

Prevention of Late Complications by Half-Solid Enteral Nutrients in Percutaneous Endoscopic Gastrostomy Tube Feeding

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Key Words

Percutaneous endoscopic gastrostomy · Enteral nutrients, half-solid · Gastroesophageal reflux

Abstract

Background: Percutaneous endoscopic gastrostomy feeding is accompanied by unique complications, which are not easily controlled. **Objective:** In an attempt to decrease complications, we used half-solid nutrients for percutaneous endoscopic gastrostomy feeding in an 85-year-old woman. The patient had been receiving enteral nutrients via percutaneous endoscopic gastrostomy, and we examined whether this approach can reduce complications. She presented with regurgitation of enteral nutrients and recurrent respiratory infections. **Methods:** Half-solid enteral nutrients, prepared by mixing liquid enteral nutrients with agar powder, were administered via percutaneous endoscopic gastrostomy. **Results:** Symptoms of gastroesophageal reflux disappeared immediately after the start of half-solid enteral nutrient feeding. **Conclusion:** Gastroesophageal reflux and leakage, two intractable late complications of percutaneous endoscopic gastrostomy tube feeding, can be alleviated

by the solidification of enteral nutrients. Since this method allows quick administration of nutrients, it is also expected to help prevent the occurrence of decubitus ulcers and reduce the burden to the caregiver.

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Introduction

Feeding via a percutaneous endoscopic gastrostomy (PEG) tube is a safe and efficient method for patients who cannot maintain adequate oral intake. PEG feeding is accompanied, however, by unique complications which are not easily controlled. The administration of liquid nutrients is often accompanied by complications such as vomiting and diarrhea, although these complications may be minimized if the patient is sitting up during the administration or if the nutrients are administered at a slower rate. Nevertheless, these methods do not completely succeed in eliminating these common complications, and may require the patients and their caregivers to have great patience. In addition, maintaining the same position for many hours may worsen the conditions of patients who have pressure ulcers. Here we report a case in which, by

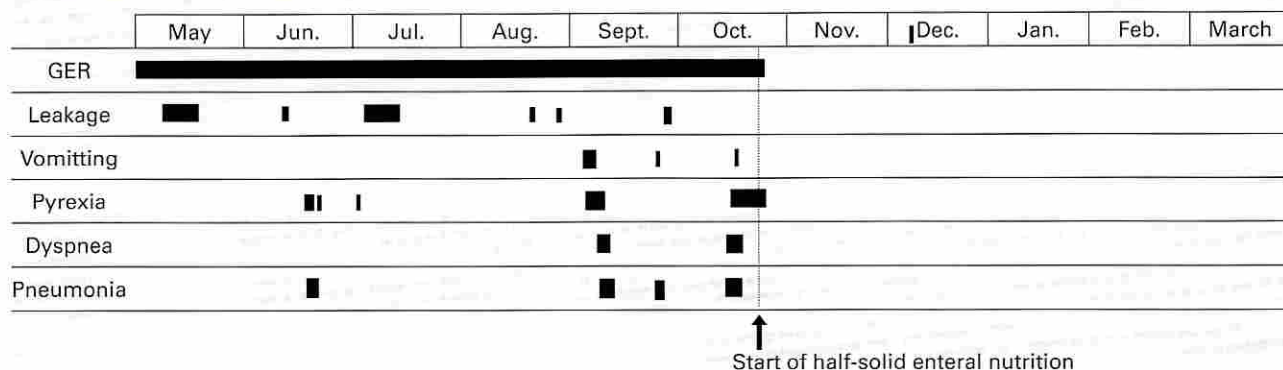


Fig. 1. Reduction of symptoms after half-solid enteral nutrition via PEG.

simply solidifying nutrients, the symptoms due to gastroesophageal reflux (GER) after PEG tube placement were relieved, and the leakage of nutrients from the PEG tube insertion site was alleviated.

Methods

An 85-year-old woman presented with regurgitation of enteral nutrients and recurrent respiratory infections after PEG placement. The patient suffered a cerebral infarction, and underwent PEG insertion on May 4, 2001, at a local hospital. After commencing PEG tube feeding, the following symptoms repeatedly occurred: regurgitation of the enteral feed; leakage of nutrients from the PEG tube insertion site; vomiting followed by pyrexia; dyspnea during the administration of nutrients, and pneumonia confirmed by chest X-ray. The patient often showed facial signs of discomfort during the feed administration. Liquid enteral nutrients were given in a sitting position at all times.

As the complications gradually became more frequent in occurrence, on October 21, 2001, we commenced giving her half-solid enteral nutrients which were prepared by mixing market-available enteral nutrients and agar powder. Half-solid nutrients were prepared by mixing 5 g agar powder with 500 ml liquid nutrients diluted with the same volume of water (1,000 ml total volume). The mixture was distributed into 50-ml syringes and kept in a refrigerator until it was administered via the PEG tubing. The mixture was not liquefied in the stomach due to body temperature. The administration of half-solid nutrients was made by injecting them into the stomach en bloc (injection time <5 min). The patient was not forced to remain in a sitting position during and after the administration.

Results

The symptoms, other than pyrexia, disappeared immediately after the administration of half-solid nutrients, and pyrexia vanished 2 weeks later. Also, the signs of discomfort during the feed administration were no longer noted. We followed the patient for up to 6 months after the start of the half-solid enteral nutrients, and observed no recurrence of the symptoms (fig. 1). At present (February 2004), the patient still remains in a stable condition and no longer suffers from the complications observed before the commencement of half-solid nutrients.

Discussion

PEG feeding is accompanied by unique complications, which occur over a long-term clinical course [1–3]. An increase in vomiting is one of the most common complications [4]. GER is clinically manifested by recurrent vomiting or aspiration. The mechanism by which GER increases in frequency has not yet been clarified.

Ogawa et al. [5, 6] suggested that since the stomach cannot move independent of the abdominal wall after the formation of a gastric fistula, enteral nutrients remain in the stomach longer, thereby increasing the chance of GER. Gastrin, a potent facilitator of peristaltic movement, may not be sufficiently induced by the distension of the stomach seen with slow infusion rates of liquid nutrients. Thus enhanced GER may eventually result. Since the nutrients can be administered in a short time by

our method (<5 min), the stomach wall is expected to be distended to a greater degree and thus stimulate peristaltic movement.

Another disadvantage of slow feed infusion is that patients are forced to remain in a sitting position for long periods while the nutrients are administered, which is unfavorable in terms of the prevention of decubitus ulcers, which are commonly found in patients with PEG feeding.

One of the late complications after PEG tube placement is leakage from the PEG tube insertion site. This is a difficult problem to cope with. There are two causes of leakage: inappropriate fixation of the bumper (including the so-called buried bumper syndrome [7]), and a decrease in the elasticity of the fistular opening, which develops over a long period after PEG placement [8]. The leakage resulting from a decrease in elasticity is intractable. Simply increasing the tube diameter cannot solve this

problem [7, 9]. We found, however, that solidification of the enteral nutrients alleviated the leakage in the present case. This may simply be explained by the fact that the solidified nutrients could not be leaked out by the intragastric pressure through the narrow gap between the fistular pore and the tube.

So far, we have administered half-solid nutrients to 17 patients with PEG feeding and followed up the patients for 6 months. During the observation period, we confirmed significant reductions in the complications observed before the commencement of the half-solid nutrients (data not shown).

In conclusion, our experience indicates that the use of half-solid nutrients in PEG feeding and their rapid administration can substantially reduce the risk of GER and may eventually contribute to a reduction in complications as well as an improvement in the quality of life of the patients and their caregivers.

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