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Case Report

A Rare Case of Gastrojejunocutaneous Fistula after Percutaneous Endoscopic Gastrostomy

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We report a rare case of fistulation to the jejunum after percutaneous endoscopic gastrostomy (PEG). An 85-year-old man with previous cerebral infarction and swallowing disturbance underwent PEG. Nine months later, he developed a high fever and discharge around the gastrostomy button. He was diagnosed with aspiration pneumonia, and administered antibiotic therapy. Examination showed digestive fluid around the gastrostomy button. Gastrointestinal contrast-enhanced CT revealed a gastrojejunocutaneous fistula. The button was removed, and the fistula closed naturally. PEG was performed again. The patient's postoperative course was uneventful. Gastrojejunocutaneous fistula should be considered in cases involving increased discharge from a gastrostomy fistula.

Key words: percutaneous endoscopic gastrostomy, gastrojejunocutaneous fistula

Percutaneous endoscopic gastrostomy (PEG) was first reported in 1980 [1] and has since been widely accepted as faster, safer, and more effective than classical laparotomy procedures. PEG is a relatively common procedure, but is known to be associated with various complications. The frequency of complications after the endoscopic installation of enteral feeding tubes has been reported to range from 8-30%, and serious complications requiring treatment occur in about 1-4% of cases [2]. The most common complications include wound infection, pneumoperitoneum, and feeding tube-related mechanical problems, such as tube blockage [3]. Enterocutaneous fistulas, on the other hand, are very rare. We report a case in which a gastrojejunocutaneous fistula developed nine months after PEG.

Case Report

An 85-year-old man presented at Unnan City Hospital with stool-like peristomal leakage from a gastrostomy button together with abdominal fullness and fever. He had previously suffered a cerebral infarction, resulting in a swallowing disturbance and aspiration pneumonia, and had undergone PEG using the introducer technique. He subsequently received care at home. Four months later, the gastrostomy tube was uneventfully replaced with a gastrostomy button.

Nine months after the PEG procedure, the patient developed a fever of 39.2°C. A discharge composed of stool-like digestive fluids was seen around the gastrostomy button, and enteral feeding was stopped. Three days later, the amount of the peristomal discharge had increased and the patient visited our hospital. He was diagnosed with aspiration pneumonia with left pleural effusion. As a result, he was admitted and treated with

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antibiotic therapy combined with thoracic drainage. On admission, green-brown digestive fluid was observed around the gastrostomy button during an abdominal physical examination (Fig. 1), but no signs of peritoneal irritation were detected. Contrast-enhanced radiography performed via the gastrostomy fistula on day three showed that the contrast medium had flowed into the jejunum. Gastrointestinal contrast-enhanced computed tomography (CT) performed on day 5 revealed a gastrojejunocutaneous fistula, but the tip of the gastrostomy button was located in the stomach (Fig. 2, 3). The amount of drainage fluid was low, and so the gauze used to collect it did not have to be replaced frequently.

We opted for conservative therapy because of the likelihood of spontaneous fistula closure. Therefore the gastrostomy button was removed immediately. By day 16, the fistula had closed naturally. On day 18, a nasogastric tube was inserted and enteral feeding was started. On day 41, under CT, the stomach was directly punctured superior to the previous PEG site with a needle, and a guidewire was inserted into the stomach. Under endoscopy, a gastrostomy tube was then inserted using the "pull" technique. The patient's postoperative course was uneventful, and he was transferred to receive care at home on day 89.

Discussion

Post-PEG gastrointestinal fistulas are rare [4], with a reported incidence ranging from 2-3% [5]. In particular, fistulation to the small bowels after PEG is extremely rare [5]. Although Mago *et al.* [6] reported that it is possible for gastrostomy tubes to be misplaced in the intestine, they did not indicate the actual loca-

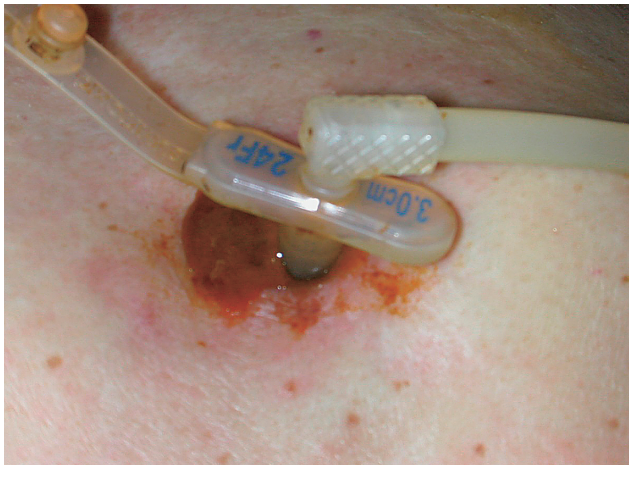

Fig. 1 A discharge composed of digestive fluids was noted around the gastrostomy button.

