report our experiences with PEC in patients with chronic refractory constipation using the pull technique known from PEG placement and to position these experiences into perspective.

2 | MATERIALS AND METHODS

2.1 | Study design and patients

After institutional board approval, a retrospective evaluation of all PEC placements performed for refractory constipation between 2009 and 2016 was performed. Analysis of chronic constipation consisted of laboratory analysis (thyroid stimulating hormone, calcium), colon transit studies (radio-opaque marker test), and defecography, when the treating physician (LG) felt these were clinically indicated.

The radio-opaque marker test involved the intake of 10 markers over a period of 6 days. Abdominal X-ray image was obtained on the 7th day. Slow colon transit was defined as a transit time >65 hours (calculated as $2.4 \times$ the number of markers remaining in the colon).

2.2 | PEC procedure

All PEC procedures were performed by the same experienced gastroenterologist (LG). Bowel preparation was performed with bisacodyl 10 mg 2 days before the procedure, and 2 L of macrogols and electrolytes (Moviprep™; Norgine B.V., Amsterdam Zuid-Oost, The Netherlands). Before the procedure, antibiotics were administered intravenously (i.v.) (amoxicillin/clavulanic acid 1000 mg/200 mg). Midazolam 5 mg (i.v.) was used for conscious sedation, combined with fentanyl 100 µg. During colonoscopy, the colon was inflated with CO₂. Bowel cleansing was judged adequate in all cases (Boston Bowel Preparation Scale [BBPS] ≥ 2 for each segment). Transillumination was used to identify an appropriate puncture site in the ascending colon. Skin was infiltrated with local anesthetics, with puncture through the colonic wall. The anesthetic needle was held inside the colon with a jaw forceps to prevent dislocation. A trocar was inserted after which the needle was removed. A guidewire was placed through the trocar and

Key Points

- Percutaneous endoscopic colostomy (PEC) is an alternative technique in refractory chronic constipation, but is not widely used. We aimed to report experiences with PEC in patients with refractory chronic constipation using an easily applicable technique.
- Within our patients group, PEC offered a safe and efficacious alternative to surgical intervention at short term in all patients and for longer term in 50% of patients with chronic refractory constipation not responding to conventional therapy.
- In refractory constipation, PEC is a potential worthwhile alternative that should be considered as option in the treatment algorithm.

pulled endoscopically through the colon. PEC was then placed with the pull technique²⁴ (Freka® PEG; Fresenius Kabi AG, Bad Homburg v.d.H., Germany). In addition, antimicrobial gazes (AMD Antimicrobial Drain Sponges) (Covidien™: Excilon™ PHMB, Mansfield, MA, USA)²⁵ were placed around the insertion site for 3 days with daily assessment for signs of infection.²⁶

2.3 | Post procedure

Antegrade lavage was started immediately with 500 mL of lukewarm water per day. Antibiotics were continued orally for 5 days (amoxicillin/clavulanic acid 500 mg/125 mg). All patients were instructed to push and turn the tube daily, after 1 week (in which the fistula forms).

2.4 | Data collection

Patients were discharged after 1 day and were seen at regular intervals to evaluate symptoms and therapeutic efficacy. Retrospectively, all patient files were examined, with a follow-up of 1-7 years (mean 3.3 years).

2.5 | Outcome measures

Of primary interest was to assess improvement of constipation symptoms, determined using a Global Physician Assessment Scale (GPA), as derived from Hanauer et al²⁷ (GPA 1: complete relief; GPA 2: marked relief; GPA 3: moderate relief; GPA 4: slight relief; GPA 5: no relief; GPA 6: worsening symptoms) based on the clinical effect reported by the patient at the time of review at outpatient visit, 6 weeks after placement. Other parameters assessed were adverse events and requirement for surgery during follow-up. Patients were seen regularly with close follow-up. One of the authors (LG) has treated and followed all patients. All data were recorded by LG in the patients' files. Patients were instructed to report to the hospital and not to their GP or other healthcare provider in case of problems or complications.

