

CASE REPORT

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Dangers associated with replacement of a percutaneous endoscopic gastrostomy tube: Report of a case of skewering of the stomach into the jejunum like a bridge

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ABSTRACT

Introduction: Percutaneous endoscopic gastrostomy (PEG) is a relatively safe and effective method of providing nutrition to patients with neurologic deficits or proximal gastrointestinal disorders. Dislodgement, dysfunction, and infection are the reported complications associated with placement of a PEG tube. On the other hand, tract disruption and external displacement are the reported complications associated with replacement of a PEG tube. In all the external displacement cases following replacement of the PEG tube, the PEG tubes were displaced into the abdominal cavity. This is the first report of displacement of the PEG tube into the jejunum by accidental skewering of the tube through the stomach during its replacement.

Case Report: An 85-year-old woman presented to our hospital complaining of erosive dermatitis around the PEG tube. Two weeks prior to her present complaints, the PEG tube had been changed, following which she developed erosive dermatitis around the PEG tube. Abdominal computed tomography (CT) and gastroendoscopy revealed that the PEG tube had gone through the anterior wall to the posterior wall of the stomach, like a “bridge,” and skewered out of the stomach. A new PEG tube was positioned in the stomach and the tract to the jejunum was treated conservatively.

Conclusion: Although complications associated with replacement of the PEG tube are rare, replacement should be performed under gastroendoscopy to avoid these complications.

Keywords: Complications, Percutaneous endoscopic gastrostomy, Replacement

How to cite this article

Bian X, Yamamoto K, Yamamoto M, Yamamoto F, Ogawa K. Dangers associated with replacement of a percutaneous endoscopic gastrostomy tube: Report of a case of skewering of the stomach into the jejunum like a bridge. Int J Case Rep Images 2023;14(1):89–93.

Article ID: 101390Z01XB2023

doi: 10.5348/101390Z01XB2023CR

INTRODUCTION

Nutrition for patients with neurologic deficits or proximal gastrointestinal disorders can be provided in two ways: enteral alimentation and parenteral nutrition. Enteral alimentation is thought to be more natural and effective than parenteral alimentation for patients requiring long-term nutritional support [1]. A gastrostomy is indicated in patients requiring long-term enteral alimentation [2, 3]. Due to advances in endoscopic procedures, percutaneous endoscopic gastrostomy (PEG) has become the preferred procedure over open gastrostomy, because of its limited invasiveness [2, 3]. Placement of PEG tubes may be associated with several complications, including dislodgement, dysfunction, and infection, all of which require tube replacement [4–8]. However, tract disruption and external displacement

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Received: 23 January 2023

Accepted: 31 March 2023

Published: 18 April 2023

can occur as complications following replacement of the PEG tube, because the replacement is always done through the previously established tract. In all the reported external displacement cases, the PEG tubes were displaced into the abdominal cavity outside of the stomach [9–13]. We experienced a case in which the PEG tube was displaced into the jejunum due to accidental skewering through the stomach during replacement of the PEG tube. Sometimes, these cases can go unnoticed, without causing symptoms suggestive of iatrogenic peritonitis, with the resultant fatality being attributed to natural causes. Our case suggests that although complications associated with replacement of the PEG tube are rare, the procedure should be performed under gastroendoscopic guidance.

CASE REPORT

An 85-year-old woman presented to our hospital complaining of erosive dermatitis around the PEG tube, which had been inserted nine months earlier at our hospital due to disuse atrophy following surgery for a femoral hernia (Figure 1A and B). Two weeks prior to her present complaints, the PEG tube had been changed at another hospital, following which she developed erosive dermatitis around the PEG tube. Her vital signs were stable and the PEG tube was being used continuously. Since the erosive dermatitis persisted for two weeks, she consulted our hospital.