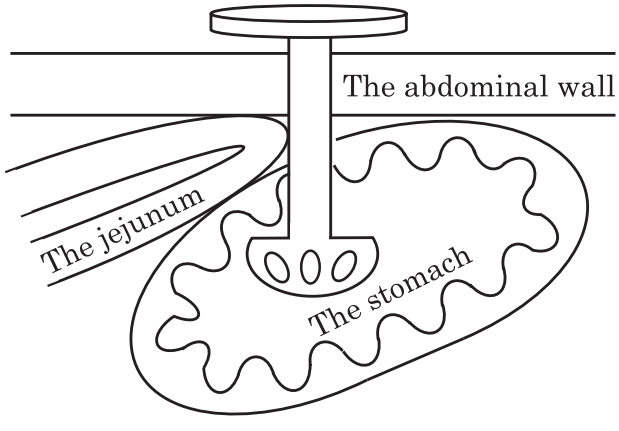

Fig. 3 A schematic representation of the location of the PEG button, stomach, and jejunum.

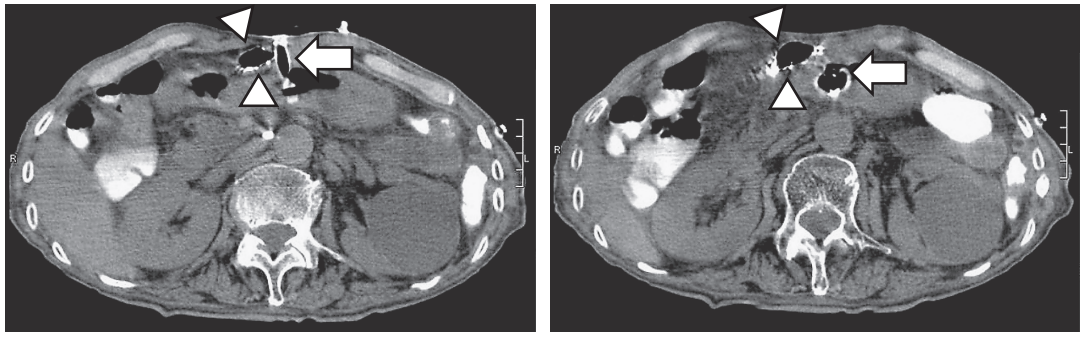

Fig. 2 An axial computed tomography scan after the injection of contrast medium via the gastrostomy fistula. The colon was stained as fluoroscopy had been performed two days earlier. The jejunum was located on the right side of the gastrostomy tube between the stomach and abdominal wall, and was stained. White arrow: PEG button, arrowhead: the jejunum.

tion of the misplaced tubes (*i.e.*, whether they were in the colon or small bowel). Bui *et al.* [7] were the first to report fistula formation in the small intestine after PEG; however, since their report, only 7 cases (in 6 reports) of such fistulas have been described in the literature (Table 1). All but one of these cases involved young patients. The patients' initial clinical symptoms were intestinal obstruction in 3 cases, discharge around the gastrostomy site in 2 cases, and diarrhea in 2 cases. As for the treatments employed, 6 patients underwent laparotomy and surgical gastrostomy, and conservative therapy (tube removal) was successful in the remaining case.

The mechanism responsible for the formation of post-PEG fistulas is multifactorial. Bui *et al.* [7] focused on the patient's position during the PEG procedure and suggested that a semi-sitting position might help the intestine to drop below the level of the stomach. Evans *et al.* [8] found that a large amount of air was introduced into the jejunum during PEG, and that the resultant distension of the jejunum pushed the transverse mesocolon upwards, which led to the tube penetrating the elevated jejunum and passing through the mesocolon into the stomach. Kubiak *et al.* [4] reported that during the PEG procedure, a portion of the jejunal loop moved upwards and became attached to the anterior abdominal wall. In addition, local infection and tight application of the external retention flange to the skin induced local inflammation leading to tube migration. De Vogelaere *et al.* [9] reported that the wall of the ileum was interposed between the abdominal wall and the stomach, and caught by the introducer needle, thus leading to its gradual erosion, and the tube passed into the ileum over weeks.