3 | RESULTS

Twelve patients were included in the analysis (75% female, mean age 56 (range 28-70 years)). Characteristics are listed in Table 1. A pragmatic approach toward diagnostics was followed. In patients with a clear clinical diagnosis (symptoms, digital rectal examination), appropriate conservative treatment was started. In unclear cases, defecography (6/12 patients) and/or radio-opaque marker studies (5/12 patients) were performed. Conservative therapeutic measures consisted of oral laxatives and enemas, pelvic floor therapy (in case of pelvic floor dysfunction), and retrograde colon lavage. One patient refused retrograde lavage.

Percutaneous endoscopic colostomy placement was technically successful in all patients, without adverse events during the procedure. Patients adjusted the amount and frequency of irrigation according to the effect (ranging from 500-1000 mL per 1-2 days).

3.1 | Effect

Percutaneous endoscopic colostomy placement and irrigation were effective in relieving constipation in all patients at short-term follow-up (6 weeks). Eight patients reported a good effect (GPA = 1) and 4 patients reported a moderate effect (GPA = 2).

3.2 | Complications

No major complications such as fecal peritonitis or bleeding occurred, and mortality was zero. Minor peristomal infection developed in 3 patients and a small abscess developed in 1 patient (Table 2). These complications were successfully treated with oral antibiotics.

Persistent abdominal wall pain occurred in 2 patients (16.7%), treated with local anesthetics (Figure 1). One PEC was replaced after 2 years because of a buried bumper, after which an abscess developed, which led to a persistent colocutaneous fistula after removal of the PEC.

3.3 | Long-term outcomes

At 6 months, efficacy of PEC treatment for alleviating symptoms was 66%. In 6 patients (50%), PEC is still in use (mean follow-up 3.3 years). Spontaneous improvement of constipation after 1-2 years resulted in removal of the PEC in 2 patients. Three patients, who initially noticed a positive effect, preferred an ileostomy over PEC after 1-5 years. These patients experienced too much discomfort from daily colonic irrigation (n = 2) or deterioration of the effect (n = 1). The fistula closed spontaneously in all 3. As mentioned above, in 1 patient, the PEC was removed because of abscess formation.

TABLE 1 Baseline characteristics

	M/F and age	RED +/-	Additional diagnosis	Frequency of bowel movements prior to PEC (defecation once per)	Radio-opaque marker study	GPA 6 weeks after PEC	Results at long term
1	F 73 years	-	-	7 days	Not performed	1	Removed due to complication
2	F 42 years	-	-	30 days	STC	2	Still in use
3	F 60 years	+	-	4 days	Not performed	1	Removed and received surgery
4	M 61 years	+	-	30 days	Normal	2	Still in use
5	F 49 years	+	-	3 days	STC	2	Removed and received surgery
6	F 63 years	+	-	7 days	Not performed	1	Still in use
7	F 55 years	-	-	5 days	STC	1	Removed due to relief of constipation
8	F 50 years	+	EDS-3	14 days	Not performed	2	Removed due to relief of constipation
9	F 32 years	-	EDS-3	7 days	Not performed	1	Removed and received surgery
10	F 72 years	+	-	5 days	Not performed	1	Still in use
11	M 56 years	-	Paraplegia	30-40 days	STC	1	Still in use
12	M 71 years	-	Paraplegia	7 days	Not performed	1	Still in use

STC = slow transit colon (confirmed by radio-opaque marker study), RED = rectal evacuation dysfunction (as determined by evacuation proctography or physical examination), EDS = Ehlers-Danlos Syndrome, -: no(ne), GPA = Global Physician Assessment Scale.

Complication	N (%) Total N = 12	Clavien–Dindo classification ⁴⁸
Peristomal infection (treated with antibiotics, no PEC removal)	3 (25)	I
Abscess (treated with antibiotics, no PEC removal)	1 (8.3)	I
Persistent abdominal wall pain (no PEC removal)	2 (16.7)	I
Buried bumper (requiring PEC removal) and abscess with colocutaneous fistula	1 (8.3)	IIIa

TABLE 2 Complications after PEC**FIGURE 1** View on luminal side of the percutaneous endoscopic colostomy (PEC) in transverse colon, with small hematoma due to local injection of anesthetics on the left side of the PEC

4 | DISCUSSION

Percutaneous endoscopic colostomy is a potential alternative treatment option in patients with chronic constipation, when conservative treatment has failed. The procedure is reversible and does not exclude performing future surgical interventions. In our study population, treatment of chronic constipation with PEC had a moderate-to-good effect on symptoms and a low rate of adverse events.

