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Our Experiences in Percutaneous Endoscopic Gastrostomy Applications

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ABSTRACT

Gastric nutrition is the most commonly applied form of enteral nutrition. Endoscopic, radiological and surgical techniques (open or laparoscopic) can be used for the placement of the gastrostomy tube. Percutaneous endoscopic gastrostomy (PEG) is considered a better and minimally invasive feeding tube placement method compared to surgical methods. In this study, we aimed to present the short- and long-term results and experiences of our patients who underwent Percutaneous endoscopic gastrostomy in the general surgery department.

The study included 115 patients who were retrospectively placed with an endoscopic gastrostomy tube due to the impossibility of oral feeding at the Department of General Surgery, Faculty of Medicine, between January 2016 and December 2020. The indications, complications and early mortality results of 115 patients who had a Percutaneous endoscopic gastrostomy tube were examined.

Out of 119 patients who underwent endoscopic intervention for Percutaneous endoscopic gastrostomy placement, 115 (96.6%) were successful. 80 (69%) of the patients were male and 35 (31%) were female. The mean age was 54.9 (13-92). PEG indications were prolonged ventilation in 50 (44%) patients, malignancy in 16 (14%) patients, chronic neurological disease in 20 (17%) patients, and other reasons in 29 (25) patients. None of our patients were taken to the operating room for PEG.

As a result, in enteral nutrition, PEG should be preferred over surgical gastrostomy because it has less morbidity and mortality, can be performed at the bedside when necessary, does not require general anesthesia, and is cheaper and more practical.

Keywords: Percutaneous Endoscopic Gastrostomy, Enteral Nutrition, Parenteral Nutrition

Introduction

The most important indication for enteral and parenteral nutrition is to meet the metabolic needs of patients with inadequate oral intake and to provide nutritional support. Enteral nutrition is a preferred method over parenteral nutrition due to reasons such as the inability of parenteral nutrition to provide enteral stimulation in patients with a functional gastrointestinal (GI) system and the subsequent compromise of the intestinal defense barrier, the associated risks of the intravenous route, and its higher cost (1) (2). In addition, it has been shown that enteric nutrition can reduce the risk of bacterial translocation and related bacteremia (3). Percutaneous endoscopic gastrostomy (PEG) is mainly considered in patients with a functional GI system and inadequate oral intake.

Gastric nutrition is the most commonly applied form of enteral nutrition. Endoscopic, radiological and surgical techniques (open or laparoscopic) can be used for the placement of the gastrostomy tube. Percutaneous endoscopic gastrostomy (PEG) first emerged in 1980 with the endoscopic placement of a feeding tube into the stomach (4). It is an important factor in determining the type of gastrostomy due to its low cost, less invasiveness and generally not requiring general anesthesia (especially in patients with poor general condition and in whom anesthesia would be risky due to additional diseases). In addition, PEG is considered a better and minimally invasive feeding tube placement method compared to surgical methods (5) (6). PEG is currently the most preferred method for medium and long-term enteral nutrition. Nutritional needs should be provided with the help of a nasogastric tube in conditions expected to be short-term (<1 month) and with gastrostomy in conditions expected to be longer. The most common indications for gastrostomy are difficulty swallowing, neurological diseases causing aspiration and head and neck cancers (7) (8). In this study, we aimed to present the short- and long-term results and experiences

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of our patients who underwent PEG in the general surgery department.

Material and Methods

After receiving approval from the Ethics Committee, the study included 115 patients who were retrospectively placed with an endoscopic gastrostomy tube due to the impossibility of oral feeding at the Department of General Surgery, Faculty of Medicine, between January 2016 and December 2020. Surgical gastrostomy was performed in 4 patients who could not be opened with a PEG due to inability to enter the stomach with an endoscope for various reasons. In our study, the indications, complications and early mortality results of 115 patients who had a PEG tube were examined. PEG was applied to neurological patients with insufficient oral intake, patients with head and neck cancer, patients who received long-term ventilation treatment in intensive care and patients who needed nutritional support.

