



Combination of Hypertonic Saline and Fibrin Glue: Another Selection to Treat Chronic Enterocutaneous Fistula

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Gastrointestinal tract fistula is a frequent complication of surgery or disease. In general, cases involving failure to manage fistulae after 5–6 weeks of nonoperative treatment possibly require surgery. Here, we report a case involving a chronic enterocutaneous fistula (ECF) for 24 months that was treated using hypertonic saline injection within the duodenal mucosa and use of fibrin glue as an adhesive to ensure rapid closure. This technique is a simple and effective method for treating an ECF. The procedure is easy to perform, carries minimal surgical risk, and features the advantages of reduced hospitalization or home nursing care and expenses compared with traditional therapy.

Key words: Endoscopic treatment, enterocutaneous fistula, fibrin glue, hypertonic saline, postoperative complications

INTRODUCTION

Gastrointestinal (GI) tract fistula is a frequent complication of surgery or disease. It can also be caused by trauma, malignancy, or inflammatory bowel disease. Initial treatment for an enterocutaneous fistula (ECF) includes nutritional support, correction of electrolyte imbalance, recognition and treatment of sepsis, abscess drainage, localization and delineation of the fistula anatomy, control of effluent drainage, and skin care, along with the determination of optimal surgical timing. Patients with chronic ECF experience failure in managing fistulae after 5–6 weeks of nonoperative treatment and possibly need surgery. However, surgical treatment is often difficult because of a poor nutritional status, infection, and lack of supple soft tissues adjacent to the fistula. Here, we describe a relatively simple treatment of ECF using fibrin glue.

CASE REPORT

A 78-year-old female presented to surgical emergency with peptic ulcer disease developed a two square centimeter of

duodenal perforation over duodenal bulb following ischemic colitis and received exploratory laparotomy for resection of the perforated duodenal ulcer. On postoperative day 24, the abdominal computed tomography (CT) revealed abscess formation over the retroperitoneal region.

The patient underwent drainage through pigtail catheter, and antibiotic therapy then was discharged in a relatively stable condition. However, a subcutaneous abscess was found in the right flank region on postoperative day 112. She admitted for wound debridement on day 114 and delayed primary colostomy closure on day 127 due to poor nutritional status, and local infection, at which time a retroperitoneal abscess complicated cutaneous fistula over the right flank region, was found which developed a persistent discharging sinus. Fistulography revealed a connection with the duodenal [Figure 1], but the patient refused surgery. Given the patient's refusal of surgical treatment, we injected fibrin glue from the external hole; however, discharge recurred 3 months later. On postoperative day 700, the patient was readmitted with increased fistula discharge. Upper GI panendoscopy revealed a small hole

Received: December 12, 2016; Revised: January 10, 2017;
Accepted: March 15, 2017

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How to cite this article: Hsu PC, Hsu SD. Combination of hypertonic saline and fibrin glue: Another selection to treat chronic enterocutaneous fistula. J Med Sci 2017;37:107-9.

CEF treated with fibrin glue

with scar formation over the bulb, and orifice closure with a hemoclip was performed. The discharge initially decreased but later recurred, stabilizing to a daily flow amount of approximately 100–200 ml.

Therefore, we consulted GI specialist for advanced therapy with fibrin glue. As the internal opening margin exhibited fibrosis and scar formation, we injected 3% saline around the internal orifice to induce tissue inflammation and adhesion; subsequently, 2 ml of fibrin glue was injected from external side to internal opening of the fistula to form a plug through the fistula. Upper GI panendoscopy facilitated fibrin glue injection to ensure occlusion of the internal hole.

After the procedure, the output ceased immediately, and no persistent discharge was found. Abdominal CT [Figure 2] at 1 month after treatment revealed near-total resorption of the fistula tract over the retroperitoneum compared with the previous CT image [Figure 2]. An outpatient clinic review after 24 months revealed complete wound healing, with no further output from the fistula or other complications.

DISCUSSION

Approximately one-third of ECFs will close spontaneously within 5–6 weeks with conservative measures.^{1–3} In a retrospective review of 79 patients with ECF, spontaneous closure occurred in 23 patients (29%) after a median of 39 days.⁴ However, spontaneous closure rates vary depending on the cause and volume of the fistula and the predictive factors of spontaneous closure, including anatomical location, tract length, defect size, fistula output, nutritional status, sepsis, and etiology.

