

Experience of Percutaneous Endoscopic Gastrostomy in the Intensive Care Unit

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Abstract

Background: During enteral nutrition in the reanimation unit, reflux and associated aspiration pneumonia are frequently encountered. Percutaneous endoscopic gastrostomy (PEG) is often selected as it facilitates patient care by decreasing this risk and shortens length of stay in hospital. The aim of this study was to share our PEG experience as it is frequently applied in our hospital.

Methods: The study included 29 patients who were applied with a PEG tube in the reanimation clinic between January 2016 and November 2017. Patients were evaluated in respect of indications, length of stay in Intensive Care Unit (ICU), complications and outcomes.

Results: The most common indication for the application of PEG was impaired nutrition associated with cerebrovascular disease in 22 (65.5%) patients. No major complications were encountered related to the procedure. The most common minor complications were nutrition intolerance in 4 patients, tube blockage in 3, displacement of the tube in 3, leakage from the side of the tube in 2, and severe wound site infection progressing to necrosis that required surgical debridement in 3.

Conclusion: Although PEG has only been defined recently, it is a simple, safe and effective nutrition method for intensive care patients that can be applied with a minimally invasive intervention and has very low rates of morbidity and mortality.

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Introduction

One of the basic needs of patients being followed up in Intensive Care Units (ICU) is nutrition. Patients treated in ICU are fed using the enteral route as far as possible and with the maintenance of this route, the integrity of gastrointestinal mucosa is preserved and it is aimed to maintain the mucosal barrier function, the intestinal immune response and the normal flora structure^[1].

Gastric nutrition is the physiological route of enteral nutrition and if the use of the stomach is not contra-indicated, is usually preferred. Feeding tubes to provide enteral nutrition for critical cases can be placed percutaneously and transgastrically. The percutaneous endoscopic gastrostomy (PEG) method was

defined by Ponsky^[2] and in 1980 was reported as an alternative to surgical gastrostomy^[3]. It is applied to provide enteral nutrition in patients who cannot be fed because of gastrointestinal system decompression and various other reasons. During enteral nutrition in the reanimation unit, reflux and associated aspiration pneumonia are frequently encountered^[4]. In patients requiring enteral nutrition such as those with chronic neurological disorders such as cerebral palsy and neuromuscular disorders and most often with brain trauma, those with severe head and neck trauma and those who have undergone upper respiratory tract surgery, nutrition can be provided with PEG. Moreover, PEG provides decompression in cases of chronic lower gastrointestinal obstruction associated with advanced abdominal malignancy^[5].



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Clinical application guidelines for the implementation of PEG are found in the recommendations for the indications and timing of PEG tube placement in acute stroke patients. The American Heart Association/American Stroke Association (USA), Acute Care National Collaboration Centre (UK), German Clinical Nutrition Association (Germany) and the German Neurology Association (Germany) recommend the placement of a PEG tube in stroke patients at 14 - 28 days^[6-9].

PEG is the most frequently preferred long-term enteral nutrition method as it does not require operating theatre conditions, can be applied with out-patient anaesthesia under mechanical ventilation, the application procedure is short and there is a low risk of complications. The aim of this study was to present the results of 29 patients who were monitored in our ICU and in whom nutrition was maintained with a “gastrostomy” tube placed with the PEG technique.

Materials and Methods

Approval for the study was granted by the Local Ethics Committee. The ICU of our hospital is a 12-bed unit with 2 isolation beds. Only patients in the ICU were involved in our study because we are responsible for ICU in our hospital and we have generally patients staying in the hospital for a long period. With improvements in ICU care conditions, the numbers of cases requiring care and long-term stay are increasing. A retrospective examination was made of the records of 29 patients who could not have oral nutrition and were applied with PEG for enteral nutrition between January 2016 and November 2017. The patients were evaluated in respect of gender, indications for PEG, length of stay in hospital before and after the PEG procedure, complications which developed related to PEG and the treatment applied for these complications.