None of our patients were administered prophylactic antibiotics before the procedure. The procedure was performed in the endoscopy unit for patients deemed appropriate by the anesthesiologist and in the intensive care unit or operating room for other patients. All patients were sedated by the anesthesiologist and sedation follow-ups were performed by the anesthesiologist before and after the procedure.

The PEG procedure was performed with the pull method described by Gauder et al. (4) following at least 6 hours of fasting. Endoscopic gastrostomy sets of different brands and diameters provided by our hospital were used in our study. After the PEG was placed, a routine control gastroduodenoscopy procedure was performed on all patients and it was checked whether the inner buffer of the tube was completely placed in the gastric mucosa and whether there was any bleeding. After the procedure, the PEG tubes were placed in free drainage and 20 cc/h feeding was started six hours after the procedure. The PEG catheters of the patients were personally evaluated by the general surgeon who performed the procedure and whether there was any leakage from the edge of the tube. After it was seen that there was no problem such as abdominal pain, bloating, vomiting, diarrhea, the amount of feeding was gradually increased to reach the amounts that would meet the daily calorie needs. Early complications of the patients who had gastrostomy tubes placed within the first month and their mortality during hospitalization were recorded, the information of the patients after discharge was reached from the outpatient clinic records and by phone calls, and information was obtained from the patients or their relatives.

Results

Out of 119 patients who underwent endoscopic intervention for PEG placement, 115 (96.6%) were successful. In four patients, PEG placement could not be done because the endoscope could not be passed into the stomach, and these patients underwent surgical gastrostomy surgery. PEG placement was performed using the standard pull method. 80 (69%) of the patients were male and 35 (31%) were female (Figure 1). The mean age was 54.9 (13-92).

Our PEG indications were prolonged ventilation in 50 (44%) patients, malignancy in 16 (14%) patients, chronic neurological disease in 20 (17%) patients, and other reasons in 29 (25) patients (Table 1).

PEG placement was performed in 14 (12%) patients in the endoscopy unit of our clinic and in 101 (88%) patients at the bedside in the intensive care unit where they were admitted. None of our patients were taken to the operating room for PEG. The highest number of PEG procedures was performed on 61 (53%) patients who were followed up in the anesthesiology and reanimation intensive care unit. No mortality was observed related to the procedure. 73 (63%) of the cases died due to their primary diseases both in the hospital and after being discharged from the hospital. 30 (41%) of the cases that developed mortality occurred within the first thirty days while their treatment in the intensive care unit was ongoing. The number of patients who died the day after the procedure was 5 (6%). The number of our mortality that occurred while their treatment in the hospital was ongoing after PEG was placed was 39 (34%). When we look at the mortality according to the services, it was determined that 29 (47%) of the 61 patients who had PEG placed in the anesthesia intensive care unit were mortal. (Table 2).

