SCIENTIFIC PAPER JSLS

Extraperitoneal Closure of Persistent Gastrocutaneous Fistula in Children

Gustavo Stringel, MD, MBA, Whitney McBride, MD, Allison Sweny, MD

ABSTRACT

Background and Objectives: Gastrostomy feeding in children is well established for nutritional support. Gastrostomy tubes may be permanent or temporary. After removal, spontaneous closure may occur, but persistence of the tract requires surgical repair. Laparotomy with gastric repair and fascial closure is the standard technique for treatment of a persistent gastrocutaneous fistula. We describe a technique of extraperitoneal excision of the fistulous tract and our results using this method.

Methods: We reviewed 21 cases of extraperitoneal gastrocutaneous fistula closure in which a Foley catheter traction technique was used and were performed over the last 8 y. The technique involves insertion of a small Foley catheter with traction applied to the fistulous tract and core excision with electrocautery. Closure of the tract without fascial separation was accomplished and early feedings were allowed.

Results: Ten males and 11 females underwent closure with this technique. The duration of the gastrostomy ranged from 1 y to 6 y, with a mean of 3.3 y. The time from removal to surgical repair was 3 wk to 1 y, with a mean of 4.3 mo; 15 had gastrostomy alone, and 6 had gastrostomy in combination with Nissen fundoplication. Open gastrostomy had been done in 10 patients and laparoscopic gastrostomy in 11 patients. Half of the patients had an ambulatory procedure. One patient developed a superficial wound infection, and there was 1 recurrence requiring intraperitoneal closure.

Conclusion: Extraperitoneal closure for gastrocutaneous fistula is safe and effective. The technique allows for rapid resumption of feeds and a shortened length of stay. Minimal morbidity occurs with this technique, and it is well tolerated in the pediatric population.

Key Words: Gastrostomy, Gastrostomy closure, Gastrocutaneous fistula.

INTRODUCTION

Persistence of a gastrocutaneous fistula after removal of a gastrostomy tube is a well-known sequela occurring in 5% to 45% of patients.[1–4] These fistulas are managed expectantly for spontaneous closure in 1 to 3 mo after removal of the feeding tube. A gastrocutaneous fistula that persists requires surgical repair.[3,4] The traditional operative technique widely used for treatment involves a layered closure. The fistula tract is excised, and the gastric wall is separated from the fascia and the gastric defect is primarily repaired. The abdominal wall is closed in a layered fashion. This procedure requires a period of bowel rest with nasogastric decompression and a 2-d to 5-d hospital stay. We describe an innovative approach that is performed entirely extraperitoneally, without the aid of endoscopy, and that can be performed in an ambulatory setting.

MATERIALS AND METHODS

This was a retrospective study reviewing 21 patients over an 8-y time span. The cases were performed by 2 pediatric surgeons at a children's hospital. This technique involves inserting an 8 or 10 French Foley catheter into the fistula tract; the stomach is then pulled up and the tract exposed and excised using electrocautery. While under traction, interrupted polyglycolic acid sutures are placed to close the gastric and peritoneal defect without fascial separation. The skin is subsequently closed with interrupted nylon sutures **(Figures 1 through 6)**. Patients were started on a diet 6 h postoperatively and were discharged home on the same day unless a preexisting medical condition required additional hospitalization. The amount of time the gastrostomy tube had been in place ranged from 1 y to 6 y. Indication for gastrostomy placement included failure to thrive, se-

Department of Pediatrics and Department of Surgery, NY Medical College, Maria Fareri Children's Hospital at Westchester County Medical Center, Valhalla, NY, USA (all authors).

Address correspondence to: Gustavo Stringel, MD, MBA, NY Medical College, Munger Pavilion Rm 321, Valhalla, NY 10595, Telephone: (914) 493-7620, Fax: (914) 594-4933, E-Mail: GStringel@aol.com

DOI: 10.4293/108680812X13517013317590

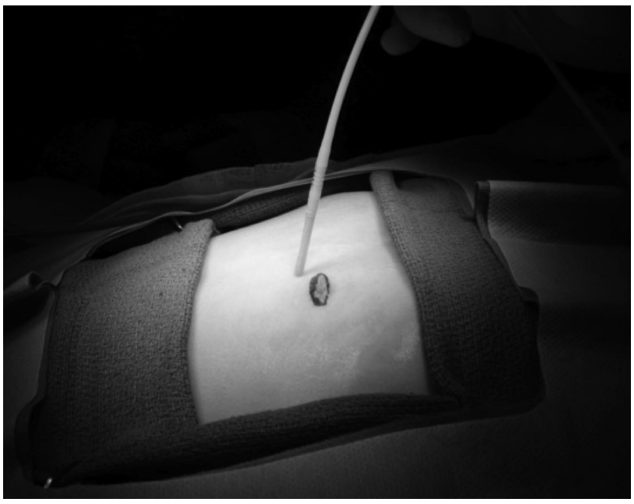

Figure 1. Gastrocutaneous fistula.