Due to the invasive character of the application, even though partial, a normal hemostasis panel was the first condition for acceptance. The procedure was applied at the bedside by a general surgery specialist with an FG 29x Pentax device. In the procedure, 18/20/22 F PEG kits (Boston Scientific EndoVive™ Standard PEG Kit) were used. Nutrition with NG was terminated 10 hours before the procedure. In our study, 12 patients (%54,5) being conscious were applied with 0,05 - 0,2 mg/kg midazolam and 0,5 - 2 mg/kg propofol as sedoanalgesia technique with the aim of anesthesia apply by anesthesiologist. Any other anesthesia method weren't applied. After confirming the entry site of the gastrostomy tube with the fiberoptic method, entry was made. At 12 hours after opening the PEG, 20 - 30 cc saline was administered to observed whether or not there were any problems. Nutrition was started at 10 ml/hour and with increases of 10 cc every 8 hours, the desired level was reached within 2 - 3 days.

Results

PEG was applied to 29 patients between January 2016 and November 2017. All the PEG application procedures were completed successfully. The patients comprised 19 (55.2%) males and 13 (44.8%) females with a mean age of 73.3 years (range, 19 - 93 years) (Table 1).

The most common indication for PEG was impaired nutrition which developed associated with cerebrovascular disease

in 19 (65.5%) patients. Other indications, as shown in Table 2 were Alzheimer's -dementia, hypoxic encephalopathy, cerebral palsy and muscular dystrophy. The mean follow-up period of the patients was 73 days (range, 7 - 224 days) (Table 2).

Table 1: Demographic data.

| | |
|--------------------------|-------------|
| Gender (Female / Male) | 13/ 19 |
| Age (Years) | 73,3 ± 14,7 |
| (Min.-Maks.) | (19 - 93) |

Table 2: PEG indications.

| | Number (n) | Percent (%) |
|--------------------------------|------------|-------------|
| Cerebrovascular disease | 19 | 65,5 |
| Hypoxic Encephalopathy | 4 | 13,7 |
| Alzheimer's - Dementia | 4 | 13,7 |
| Cerebral palsy | 1 | 3,4 |
| Muscular dystrophy | 1 | 3,4 |
| Total | 29 | |

PEG: *Percutaneous Endoscopic Gastrostomy*

In 1 patient, subcutaneous bleeding was seen below the tube location during the procedure and this was sutured. Severe infection developed progressing to skin necrosis in the tube site in 2 patients (1 diabetic, 1 obese) in the early stages and in 1 patient in the late stage and all were treated with appropriate antibiotics and debridement without removal of the tube. A stomach ulcer was determined in the tube location in 1 patient in the late stage; the tube was removed, the ulcer was treated and then the tube was replaced. In 3 patients, as the tube was displaced at a later stage, they presented again. In 2, a replacement tube was attached in the same place and in 1, nutrition was provided with the placement of a Foley catheter until a replacement tube could be obtained. In 3 patients, in the later stage the tube was removed and exchanged for a replacement tube because of deformation and obstruction. In 2 patients, there was a leakage from the side of the tube, which continued for a long time. The leak was terminated by changing the tube for a larger diameter PEG. In the early period, nutrition intolerance developed in 4 patients. The volume of food was reduced by half and recovery was made with gradual increases. Nutrition intolerance developed in the late stage in 1 patient so the feeding tube was left for free drainage for 2 days and after parenteral nutrition, the transfer back to enteral nutrition was tolerated. The PEG-related complications and rates are given in Table 3. Mortality was seen in 10 (34.4%) patients while under observation in the hospital (Table 3).