Physical examination on admission indicated stable vital signs. Her abdomen was soft and non-distended with normal bowel sounds. An area of redness 1½ inches in diameter was present around the PEG tube. Laboratory findings were as follows: white blood cell count 13,400/ μ L (normal 5000–8000/ μ L); aspartate aminotransferase 14 U/L (normal 5–35 U/L); alanine aminotransferase 8 U/L (normal 5–30 U/L); alkaline phosphatase 250 U/L (normal 115–359 U/L); gamma-glutamyl transferase 22 U/mL (normal 0–50 U/mL); lactate dehydrogenase 192 U/L (normal 106–211 U/L); albumin 2.7 g/dL (normal 3.7–5.5 g/dL); total bilirubin 0.08 g/dL (normal 0.2–1.0 g/dL); and C-reactive protein 5.64 mg/dL (normal 0–0.3 mg/dL). Almost all the laboratory findings were within the normal range, other than inflammatory parameters. Abdominal computed tomography (CT) revealed that the PEG tube was displaced into the jejunum by skewering through the stomach (Figure 2). Gastroendoscopy revealed that the PEG tube had gone through the anterior wall to the posterior wall of the stomach, like a “bridge,” and skewered out of the stomach (Figure 3A).

Since the PEG tube had been replaced two weeks earlier, stable tracts were assumed to have been formed [14, 15]. Thereafter, a new PEG tube was positioned in the stomach under gastroendoscopy, and the tract to the jejunum was treated conservatively (Figure 3B and C). On day 6 after PEG tube replacement, gastrografin contrast X-ray confirmed that the gastrojejunal tract had closed.

Further, the erosive dermatitis healed within one week despite commencing feeding through the PEG tube.

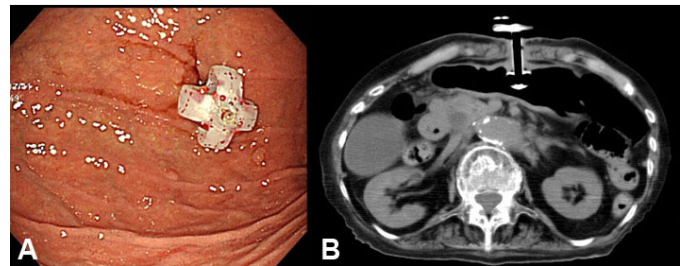


Figure 1: Gastroendoscopy nine months prior to the patient's current complaints. The PEG tube was placed via the anterior wall of the stomach at our hospital. (A) Gastroendoscopy and (B) Computed tomography.



Figure 2: Computed tomography at presentation. The white arrow indicates the PEG tube in the jejunum, after skewering through the stomach.

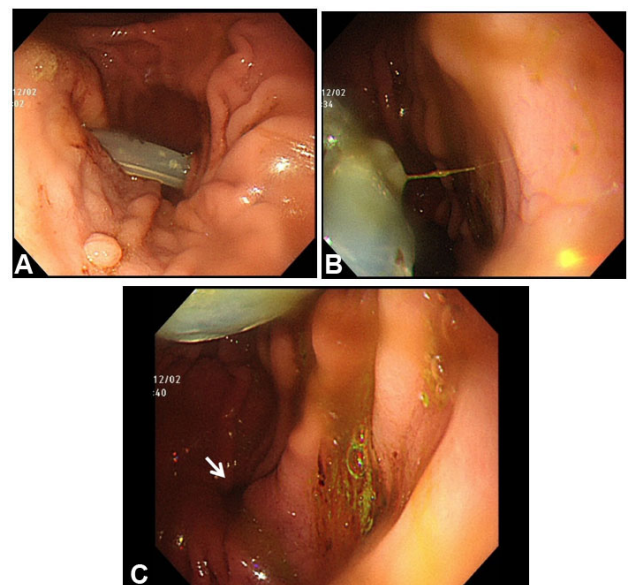


Figure 3: Gastroendoscopy on admission. (A) The PEG tube went through the anterior and posterior walls of the stomach, skewering out of the stomach, and into the jejunum. (B) The inaccurately positioned PEG tube was replaced by a new one. (C) The white arrow indicates the tract.

DISCUSSION

In both Western and Eastern countries, PEG has replaced open gastrostomy due to its limited invasiveness [16, 17]. Recently, the number of PEG placements being performed is decreasing due to a change in ethical considerations, although, with the global aging of the population, a certain proportion of patients still require enteral alimentation [18].