Figure 2. Foley traction on the GCF tract.

Figure 3. Excision of the fistula tract.

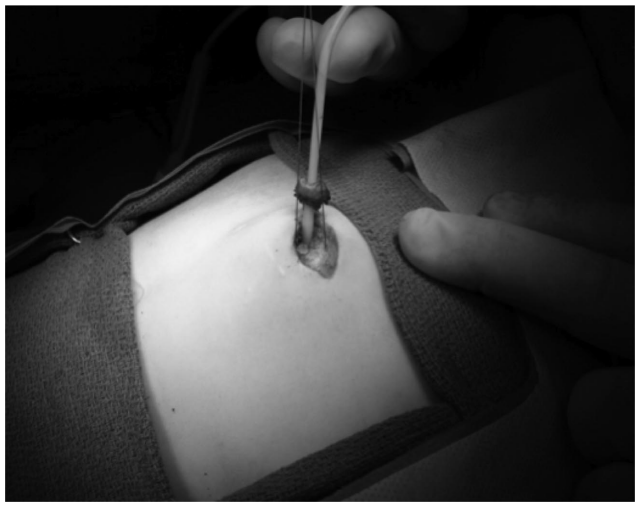

Figure 4. Fistulous tract excised and extraperitoneal suture placed.

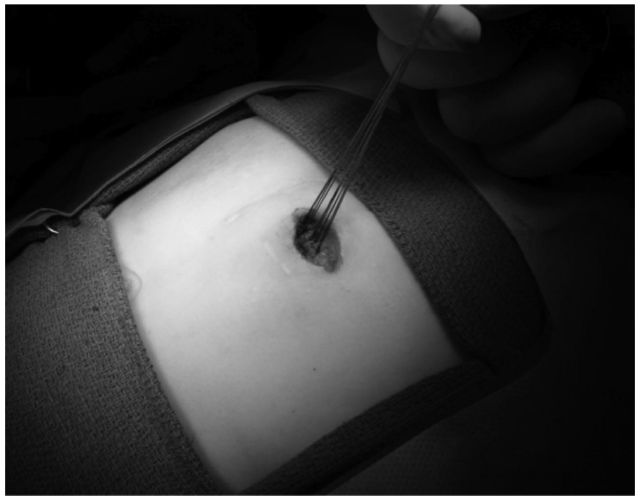

Figure 5. Full thickness extraperitoneal closure.

Figure 6. Skin closure.

vere mental retardation, genetic disorders, and congenital malformations as described in **Table 1**. An open gastrostomy had been performed in 10 patients, while the remaining had undergone laparoscopic placement. Fifteen patients had a gastrostomy alone, and 6 had a gastrostomy in combination with fundoplication. The interval time from removal of the gastrostomy tube to closure ranged from 3 wk to 1 y, with an average of 4.3 mo.

RESULTS

All patients recovered uneventfully. There were 2 complications. One patient developed a recurrence of the gastrocutaneous fistula requiring intraperitoneal layered closure. This patient had the initial extraperitoneal closure 3 wk following removal of the gastrostomy tube; he had severe irritation around the stoma at the time of closure. He was 1 of the initial patients in our series.

One patient, who was HIV/AIDS positive and immunocompromised, developed a superficial wound infection that resolved with conservative management.

Eleven patients were ambulatory and were discharged on a regular diet the day of surgery. Nine patients were admitted for 2 to 3 d due to other comorbidities. One patient remained hospitalized for 7 d secondary to other medical comorbidities. All patients were started on a diet on postoperative day 1. A few patients were observed to have a small amount of leakage at the gastrocutaneous fistula site postoperatively. This resolved spontaneously after a short period of time.

