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Original Article

Outcomes of percutaneous endoscopic gastrostomy: One surgeon experience

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Abstract

Aim: We aimed to present our experience and findings in patients which in we applied percutaneous endoscopic gastrostomy (PEG) tube insertion because of the oral nutritional deficiency.

Material and Methods: The data of 41 patients who had PEG tube insertion between 2014 and 2018 years in the General Surgery Clinic of Medicine Faculty of Ordu University were evaluated retrospectively. The indications, complications, mortality and short-term outcomes of the patients were analyzed.

Results: 43 patients underwent gastroscopy due to insertion of PEG. In 41(95.3%) patients, PEG insertion was successful. In 2(4.7%) patients, PEG insertion failed due to obesity. 16(39%) of the PEG patients were males and 25 (61%) were females. The mean age was 77.68 ± 13.9 (20-94) years. PEG indications were chronic neurological disease in 22 (53.6%) patients, cerebrovascular disease in 15 (36.6%) patients and malignancy in 4 (9.8%) patients. Minor complications in 11(26.8%) patients and major complications in 2 (4.9%) patients were observed. 10 (24.4%) of the complications were in the early period and 3 (7.3%) were in the late period. During the follow up, the PEG tube in 3 (7.3%) patients was pull out. No mortality due to PEG insertion was observed. During the mean follow-up period of 9.37 ± 7.8 months, 14 (34.1%) of the PEG-treated patients died due to their primary disease.

Conclusions: PEG tube insertion is an easy method with the low rates of the complication and mortality in the patients with poor oral intake who have a functional gastrointestinal system. PEG is the first choice for long-term enteral nutrition in appropriate patients.

Keywords: Percutaneous Endoscopic Gastrostomy; Complication; Mortality.

INTRODUCTION

In patients without adequate oral feeding, the enteral and parenteral nutrition is important for nutritional support in order to meet metabolic requirements. As the enteral feeding is simple, cheap and most physiological, it is the most preferred. Intestinal flora and bacterial translocation are preserved, intestinal atrophy is prevented, and so intestinal immunity remains alive. İf the patient has a functional gastrointestinal (GI) system, enteral feeding is much more preferable than parenteral nutrition (1). The routes that we use for enteral feding are; nasogastric or nasojejunal tube, surgical gastrostomy, surgical jejunostomy, percutaneous endoscopic jejunostomy and percutaneous endoscopic gastrostomy (PEG). PEG is one of the most preferred methods for long-term enteral feeding in patients with normal GI function and without adequate oral feeding. PEG operation was first described in the world by Gauderer in 1980 (2). PEG can be used in cases of dysphagia due to neurological diseases, head and neck tumors, prolonged coma, multiple traumas, fluid-electrolyte disturbances and recurrent aspiration pneumonia (2-4). In this study, it was aimed to investigate the demographic data and the complication rates of the patients who underwent PEG procedure.

MATERIAL and METHODS

The data of 41 patients who had PEG tube insertion due to inadequacy oral intake between the years of 2014 and 2018 at General Surgery Clinic of Medical Faculty of Ordu University, were retrospectively screened. The age, gender, indications for PEG insertion, complications and mortality rates were evaluated.

PEG tube insertion was performed in the endoscopy unit for the patients whose general condition is appropriate.

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While in patients who were not fit, it was performed in bed at the ward or in the intensive care unit. Patients were provided hunger for at least 12 hours. No prophylactic antibiotics were given. Patients were seen by the anesthesiologist at least 24 hours before the procedure and preoperative evaluations were performed. Patients who underwent routine monitorization procedures (Electrocardiography graphy, pulse oximetry and blood pressure) in the endoscopy unit received nasal oxygen from 2-3 L/min, 0.05 mg kg midazolam (Dormicum, Roche) and 0.5 mcg / kg fentanyl (Talinat, Vem) for sedation under the supervision of an anesthesiologist. The mechanical ventilation support was provided in intubated patients.

In the insertion of the PEG tube, we used the pull method described by Gauder et al. In this method a string is inserted through a needle in the abdominal wall and the guide was inserted into the stomach in the illumination of light and the guiding rope sent from here was caught with forceps and removed from the mouth. The guide rope is fixed to the external end of the PEG tube and the tube is pulled from the mouth to the esophagus, stomach and then out though the abdominal wall. It was placed into the stomach (2). At the end of the procedure, we also confirmed tube placement by visualizing inner bolster at stomach through re-endoscopy. After the procedure, PEG tube was taken free drainage. After the next morning visit by the surgery team, the patient started to feed with 10 cc/hr of fiber-rich enteral product. In our patients, we inserted a 20-Fr standard percutaneous endoscopic gastrostomy set (EndoVive, Boston Scientific) with using Pentax EPK-i 5000 fiber endoscope. The approval of the ethics committee has been obtained from The Clinical Research Committee of The Medical Faculty of Ordu University.