Meanwhile, Patwardin *et al.* [5] suggested that an abnormal posture and spinal deformities contribute to abnormal positioning of the stomach and might be responsible for the increased incidence of post-PEG fistulas. In addition, because the point of entry of the PEG tube was located in the posterior wall of the stomach in all cases in their series, inflation of the stomach before the insertion of gastrostomy tube resulted in anterior rotation of the greater curvature of the stomach, moving the intestines anterior to the stomach. As a result, the needle passed through the intestine before entering the posterior wall of the stomach. Karhadkar *et al.* [10] reported that there are no methods that can completely prevent fistulas from developing after PEG.

At our hospital, transillumination and finger identification of the proposed tube insertion site for endoscopic recognition are routinely performed before the skin is punctured. In the present case, PEG was performed uneventfully in the usual manner and a CT scan showed that the PEG site was located in the anterior wall of the stomach. Therefore it is unlikely that rotation of the stomach caused by inflation during the procedure was responsible for the patient's fistula. In addition, the patient had not undergone any previous abdominal surgery, did not exhibit any spinal deformities, and was bedridden. We could not definitively determine whether the jejunum had been elevated up to the level of the anterior abdominal wall during the procedure. However, the jejunum was the right of the gastrostomy button, so it is doubtful that it was elevated

Table 1 Reported cases in which fistulas to the small intestine developed after PEG

Authors (yrs)	Age (yrs)	Gender	Interval between PEG and onset	Clinical symptoms	Treatment
Bui HM *et al.* [7] (1988)	16	Male	7 months	Small bowel obstruction	Laparotomy and enterolysis
Evans PM *et al.* [8] (1994)	22	Male	1 week	Increased discharge around the PEG site	Laparotomy and surgical gastrostomy
Kubiak R *et al.* [4] (1999)	12	Male	14 months	Leakage of a bilious fluid from around the tube	Laparotomy and surgical gastrostomy
De Vogelaere K *et al.* [9] (2000)	32	Male	4 months	Diarrhea	Laparotomy and surgical gastrostomy
Patwardhan N *et al.* [5] (2000)	5	Male	2 days	Intestinal obstruction	Laparotomy and surgical gastrostomy
	9	Male	6 weeks	Intestinal obstruction	Laparotomy and surgical gastrostomy
Karhadkar AS *et al.* [10] (2006)	81	Male	12 months	Chronic diarrhea after tube replacement	Removal of tube and fluoroscopic percutaneous gastrostomy
Our case	85	Male	9 months	Increased peristomal discharge	Removal of gastrostomy button and PEG

to the level of the stomach and became fixed between the stomach and abdominal wall during the procedure. If the jejunum had been trapped between the stomach and the abdominal wall during the procedure, complications such as intestinal obstruction or perforation would likely have occurred.

Moreover, the period between the PEG and the detection of the fistula was nine months, and the patient's clinical course was otherwise uneventful. Therefore, we consider the fistula to have formed gradually. One possible explanation for the patient's fistula was that following the PEG, the jejunum adhered to the tube insertion site between the stomach and anterior abdominal wall because of inflammation associated with the PEG procedure and become interposed there. Continuous mechanical stimulation then led to gradual erosion, and the jejunal wall became connected to the gastrocutaneous fistula. However, we cannot completely eliminate the possibility of jejunal wall fixation during the PEG procedure, as in the report by De Vogelaere *et al.* [9], under the lack of postoperative imaging evaluation.

Adhesion in the peristomal space between the abdominal and stomach walls is considered necessary for gastrostomy tract formation, and so PEG procedure-related inflammation in these areas is unavoidable. Based on our experience, we consider it necessary to avoid a gap between the abdominal and stomach walls near the tube to prevent such unfavorable complications. Thus, during this procedure, relatively widespread wall fixation should be performed at a distance of about 2 cm from the tube, and the tube insertion should be carried out vertically, rather than obliquely relative to the wall.

Enterocutaneous fistulas are an intractable complication, and various management strategies have been suggested although none of them are supported by high quality evidence. A previous report suggested that the factors associated with the failure of spontaneous fistula closure include a jejunal site, high output, and multiple fistulas. Patients with these unfavorable predictive factors should be considered for surgical treatment after a reasonable period of conservative management [11]. In our case, the fistula originated from the jejunum, but the amount of drainage fluid was so low that the gauze used to collect it did not need to be changed frequently [12]. Consequently, conservative therapy, involving tube removal and fasting with parenteral nutrition, was effective, and the fistula closed spontaneously without surgical treatment.

In conclusion, we reported a case in which a gastrojejunocutaneous fistula (an extremely rare complication) developed after PEG. Particular attention should be paid to abnormal discharges around PEG sites, even if adequate nutritional support is being supplied via the gastrostomy tube.

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