Efficacy of this therapeutic intervention in our population for alleviating chronic constipation was 66% at 6 months, a result comparable to previous literature data.^{13,20} Long-term efficacy is considerable (50%), especially when taking into account the refractory nature of symptoms. To our knowledge, this is the first reporting on longer term efficacy (mean 3.3 years) of PEC for chronic constipation.^{19,21} In our group, 2 patients (16.7%) experienced spontaneous relief of constipation. This is an argument in favor of careful evaluation of chronic constipation and of being restrictive in referral for surgery.

With respect to minor infectious adverse events, our study showed rates (33%) comparable to previously reported data (18–77%).^{18,19,21,23} Tube removal due to infection or abscess was necessary in 1 patient (8.3%), in contrast to 44% of the reported rates.¹⁹ Fecal peritonitis is a major issue in PEC, considering the abundance of resident colonic microbiota. We did not encounter fecal peritonitis in any of our 12 patients, whereas this has been reported in 9%–12% of

patients previously.^{18,19} We believe that the regimen with use of antibiotic gazes in addition to systemic antibiotics may have contributed in preventing fecal peritonitis.²⁶

Our mortality rate was zero, contrary to literature data where high rates have been reported, up to 26%.¹⁹ A recent study on this topic described 19 patients with a 1-year follow-up period. Pain occurred in 47% of patients, which lead to removal of the tube in 26%.²¹ We observed pain in only 16.7% of patients. We believe that this discrepancy can be explained by the technique used for PEC placement. The PEC technique used by Duchalais et al²¹ and Moriwaki et al²⁸ includes insertion of anchors to fixate the colon to the abdominal wall, thereby potentially increasing the risk for infections and pain, and making the technique more difficult (success rates reported of 90%). The pull technique we used is based on a procedure that most endoscopists who perform PEG placements are familiar with. Baraza et al¹⁸ and Cowlam et al¹⁹ also used this technique but held the needle in place with a snare, while in our opinion a grasping forceps provides better stability. Previous studies using the same pull technique had significantly higher complication rates but included lower numbers of patients with constipation (the primary indication being volvulus).^{18,19} In addition, previous studies did not report use of antibiotic gazes and applied a shorter postprocedural antibiotics period (8 hours instead of 5 days).¹⁸ Lastly, previous studies reporting on the use of PEC in cases of both constipation and volvulus or pseudo-obstruction report on lower mean age in patients with constipation (mean age 41–51 years) compared to patients with intestinal pseudo-obstruction and recurrent sigmoid volvulus (mean ages resp. 70–75 years and 79–80 years). Higher ages were also reported by other studies on pseudo-obstruction^{1,29,30} and volvulus.^{31,32} Mean age of our population was 56 years, significantly younger and probably less frail than the patients undergoing PEC for volvulus or pseudo-obstruction. Our patients all were in good nutritional state and general condition before PEC, which might also contribute to the lower number of complications. On the other hand, complications in the studies by Cowlam¹⁹ and Baraza¹⁸ did not differ among groups, despite the age difference and frailty of the elderly groups.