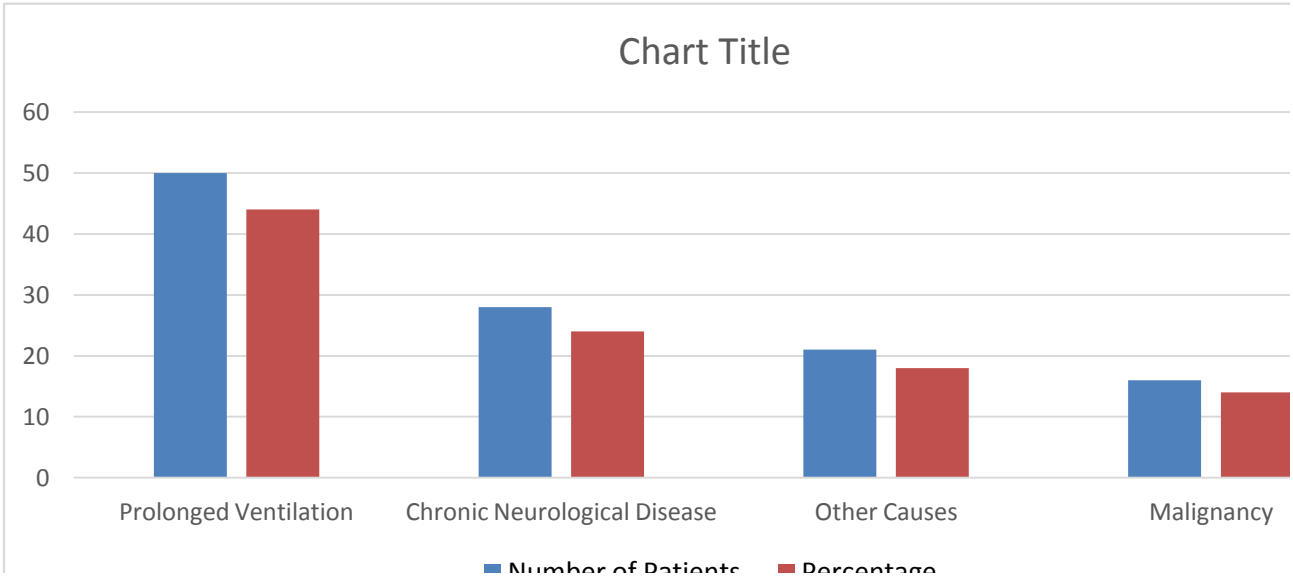
Discussion

The PEG procedure, which was first described in the world by Gauderer in 1980, has been widely used all over the world since its definition. PEG has been an adequate, balanced and easy way of

Table 1: Indications for PEG

Clinic	n (%)	Mortality (%)	Hospitalization Mortality (%)
Anesthesia and Reanimation	61 (53)	44	29
General Surgery	26 (23)	12	3
Neurology	10 (9)	7	1
Internal Medicine	9 (8)	4	4
Chest Diseases	6 (5)	5	1
Neurosurgery	3 (2)	1	1

Table 2: Numbers and Mortality of Patients With PEG According To Clinics



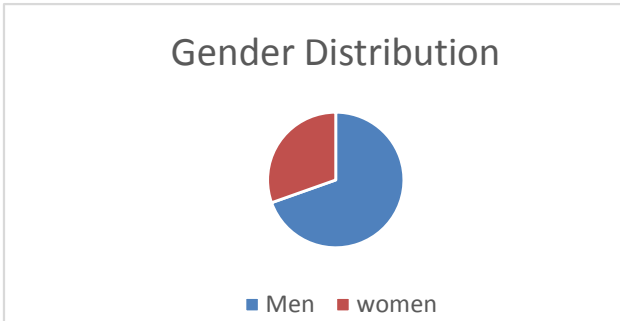


Fig. 1. Age Distribution

enteral nutrition for patients with malnutrition and whose oral intake cannot meet their daily calorie needs (9).

In large case studies published in our country and world literature, it has been determined that the most common reason for PEG insertion is patients with neurological disorders (10) (11) (12). In a study conducted by Ermiş et al., it was reported that the most common reason for PEG insertion is neurological dysphagia (92%), followed by stroke and head and neck cancers (8). In another study conducted by Hossein et al. (7), it was reported that the most common reason for PEG indications is neurological dysphagia (66%), followed by aspiration pneumonia and esophageal tumors. When the indications of 115 patients who had PEG inserted in our clinic were evaluated, it was seen that patients who were followed up intubated in the anesthesia and reanimation clinic were at the forefront. In our study, PEG procedure was applied to 50 (44%) patients who were intubated in the anesthesia and reanimation clinic for various reasons and could not be fed orally due to prolonged ventilation times. When other indications were examined, we came across neurological disorders, head and neck tumors, benign or malignant diseases causing upper gastrointestinal system obstruction and conditions with inadequate swallowing function (13) (14). We thought that the reason why the indications in our series were different from the literature could be due to the fact that PEG procedure was applied by both gastroenterology and general surgery clinics in our hospital. PEG procedures of anesthesia and reanimation intensive care patients and patients referred from external centers were