Table 3: Complications of PEG.

| | Number (Percent) |
|--------------------------------|------------------|
| Tube displaced | 3 (%10,3) |
| Nutritional intolerance | 4 (%13,7) |
| Tube obstruction | 3 (%10,3) |
| Tube site infection | 3 (%10,3) |
| Leak from tube edge | 2 (%6,8) |
| Total | 15 |

PEG: *Percutaneous Endoscopic Gastrostomy*

Discussion

In the feeding of patients in the ICU, the enteral route is always the first choice when the gastrointestinal system is functional. When using the enteral route, there is a choice of techniques according to the ease of application, duration, and manner of application and risk of aspiration. In patients where the enteral route is considered, in short-term applications which will exceed 6 weeks the nasogastric or nasoenteral route is considered first, and in patients who will require long-term support, permanent catheterisation may be necessary. In a meta-analysis, the rate of nosocomial infection was shown to be between 0% and 40% in various studies^[10]. In the current study, a reduction in the rate of nosocomial infection was seen following PEG. In long-term enteral nutrition applications, PEG is the most widely used and advocated procedure as there is a reduction in both nasal irritation and psychological stress, there is no need for frequent changing and the application is simple^[11].

In patients with permanent neurological dysphagia, nutritional support is provided with NG and PEG. Hamidon et al^[12] compared the safety and efficacy of these two methods in the treatment of dysphagia in stroke patients. It was reported that in dysphagia following acute stroke, nutrition with NG tube and PEG met the treatment and nutritional needs and nutrition with PEG was found to be more effective than NG tube. PEG placement in neurodegenerative disease has frequently been mentioned at a review study^[13]. In the current study, adaptation was seen to be good in patients who were first applied with NG and then transferred to nutrition with PEG and the follow-up was observed to be problem-free. PEG is preferable as the complications are fewer compared to other gastrostomy methods, it can be applied at the bedside, it does not require anaesthesia and it is a method close to natural feeding^[14,15].

In a study in Japan by Kusano et al, PEG was applied to 43.9% of 545 patients because of cerebrovascular disease^[16]. In Turkey as in other countries, PEG tube is often applied proactively for end-of-life medical care in dementia and very elderly patients.

Different techniques have been practised about PEG application. The application of gastrostomy tube by Pull method (Ponsky technique) and Push method (Sachs-Vine technique) is the most frequently used methods. It has been declared that Pull technique has more complication than Push technique because two endoscopy procedures are needed for both application of the tube and removal of the tube in Pull technique. However; endoscopy procedure is needed only for application of tube in Push technique. Endoscopy procedure isn't needed for the removal of tube. Thus, it can be said that Pull technique has more disadvantages than Push technique. At another technique called as "introducer method", gastric is directly entered and foley catheter is applied by means of a guide. And also, percutaneous gastrostomy tube can be applied radiologically to patients having advancedly pharyngeal and esophageal obstruction^[2,17-19]. PEG tube was applied in our whole case by means of Pull technique, furthermore; a technique-related major complication was not observed in our cases.

In many studies, despite the successful application of PEG, minor complications have been observed^[15,20,21]. Although PEG is safe and effective, complications may be seen during or after the procedure. In literature, PEG-related mortality has

been reported as 1% - 3%. The main complications seen during the procedure are abdominal wall bleeding, peristomal leakage, pneumoperitoneum and intraperitoneal bleeding. After the procedure, peristomal pain, necrotising fasciitis, wound site infection or abscess, gastric outlet obstruction, gastrocolic fistula, diarrhea, gastroparesia and aspiration (leakage of the stomach contents to the lungs) may be observed^[22]. None of these complications reported in literature were seen in any of the 29 patients of the current study. Minor complications were seen of nutrition intolerance in 4 patients, tube blockage in 3, displacement of the tube in 3, tube site infection in 3 and leakage from the side of the tube in 2.

In a study by Mohandas et al^[20], PEG was applied to 54 patients in a 10-month period and was successful in 50 (93%). Minor complications developed in 11 of these patients. The reason for failure in 4 patients was tumour invasion in the site opened with PEG. In the 29 patients of the current study, infection developed at the skin entry site as a minor complication and this was successfully treated with dressings and antibiotics. Previous studies have stated that this rate could be much reduced with the use of prophylactic antibiotics^[23,24].