Compared to surgery, PEC is less invasive and reversible. It therefore has the potential to become a more attractive alternative, when more data become available on efficacy and complications. Surgical procedures for chronic refractory constipation include total colectomy with ileorectal anastomosis and subtotal colectomy with ileosigmoid/colorectal anastomosis.^{7,12} Mean success rate for these interventions is reported to be high, around 89%.⁷ However, postsurgical adverse

TABLE 3 Comparison of available treatments

	PEC (current study)	PEC (previous studies) ^{18,19,21,28}	Colectomy with ileorectal anastomosis or ileostomy ^{7,40-42,49,50}	Malone stoma ^{6,43-46}	Transstibial stimulation ¹³⁻¹⁵	Sacral neuromodulation ^{16,17}
Efficacy—initial (<8 weeks, response rate)	67% Good 33% Moderate	Not reported	Not reported	Not reported	26%	28%, no significant difference vs placebo condition
Efficacy—long term (response rate)	50%	50%-75%	64%-94%	25%-75%	12%-32%	23%-25%, no significant difference vs placebo condition
Morbidity	33% minor infection 16.7% minor pain 8.3% buried bumper	18%-77% infections 9%-12% fecal peritonitis	53.4% (total), resurgery due to complications; 9% small bowel obstruction 12% ileus 9.5% diarrhea (ileostomy)	30% (stenosis, occlusion or spontaneous closure)	0%-10.5% (mild pain and oozing bleeding)	44% pain 16% wound infections 23% urological adverse events (e.g., urinary tract infections) 61% total
Success rate (procedure)	100%	90%-100%	89%-100%	77%	100%	100%
Easily reversible	Yes	Yes	No	Yes (requires surgery)	No	No

events are described in up to 45% of patients.^{10,11} In addition, mortality is considerable when an anastomosis is made.¹⁰ Subtotal and segmental colectomy often fail to improve symptoms, which might be due to the presence of a more generalized motility disorder or coexisting pelvic floor disorders.⁵ After total colectomy, functional outcomes vary; constipation persists in 8%-30% of patients.^{11,21,33,34} Others have reported better outcomes with 79%-90% of patients having satisfactory results,^{35,36} see Table 3.

Total colectomy with ileostomy (definite or temporary) appears to be the surgical procedure of choice.^{8,9,37-39} However, after ileostomy, complication rates of 53.4% (with resurgery in 29.3%) are reported.⁴⁰ Constipation persists in 4%-15% of patients,^{40,41} with up to 50% needing further surgery.^{7,11} Moreover, ileostomy might also lead to diarrhea (9.5%).⁴²

Another surgical option is the Malone procedure (appendicostomy).⁴³ Limitations of this procedure are stenosis, occlusion, and spontaneous closure of the appendicostomy. These complications have been observed in 30% of cases.^{6,44,45} Success rates of around 70% have been reported.⁴⁶ The Malone procedure is considered an alternative therapy for patients with high operation risk.⁷ Cannulation is necessary for lavage and leakage may occur. Clinical outcomes vary greatly, with up to 75% requiring colostomy/ileostomy.^{44,47}

We therefore believe that PEC (placed using the pull technique described here), given its high success rate for placement, considerable long-term success rate of 50%, and low rate of major complications, should have a place in the treatment algorithm of chronic refractory constipation, potentially filling a gap between conservative and surgical treatment options. In terms of efficacy, PEC success rate is comparable to the Malone procedure, but PEC is characterized by less complications and higher success rate for placement. The limited number and severity of complications in addition to its reversible nature are in fact the primary advantages of PEC compared to more invasive surgical interventions, even when PEC appears less efficacious on long term. Therefore, PEC seems particularly attractive for patients with a high perioperative risk or generalized gastrointestinal motility disorder.

Limitations of our series are the retrospective nature of the study, the small number of patients, the lack of patient-reported outcome measures, and the fact that the exact etiology of their chronic constipation was not investigated systematically in all patients. Our study should therefore be considered as exploratory. Future studies will have to investigate more patients' characteristics in order to determine which patients might benefit from this form of treatment.

5 | CONCLUSION

We postulate that PEC deserves more attention and a more prominent place in the treatment algorithm of otherwise therapy-resistant chronic constipation. PEC, when applying the pull technique as used for PEG placements, seems to be a safe, easy to perform, and is a reversible endoscopic alternative for surgical interventions in patients with chronic constipation, with reasonable long-term efficacy.

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DS performed the research, analyzed the data, and wrote the manuscript, LG designed the research study, DK, AM, and LG drafted and revised the manuscript.

DISCLOSURES

No competing interests declared.

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