performed by the general surgery clinic, while PEG procedures of neurology intensive care and neurology clinic patients were mostly performed by the gastroenterology clinic. Although the contraindications determined by studies for the PEG procedure have decreased over time, they still include a history of previous abdominal surgery, coagulopathy, morbid obesity, advanced ascites, peritoneal carcinomatosis, laryngeal or esophageal obstruction (8) (15). In addition to the reasons listed above, we believe that including patients with a life expectancy of less than 1 month in the contraindication and, if possible, not performing the procedure will be effective in reducing morbidity and mortality. Although PEG is a less invasive, reliable and effective procedure compared to other gastrostomy methods, many complications may occur during or after the procedure. If we classify these complications as minor and major, minor complications of the procedure include wound infection (most common), tube obstruction, leakage from the tube edge, and spontaneous removal of the tube. Major complications include buried internal tampon syndrome, bleeding, perforation, and gastrocolic fistula (7) (8). In the literature, the minor complication rate is reported as 6-33% and the major complication rate as 0-2.8% (16) (17). In our study, minor complications were observed in 32 patients (28%), while 4 patients (3.4%) developed major complications. Major complications were buried bumper syndrome in 2 (1.6%), gastric bleeding in 1 (0.8%) and colocutaneous fistula in 1 (0.8%). There are controversial results in the literature regarding the use of prophylactic antibiotics before the procedure to reduce the risk of local infection, which is the most common minor complication. Although a published meta-analysis showed that single-dose antibiotic application reduces peristomal wound infection, two studies evaluated indicated that using antibiotics before the procedure was not beneficial (18). The ESPEN guideline recommends that antibiotic prophylaxis is not necessary for patients receiving antibiotics and also in experienced hands, and that it should be applied in suspicious cases or in inexperienced centers (19). Routine antibiotic prophylaxis was not applied in our practice. In our study, 14 (12%) patients developed infection around the PEG catheter. It was observed that they were treated rapidly with the given antibiotics. Studies have reported PEG-related mortality below 1% (20). Mortality rates in the first 30 days after the procedure have been reported as 8-20% in foreign series and 10-26.8% in studies conducted in our country (21) (22) (23). No procedure-related mortality was observed in our study. Our total mortality number in long-term follow-up was 73 (63%). Mortality developed in 39 (34%) of the patients who underwent the procedure while their treatment in the hospital was ongoing. The reason for our high mortality rate may be that a large proportion of our patients (53%) had prolonged stays in the anesthesia intensive care unit, had many additional diseases, and had a short life expectancy. We believe that the decision to open a PEG in patients with a life expectancy of less than 1 month will reduce mortality if it is made by a team consisting of a general surgeon, anesthesiologist and other necessary branches.

As a result, enteral nutrition should be preferred in patients who require long-term nutrition to avoid the complications of parenteral nutrition. In enteral nutrition, PEG should be preferred over surgical gastrostomy because it has less morbidity and mortality, can be performed at the bedside when necessary, does not require general anesthesia, and is cheaper and more practical. In patients planned to open a PEG, it may be effective in reducing morbidity and mortality if the unit performing the procedure (general surgery, gastroenterology, etc.) is consulted during the evaluation of the indication.

References

1. Alverdy J, Chi HS, Sheldon GF. The effect of parenteral nutrition on gastrointestinal immunity. The importance of enteral stimulation. Ann Surg. 1985;202:681–684. .
2. Deitch EA, Ma WJ, Ma L, Berg RD, Specian RD. Protein malnutrition predisposes to inflammatory-induced gut-origin septic states. Ann Surg. 1990;211:560–567; discussion 560-567.
3. Deitch EA, Winterton J, Li M, Berg R. The gut as a portal of entry for bacteremia. Role of protein malnutrition. Ann Surg. 1987;205:681–692. .
4. Gauderer MW, Ponsky JL, Izant RJ. Gastrostomy without laparotomy: a percutaneous endoscopic technique. J Pediatr Surg. 1980;15:872–875.
5. Grant JP. Comparison of percutaneous endoscopic gastrostomy with Stamm gastrostomy. Ann Surg. 1988;207:598–603.
6. Ho CS, Yee AC, McPherson R. Complications of surgical and percutaneous nonendoscopic gastrostomy: review of 233 patients. Gastroenterology. 1988;95:1206–1210. .