There are three most commonly used techniques for placing a PEG tube: the “pull,” “push,” and “introducer” techniques [16, 19, 20]. In the “pull” technique, a string is inserted via a needle inserted through the abdominal wall into the stomach, grasped with endoscopic biopsy forceps and pulled out through the esophagus and mouth. Subsequently, the string is fixed to the external end of the feeding tube and the tube is pulled from the mouth to the esophagus, stomach, and then out through the abdominal wall [16, 20]. In the “push” technique, a guide wire is inserted through the needle in the abdominal wall and stomach, and pulled out through the mouth with the endoscope. The feeding tube is pushed over the guide wire into the stomach [20]. In the “introducer” technique, a guide wire is placed in the stomach by the Seldinger technique under endoscopy [21]. Then, a dilating sheath is passed over the guide wire. After removal of the dilating sheath, the feeding tube is advanced into the stomach along the guide wire [19]. In our hospital, we usually use the “introducer” method for PEG tube placement. Before placing the PEG tube, a CT scan is performed after screening endogastroscopy in all the patients, in order to avoid internal organ injury. Thereafter, we choose between PEG and open gastrostomy based on the CT findings. Hence, we have never experienced internal organ injury.

Long-term use of gastrostomy tubes may not be favorable in some patients due to degradation of the tube; hence, tube replacement is recommended every 6 months [22]. Since the tube tracts are reported to be completely mature within 4–6 weeks after placing the PEG tube [14, 15], complications associated with PEG tube exchange are rare, but possible [12, 23]. There are three commonly used techniques for changing the tube: the fluoroscopic method, the gastroendoscopic method, and the sky blue method [24–26]. In the fluoroscopic method, the tube is replaced with or without a guide wire under X-ray visualization, and its correct placement is confirmed by contrast radiography [24, 25]. The fluoroscopic method is simple and quick, but involves X-ray fluoroscopy. In the gastroendoscopic method, the tube is replaced with or without a guide wire under gastroendoscopy [24, 25]. This method is reliable and accurate, but involves the costs of gastroendoscopy. In the sky blue method, before changing the tube, indigocarmine diluted with saline is injected into the stomach. After changing the tube, the sky blue solution is collected through the new PEG tube for confirmation of its correct placement [26]. The sky blue method is so simple and quick that it can be done

by the patient’s bedside; however, it is less reliable than the other two methods. In our hospital, the PEG tube is changed using the gastroendoscopic method, because we believe it is most reliable. Under gastroendoscopy, the guide wire is accurately inserted into the stomach through the established tracts, and the newly replaced tube can be directly visualized for confirmation of appropriate placement. This method is not only accurate, but is also relatively easy, since gaseous distension of the stomach during gastroendoscopy facilitates insertion of the tube. Furthermore, it has been reported that reinsertion is possible under gastroendoscopy even if the tracts are immature [4, 7].

In our case, the PEG tube was initially inserted at our hospital using the “introducer” method, but was later blindly exchanged without fluoroscopy, endoscopy, or the sky blue method at another hospital. This resulted in the tube being placed in the jejunum after piercing through the posterior wall of the stomach. If the tube had instead been inadvertently placed in the abdominal cavity, it could have resulted in the patient’s death due to iatrogenic peritonitis. Since the PEG tube is often required in aged patients, such cases might go unnoticed and might be treated as death due to natural causes. As previously mentioned, the tracts take 4–6 weeks after placing the PEG tube to become completely established [14, 15]. This process of tract maturation is sometimes delayed depending on the physical condition of the patient [26, 27]. Replacement under gastroendoscopy is not as simple and quick as the fluoroscopic method and the sky blue method, and involves considerable expenditure in terms of time and money; however, it is the most reliable and accurate method of PEG tube placement. Hence, even when the tube is changed, the procedure should be performed under endoscopy to avoid potentially life-threatening complications.

CONCLUSION

Even if replacement of a PEG tube is easy because of the presence of well-established tracts, it should be performed under gastroendoscopy to avoid further complications.

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Author Contributions

Xueyi Bian – Acquisition of data, Analysis of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Kentaroh Yamamoto – Acquisition of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Mami Yamamoto – Acquisition of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Fumio Yamamoto – Acquisition of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Kenichi Ogawa – Analysis of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

The corresponding author is the guarantor of submission.

Source of Support

None.

Consent Statement

Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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