The limitations of our study may be the minority of the number of patient, being of a retrospective study, the difficulty of reaching patient registries, the lack of exact knowledge on long-term outcomes of patients.

In conclusion, PEG tube can be applied to fewer patients than necessary in our country. This rate is much more in developed countries. By taking consideration into these data, PEG tube is applied to only ¼ of patients who needs PEG, other patients are exposed to negative conditions resulting from malnutrition. When PEG is applied by an experienced team, it is a simple, safe and effective method of enteral nutrition with a low complication rate. In selected patients, it is the form of nutrition that should be applied first for long-term enteral nutrition.

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References:

1. Marik, P.E., Zaloga, G.P. Early enteral nutrition in acutely ill patients: a systematic review. (2001) *Crit Care Med* 29(12): 2264–2270.
[PubMed](#) | [CrossRef](#) | [Others](#)
2. Ponsky, J.L., Gauderer, M.W.L. Percutaneous endoscopic gastrostomy: a nonoperative technique for feeding gastrostomy. (1981) *Gastrointest Endosc* 27(1): 9–11.
[PubMed](#) | [CrossRef](#) | [Others](#)
3. Gauderer, M.W.L., Ponsky, J.L., Izant, R.J. Gastrostomy without laparotomy: A percutaneous endoscopic technique. (1980) *J Pediatr Surg* 15(6): 872–875.
[PubMed](#) | [CrossRef](#) | [Others](#)
4. Tomioka, H., Yamashita, S., Mamesaya, N., et al. Percutaneous endoscopic gastrostomy for aspiration pneumonia: A 10-year single-center experience. (2017) *Respiratory Investigation* 55(3): 203–211.
[PubMed](#) | [CrossRef](#) | [Others](#)
5. Schrag, S.P., Sharma, R., Jaik, N.P., et al. Complications related to percutaneous endoscopic gastrostomy (PEG) tubes. A comprehensive clinical review. (2007) *J Gastrointest Liver Dis* 16(4): 407–418.
[PubMed](#) | [CrossRef](#) | [Others](#)
6. Jauch, E.C., Saver, J.L., Adams, H.P., et al. Guidelines for the early management of patients with acute ischemic stroke: A guideline for healthcare professionals from the American Heart Association/American Stroke Association. (2013) *Stroke* 44(3): 870–947.
[PubMed](#) | [CrossRef](#) | [Others](#)
7. Stroud, M. Nutrition support for adults: oral nutrition support, enteral tube feeding and parenteral nutrition. (2006) *Natl Collab Cent Acute Care*.
[PubMed](#) | [CrossRef](#) | [Others](#)
8. Wirth, R., Smoliner, C., Jäger, M., et al. Guideline clinical nutrition in patients with stroke. (2013) *Exp Transl Stroke Med* 5(1): 14.
[PubMed](#) | [CrossRef](#) | [Others](#)
9. Prosiegel, M. Leitlinien für Diagnostik und Therapie in der Neurologie. (2012) Stuttgart: Thieme.
[PubMed](#) | [CrossRef](#) | [Others](#)
10. Lazarus, B.A., Murphy, J.B., Culpepper, L. Aspiration associated with long-term gastric versus jejunal feeding: a critical analysis of the literature. (1990) *Arch Phys Med Rehabil* 71(1): 46–53.
[PubMed](#) | [CrossRef](#) | [Others](#)