7. Hossein SM, Leili M, Hossein AM. Acceptability and outcomes of percutaneous endoscopic gastrostomy (PEG) tube placement and patient quality of life. Turk J Gastroenterol 2011; 22(2):128-133. .
8. Ermis F, Ozel M, Oncu K, Yazgan Y, Demirturk L, Gurbuz AK ve ark. Indications, complications and long-term follow-up of patients undergoing percutaneous endoscopic gastrostomy: A retrospective study. Wien Klin Wochenschr 2012; 124(5-6):148-153. .
9. Gauderer M. Twenty years of percutaneous endoscopic gastrostomy: origin and evolution of a concept and its expanded applications. Gastrointest Endosc 1999;50:879-83.
10. Srinivasan R, Irvine T, Dalzell M. Indications for percutaneous endoscopic gastrostomy and procedure-related outcome. J Pediatr Gastroenterol Nutr 2009;49:584-8.
11. Fortunato JE, Troy AL, Cuffari C, et al. Outcome after percutaneous endoscopic gastrostomy in children and young adults. J Pediatr Gastroenterol Nutr 2010;50:390-3.
12. Cantez MS, Cantez S, Gerenli N, Durmaz Ö. Demographic findings of 104 patients with percutaneous endoscopic gastrostomy. Türk Ped Arş 2013;210-4.
13. Yılmaz H, Alptekin H, Acar F, et al. Experience of percutaneous endoscopic gastrostomy. Selçuk Tıp Derg 2013;29:68-70.
14. Herman LL, Hoskins WJ, Shike M. Percutaneous endoscopic gastrostomy for decompression of the stomach and small bowel. Gastrointest Endosc 1992;38:314-8. .
15. Nadir I, Türkay C. Uzun Süreli Enteral Beslenmede Etkili ve Güvenilir Yaklaşım: Perkütan Endoskopik Gastrostomi. Güncel Gastroenteroloji 2011; 15:2. .
16. Erdil A, Tüzün A, Saka M, ve ark. Perkütan endoskopik gastrostomi uygulamalarımız ve sonuçları. Gülhane Tıp Dergisi. 2001; 43(4):379-383.
17. Foutch PG. Complications of percutaneous gastrostomy and jejunostomy. Recognition, prevention and treatment. Gastrointest Clin N Am 1992; 2:231-248.
18. Sharma VK, Howden CW. Meta-analysis of randomized, controlled trials of antibiotic prophylaxis before percutaneous endoscopic gastrostomy. Am J Gastroenterol 2000;95:3133-3136. .
19. Löser C, Aschl G, Hebuterne X, et al. ESPEN guidelines on artificial enteral nutrition—Percutaneous endoscopic gastrostomy (PEG). Clin Nutr 2005;24:848–861.
20. Marik PE, Zaloga GP. Early enteral nutrition in acutely ill patients: a systematic eview. Crit Care Med 2001;29:2264-70.
21. Nicholson FB, Korman MG, Richardson MA. Percutaneous endoscopic gastrostomy: a review of indications, complications and outcome. J Gastroenterol Hepatol 2000;15:21-5. .
22. Skelly RH, Kupfer RM, Metcalfe ME, et al. Percutaneous endoscopic gastrostomy (PEG): change in practice since 1988. Clin Nutr 2002;21:389-94.
23. Kobayashi K, Cooper GS, Chak A, et al. A prospective evaluation of outcome in patients referred for PEG placement. Gastrointest Endosc 2002;55:500-6.
24. Abuksis G, Mor M, Segal N, Shemesh I, Plout S. Sulkes J, Fraser GM, Niv Y. Percutaneous endoscopic gastrostomy: high mortality rates in hospitalized patients. Am J Gastroenterol. 2000;95:128-32.
25. Gottfried EB, Plumser AB, Clair MR. Pneumoperitoneum following percutaneous endoscopic gastrostomy. A prospective study. Gastrointest Endosc 1986;32:397-9. .
26. Hull MA, Rawlings J, Murray FE, et al. Audit of outcome of long-term enteral nutrition by percutaneous endoscopic gastrostomy. Lancet 1993;341:869-72. .
27. Finocchiaro C, Galletti R, Rovera G, et al. Percutaneous endoscopic gastrostomy: a long-term follow-up. Nutrition 1997;13:520-3. .