Statistics

Descriptive statistics for continuous variables; mean, minimum and maximum values; expressed as number and percentage for categorical variables. Statistical package program SPSS (IBM SPSS for Windows, Ver.24) was used in the calculations.

RESULTS

Forty-three patients underwent gastroscopy due to insertion of PEG tube. In 41(95.3%) patients, PEG tube insertion was successful. In 2(4.7%) patients, PEG tube insertion failed due to obesity. The PEG tube was inserted by using the standard pull method. All PEG tubes were inserted by the same general surgeon. In the cases, 16 (39%) of them were male and 25 (61%) of them were females. The mean age was 77.68 ± 13.9 (20-94) years. PEG indications were chronic neurological disease in 22 (53.6%) patients, cerebrovascular disease in 15 (36.6%) patients and malignancy in 4 (9.8%) patients (Table 1).

Table 1. Distribution of cases according to etiology

Primary Disease	n	%
Chronic neurological disease	22	53.6
Cerebrovascular disease	15	36.6
Malignancy	4	9.8

The PEG tube was inserted in 7 (17.1%) patients in the intensive care unit and in 34 (82.9%) patients in the endoscopy unit. Among the patients with PEG, 23 (56.1%) patients from palliative care service formed the majority of the cases.

Minor complications in 11 (26.8%) patients and major complications in 2 (4.9%) patients were observed according to data obtained from the records. When we evaluated the minor complications, we observed the wound infection developed in 5 (12.2%) patients. All this infections improved by the antibiotic treatment, wound care and dressing. In our 3 (7.3%) patients minimal leakage was observed around the tube. The bleeding from the skin was observed in 1 (2.4%) patient. Transient ileus developed in 1 (2.4%) patient and it was improved after the adaptation to enteral solution. In 1 (2.4%) patient pneumoperitoneum developed and spontaneous remission was observed within 1 week without any treatment. When we investigated the major complications, buried bumper syndrome developed in 1 (2.4%) patient and the tube had to be withdrawn. In 1 (2.4%) patient, necrotizing fasciitis was observed around the tube. The patient was taken to the surgery and the infected tissue around the tube was debrided and treated with antibiotics. The patient healed.

When we evaluated the complications of patients early and late (in 30 days and later), early complications were seen in our 10 (24.4%) patients and late in our 3 (7.3%) patients. When we investigated the early complications, we found wound infections around the tube in 3 patients (7.3%) and minimal leakage around the tube in 3 (7,3%). Also the bleeding from the skin in 1 (2.4%), transient ileus in 1(2.4%), pneumoperitoneum in 1 (2.4%), and buried bumper syndrome in 1 (2.4%) patient developed. When we evaluated the late complications, 2 were wound infection around the tube and the other 1 was necrotizing fasciitis around the tube (Table 2).

Table 2. Distribution of Minor and Major Complications of PEG

Complication	Minor Complications (n)	Major Complications (n)	%
Peristomal infection	5		12.2
Leaking around the tube	3		7.3
Peristomal bleeding	1		2.4
Ileus	1		2.4
Pneumoperitoneum	1		2.4
Buried bumper syndrome		1	2.4
Necrotizing Fasciitis		1	2.4
Total	11	2	

During follow-up, it was observed that 3 (7.3%) patients pulled out the tube. For these patients, PEG is re-inserted in the endoscopy unit. No mortality due to PEG insertion was observed. During the mean follow-up period of 9.37 ± 7.8 months, 14 (34.1%) of the PEG-treated patients died due to their primary disease.

DISCUSSION

Enteral nutrition is the first choice because of the practicality and efficiency in patients with insufficient or absent oral nutrition. PEG is one of the most preferred enteral feeding routes in patients who need long-term nutritional support because it can be inserted under local anesthesia and sedation in a short time, operating room conditions are not generally required and the complication rate is low (5). PEG is considered suitable for cases requiring an enteral tube nutrition that exceeds 30 days (6).

The PEG placement methods are the Ponsky-Gauderer "pull" technique, the Sachs-Vine "push" method, the Russell procedure and Versa (T-fastener) technique which are bacisc and most preferables. The most frequently used methods are pull and push techniques (2,4,7,8). We used "pull" technique which confers satisfactory tube insertion. Antibiotic prophylaxis for the PEG implementation is not routine and there are different opinions on this subject. Antibiotic prophylaxis is not required for PEG tube insertion in experienced centers with sterile conditions (9). In our study, antibiotic prophylaxis was not performed to the patients, based on European Society for Clinical Nutrition and Metabolism (ESPEN) guidelines. There is no consensus on the issue of when to start feeding by PEG after PEG insertion. In our cases the nutrition started 24 hours after insertion. In this time period, PEG tube free drainage was obtained. It was ensured that the gas and liquid supplied to the stomach during the procedure were completely removed. It was also possible to monitor for bleeding through the free drainage. It has also not been started to be fed earlier to allow time for epithelization of skin, muscle and peritoneal defects (10).