Table 1.
Patient Demographics

Sex	Age	Comorbidity[a]	Open Vs Lap[a]	Duration of GT	Interval to Closure	NISSEN	Length of Stay Days	Complication
M	8 m	FTT	O	6 y	3 m	Y	0	None
F	5 y	Esophageal perforation	O	5 y	4 wks	N	0	None
F	19 m	FTT	L	3 y	6 m	Y	0	None
M	10 m	Trisomy 21, GERD	L	2 y	2 wks	Y	0	Recurrence
F	3 y	S/p renal transplant	O	1 y	3 wks	N	2	None
M	2 m	Kabuki syndrome	O	5 y	2 m	Y	7	None
M	1 y	CPMR	O	7 y	1 y	N	2	None
F	22 m	Unknown	L	6 y	3 m	N	0	None
M	1 day	Long gap EA	O	2 y	2 m	N	0	None
M	5 m	CPMR	L	2 y	3 m	N	2	None
F	2 m	Cardiac disease		1 y	6 m	Y	3	None
M	4 y	Small bowel transplant	O	6 y	1 y	N	2	None
F	3 wks	Tracheal mass	O	4 y	2 m	N	0	None
M	6 wks	Multiple medical problems	L	2 y	2 m	N	0	None
F	2 m	Prader Willi syndrome	L	2 y	6 m	N	0	None
F	2 m	Multiple medical problems	L	2 y	6 m	N	2	None
F	6 y	HIV/AIDS	O	4 y	1 y	N	1	Wound infection
M	3 m	Trisomy 21, AV canal defect	L	3 y	6 m	N	2	None
M	5 m	CPMR	L	4 y	3 m	Y	0	None
F	3 m	Gastroschisis	O	15 m	2 m	N	0	None
F	2 y	FTT	L	1 year	3 m	N	1	None

[a]FTT (failure to thrive), O (open), L (Laparoscopic), EA (esophageal Atresia), GERD (Gastroesophageal reflux), CPMR (cerebral palsy mental retardation).

DISCUSSION

Gastrostomy tubes are commonly used in the pediatric population to manage enteral feeding. This can be temporary for short-term therapy or permanent. Gastrostomy feeding tubes can provide a safe and physiologic method of providing nutrition for patients with failure to thrive, neurological disorders, and other conditions that impair oral intake. If the underlying disease process can be corrected, gastrostomy tubes are removed and the tract allowed to close spontaneously. Previous studies[1–4] have demonstrated failure of closure with subsequent gastrocutaneous fistula formation 5% to 45% of the time. Nonsurgical management is initially attempted with the application of silver nitrate and a pressure dressing. H2 blockers and proton pump inhibitors are also used at the time of gastrostomy removal. Unfortunately, a number of patients fail conservative therapy and surgical intervention is indicated. The traditional layered closure technique involves a hospital stay of an average of 3 d to 5 d and requires nasogastric tube decompression and fasting for a period of time postoperatively. While this technique has proven to be quite successful in repairing the defect with low recurrence rates, it involves substantial health care costs and discomfort for patients and caregivers. More recently, endoscopic techniques are being advocated with placement of an endoclip to close the gastric defect in conjunction with chemical cauterization to de-epithelialize the fistula tract.[5] Fibrin tissue glue has also been used with some success.[6] Most the data available for the above-mentioned techniques involves case studies or small-scale reviews, and the success of complete closure is questionable. The extraperitoneal technique we describe has lower morbidity, shorter hospital stay, and is more cost effective than the traditional layered closure. Furthermore, this approach is a simple technique that can be done without the use of costly endoscopic equipment that may not be readily available. Our data suggest that this technique is both safe and effective with low morbidity.

References:

1. Janik TA, Hendrickson RJ, Janick JS, Landholm AE. Analysis of factors affecting the spontaneous closure of a gastrocutaneous fistula. *J Pediatr Surg*. 2004;39:1197–1199.

2. Gordon JM, Langer JC. Gastrocutaneous fistula in children after removal of gastrostomy tube: Incidence and predictive factors. *J Pediatr Surg*. 1999;34:1345–1346.

3. Arnbjornsson E, Backman T, Berglund Y, Kullendorff CM. Closure after gastrostomy button. *Pediatr Surg Int*. 2005;21:797–799.

4. El-Rifai N, Michaud L, Mention K, et al. Persistence of gastrocutaneous fistula after removal of gastrostomy tubes in children; prevalence and associated factors. *Endoscopy*. 2004;36:700–704.

5. Teitelbaum JE, Gorcey SA, Fox VL. Combined endoscopic cautery and clip closure of chronic gastrocutaneous fistula. *Gastrointest Endosc*. 2005;62:432–435.

6. González-Ojeda A, Avalos-González J, Muciño-Hernández MI, et al. Fibrin glue as adjuvant treatment for gastrocutaneous fistula after gastrostomy tube removal. *Endoscopy*. 2004;36:337–341.