11. Park, R.H., Allison, M.C., Lang, J.E., et al. Randomised comparison of percutaneous endoscopic gastrostomy and nasogastric tube feeding in patients with persisting neurological dysphagia. (1992) *BMJ* 304(6839): 1406–1409.
[PubMed](#) | [CrossRef](#) | [Others](#)
12. Hamidon, B.B., Abdullah, S.A., Zawawi, M.F., et al. A prospective comparison of percutaneous endoscopic gastrostomy and nasogastric tube feeding in patients with acute dysphagic stroke. (2006) *Med J Malaysia* 61(1): 59–66.
[PubMed](#) | [CrossRef](#) | [Others](#)
13. Sarkar, P., Cole, A., Scolding, N. J., et al. Percutaneous endoscopic gastrostomy tube insertion in neurodegenerative disease: a retrospective study and literature review. (2017) *Clin Endosc* 50(3): 270–278.
[PubMed](#) | [CrossRef](#) | [Others](#)
14. Erdil, A., Saka, M., Ates, Y., et al. Enteral nutrition via percutaneous endoscopic gastrostomy and nutritional status of patients: five-year prospective study. (2005) *J Gastroenterol Hepatol* 20(7): 1002–1007.
[PubMed](#) | [CrossRef](#) | [Others](#)
15. Zalar, A.E., Guedon, C., Piskorz, E.L., et al. Percutaneous endoscopic gastrostomy in patients with neurological diseases. Results of a prospective multicenter and international study. (2004) *Acta Gastroenterol Latinoam* 34(3): 127–132.
[PubMed](#) | [CrossRef](#) | [Others](#)
16. Kusano, C., Yamada, N., Kikuchi, K., et al. Current status of percutaneous endoscopic gastrostomy (PEG) in a general hospital in Japan: a cross-sectional study. (2016) *J Rural Med* 11: 7–10.
[PubMed](#) | [CrossRef](#) | [Others](#)
17. Russel, T.R., Brotman, M., Norris, F. Percutaneous gastrostomy: a new simplified and cost effective technique. (1984) *Am J Surg* 148(1): 132–137.
[PubMed](#) | [CrossRef](#) | [Others](#)
18. DeLegge, M.H., Berry, A.J. Risk of endoscopic enteral Access. (2008) *Tech Gastrointest Endosc* (10): 36–44.
[PubMed](#) | [CrossRef](#) | [Others](#)
19. Çanakç, E., Yağan, Ö., Taş, N., et al. Yoğun Bakım Ünitemizde Perkütan Endoskopik Gastrostomi Uygulanan Olguların Retrospektif Analizi . (2016) *Dergi Park* 3: 24–28.
[PubMed](#) | [CrossRef](#) | [Others](#)
20. Mohandas, K.M., Dave, U.R., Santhi Swaroop, V., et al. Percutaneous endoscopic gastrostomy for long term enteral nutrition. (1992) *Natl Med J India* 5(2): 52–55.
[PubMed](#) | [CrossRef](#) | [Others](#)
21. Tuncer, K., Kılınçsoy, N., Lebe, E., et al. Perkutan endoskopik gastrostomi sonuçlarımız: 49 olgunun irdelenmesi. (2003) *Akad Gastroenteroloji Derg* 2(2): 64–68.
[PubMed](#) | [CrossRef](#) | [Others](#)
22. Finocchiaro, C., Galletti, R., Rovera, G., et al. Percutaneous endoscopic gastrostomy: A long-term follow-up. (1997) *Nutrition* 13(6): 520–523.
[PubMed](#) | [CrossRef](#) | [Others](#)
23. Nicholson, F.B., Korman, M.G., Richardson, M.A. Percutaneous endoscopic gastrostomy: A review of indications, complications and outcome. (2000) *J Gastroenterol Hepatol* 15(1): 21–25.
[PubMed](#) | [CrossRef](#) | [Others](#)
24. Gossner, L., Keymling, J.H.E. Antibiotic prophylaxis in percutaneous endoscopic gastrostomy (PEG): a prospective randomized clinical trial. (1999) *Endoscopy* 31(2): 119–124.
[PubMed](#) | [CrossRef](#) | [Others](#)