PEG insertion may fail because of obesity, anatomical variation and previous gastrointestinal surgeries, whichever technique is used. With experience, the success rate is also increasing. When we look at the literature, the success rate is up to 99% (11). In our study, the success rate is 95.3%. Previous gastrointestinal surgery is not a contraindication to PEG tube insertion, but in this condition the failure rate is high. We observe that the rate of failure after previous gastrointestinal surgery is between 2.7 and 12 % in the literature (12,13). In our series, there were 8 patients with previous gastrointestinal surgery and the success rate was 100% in these patients. In the past, PEG has been used in only chronic neurology patients who have swallowing difficulties but nowadays PEG indications are enlarged. The enlarged indications of PEG are metabolic diseases, cardiac diseases, fluid-electrolyte disorders, cystic fibrosis, trauma, malignancy, recurrent aspiration pneumonia and oropharyngeal anatomic disorders (2-4,14,15). When we look at the indications of our own patients, 22 (53.6%) patients have chronic neurological disease, 15 patients (36.6%) have cerebrovascular disease and 4 (9.8%) patients have malignancy.

Gastrostomy tube should be replaced or removed if it is no longer needed or problems develop. The removal of PEG tube in the PEG-inserted centers also has an important place in the total number of transactions. When we look at the literature, in some large series, nearly 10% of all PEG-related operations are PEG subtraction (16). In our series, only 3 of the 41 patients (7.3%) had PEG removal.

PEG tube insertion is an effective and reliable method but complications may occur during or after the procedure and may even lead to death in patients. Good transillumination through the abdominal wall and clear visualization of indentation of the stomach by external palpation increase PEG safety. İt is reporting that the minor complications ranges varies from 16% to 50% while the major complications occurs at rates of 1-3% and sometimes up to 9%. Even if PEG is a minimally invasive procedure, it carries a mortality risk of 0.8% (17-21). İn our patients, minor complications were observed in 11 (26.8%) patients and major complications in 2 (4.9%) patients. There is no PEG-related mortality in our cases.

We can separate PEG-related complications into two groups as minor and major. Complications such as wound infection, hyper-granulation tissue around the gastrostomy tube, hemorrhage from the site of the tube, leakage from the wound site, transient ileus, pneumoperitoneum and occlusion or perforation of the tube may be considered minor. On the other hand, the necrotizing fasciitis, esophageal perforation, gastric perforation, colonic perforation, colocutaneous fistula, aspiration pneumonia, buried buffer syndrome and gastric luminal hemorrhage are major complications (22,23). Minor complications are much more common than major complications. In a study of Binicier et al., it was detected that 84% of the complications were minor and 16% were major (24). The results in our series are similar to the literature, 84.6% of the complications are minor and 15.4% are major.

When we discuss the most common complications after PEG tube insertion; the most common minor complication is undoubtedly the wound infection. Prevalences ranging from 5% to 65% have been reported in the literature (25,26). In our series, wound infection was seen in 5 (12,2%) of the patients. Intra-abdominal organ injuries which are the most common and most important of the major complications are life-threatening and the colon injury is the most common among these (27). It has never been seen in our cases. One of the common major complications is also the buried bumper syndrome. Buried bumper syndrome is the dislocation of the PEG tube from the stomach mucosa towards the skin. Excessive traction applied to the PEG for a long period is related with Burried bumper syndrome. İt occurs in 0.3 and 4 % of patients (21). This syndrome was occured in 1 (%2.4) of our cases.

One of the most frequent reasons for emergency service admission in the follow-up of PEG tube-inserted patients is the removal of the tube. The tube may slide into or out of the stomach. If the tube goes inside the stomach towards the pilor, the lumen becomes blocked. If it moves outward from the stomach wall, it can come out from the sutur region. This has been reported in some series to rates

as high as 12.8% (28,29). In our cases, the removal of the tube was seen in 3 (7.3%) patients.

Complications can be divided into two, as early which is seen within 30 days and late which is seen 30 days later. In the study of Karaca et al., early complication rate was 17.2% and late complication rate was 9% (30). In our study, 24.4% of the complications are early and 7.3% of the complications are late. Life-threatening complications are usually early-stage complications. Long term complications are mainly due to insufficiency of PEG tube care. The best way to prevent long-term complications is through the training of patient caregivers.

CONCLUSION

According to our experience, PEG tube in patients with poor oral intake who have a functional GI system is a practical minimally invasive enteral feeding method which has low morbidity and mortality rates. PEG can be inserted even at bedside without anesthesia. Because of all these advantages, PEG is the first choice for long-term enteral nutrition in appropriate patients.

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