Previous reports have described the role of fibrin glue in ECF management. Wu *et al.* reported a prospective, nonrandomized cohort study of 75 patients with low-output ECF and described

a success rate of 77% through fibrin glue injection with a mean duration of 28 days.⁵

Lippert *et al.* conducted a retrospective analysis of fibrin glue for the treatment of GI fistulae and reported successful ECF closure in 55.7% of cases.⁶ Due to the success rate of fibrin glue injection, the low complication rate, and relative technical simplicity, the authors considered it to be a valuable treatment option.

Usually, chronic epithelialization and fibrosis lead to difficulties in fistula healing.⁴ Chhabra *et al.* and Rao *et al.* reported two and three cases, respectively, of chronic parotid fistulae treated through hypertonic saline injections.^{7,8} These injections were used to induce conformational denaturation of cell membrane proteins *in situ*, and saline could be diluted below the level of cellular toxicity.

In our case, earlier upper GI panendoscopy revealed fibrosis of the internal opening, and partial epithelialization of the tracts could be assumed. This may have caused the failure of the previous fibrin glue therapy. In contrast to the first fibrin glue treatment, the second treatment included 3% saline injection to denature the fibrosis and epithelialization, which caused local tissue inflammation and induced the fistula tract adhesion. Besides, unlike the other reports in literature which direct injected fibrin glue

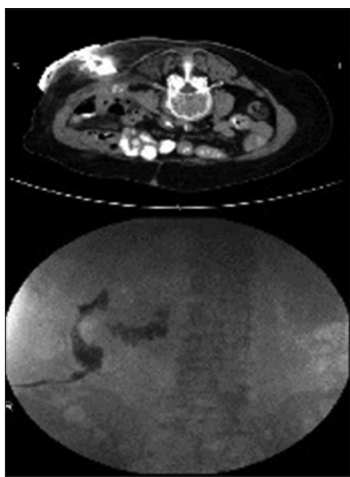


Figure 1: Retrograde contrast from the external opening shows a connection with the duodenal junction

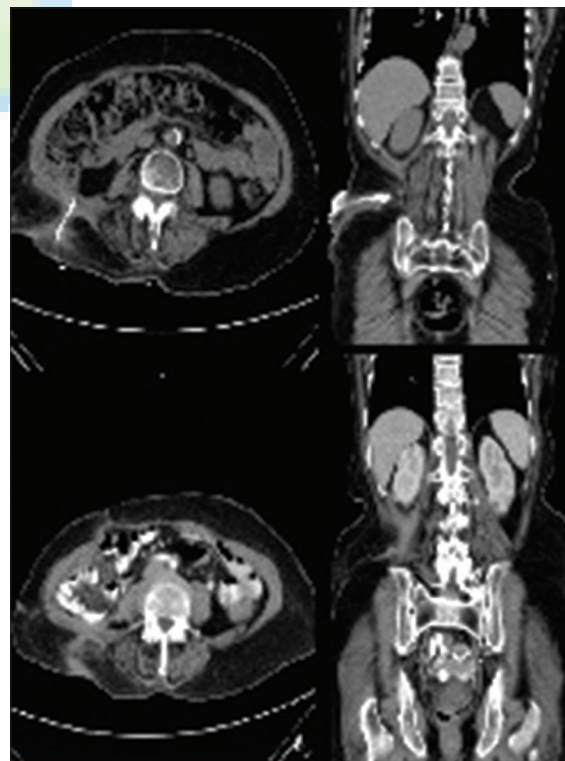


Figure 2: Computed tomography before secondary fibrin glue injection and after secondary fibrin glue injection with near-total resorption of the fistula tract

into the external orifice, we inserted injection tube from internal orifice to external orifice by fiberscope combined inserted suction tube from external orifice. Subsequently, we withdraw suction tube to minimize the discharge in the fistulae followed by fibrin glue injection from external side to internal opening of the fistula immediately. In contrast to other reports, this procedure not only reduces the resistance during injection but also helps fibrin glue to fulfill the whole fistulae.

Traditional methods of chronic ECF treatment are often difficult, and conservative management may involve long-term hospitalization or home nursing care. The rate of spontaneous fistula closure decreases with the fistula duration. Based on our experience, we would like to emphasize that only one case of long-term (24 months) ECF has been treated by hypertonic saline combined with fibrin glue, and this safe and relatively simple procedure may be useful for the first-line treatment of chronic ECF.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Acknowledgment

The authors would like to acknowledge the help and support of the following surgeons: Chang Hao-Ming, MD and Huang Tianyou, MD, at Tri-Service General Hospital in the preparation of this report.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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