

Evaluation of factors relating with early period complications that develop following application of percutaneous endoscopic gastrostomy

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ABSTRACT

Introduction: Percutaneous endoscopic gastrostomy (PEG) is the method which is preferred for nutrition in patients who need long-term enteral nutrition. In this procedure which seems to be simple technically, complications which can form following the process can give rise to serious results. In this study, it has been aimed to examine the factors relating with complications observed in early period following PEG process.

Materials and Methods: Patients who underwent PEG process in our clinic between years of 2014 and 2020 are included in the study. Patients are divided into two groups within the first period of 30 days depending on whether complication has developed or not. Factors that could be related with complications in groups and long-term results in patients relating with whom complications developed are analyzed retrospectively.

Results: One hundred and six patients were included in our study. In the group with early complications, long-term complications (30.8% vs. 6.3% p=0.001), catheter dysfunction (19.2% vs. 3.8% p=0.009), and withdrawal of the PEG tube (11.5% vs. 0% p=0.002) were found to be more frequent at a significant level statistically.

Conclusion: None of the parameters evaluated in our study alone were associated with PEG complications. In patients with early PEG complications, the rate of complications, catheter dysfunction, and withdrawal of the PEG catheter increased in the long term. Prevention of early complications in patients with PEG can increase the quality of life of patients by preventing complications that may occur in the long term, while also reducing hospital costs.

Keywords: Complication, Indication, Percutaneous endoscopic gastrostomy

Introduction

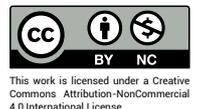
The gastrointestinal system should be used whenever possible in patients whose oral intake is insufficient and for whom the gastrointestinal system can be used. Using the

enteral system reduces the possibility of bacterial translocation. Its complications and costs are less with respect to parenteral nutrition. While patients who cannot take oral administration for various reasons and who will be given



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short-term enteral nutrition can be fed nasointerally, more permanent methods should be preferred in case of feeding for more than 1 month. One of these physiological methods is opening a gastrostomy. Gastrostomy can be opened endoscopically, radiologically, and surgically. With the widespread use of minimally invasive methods, if there is no obstacle, endoscopic opening is preferred. In this technically simple procedure, complications that may occur after the procedure can lead to serious consequences.^[1,2] In this study, it was aimed to examine the factors associated with early complications after percutaneous endoscopic gastrostomy (PEG) procedure.

Materials and Methods

Patients who underwent PEG procedures in our clinic between 2014 and 2020 were retrospectively screened and included in the study. Gender, PEG placement indications, previous abdominal surgery, and complications were evaluated. The procedure was performed in the endoscopy unit in patients with good general condition and in the intensive care unit after 12 h of fasting in unsuitable patients. Prophylactic antibiotics were not administered. The PEG procedure was performed by the same team using the standard pull method and a 20 Fr endoscopic gastrostomy tube. After the procedure, the PEG tube was placed in free drainage. The next day, after the patient was seen by the team performing the procedure, 10 cc/hour of enteral nutrition was started. Patients were divided into two groups. Complicated patients were divided into Group 1, and those without complications were divided into Group 2. Factors that may be associated with complications in the groups and long-term results in patients who developed complications were analyzed. Approval was obtained from the Erciyes University Ethical Committee.

Statistical Analysis

Categorical measurements, number and percentage; continuous measurements were expressed as mean and standard deviation (median and minimum-maximum where necessary). Statistical package program SPSS (Windows IBM SPSS Ver.24) was used for calculations. The statistical significance level was taken as 0.05 in all tests.

Results

One hundred and six patients were included in our study. Group 1 consisted of 26; Group 2 consisted of 80 patients.

About 74% of the complications were minor complications. The most common complication (34%) was leakage in catheter place. It was observed that male gender was dominant in both groups (69.2% vs. 61.3% $p=0.464$). The most common indication was chronic neurological disease (38.5% vs. 38.8% $p=0.852$) in both groups. History of previous abdominal surgery (7.7% vs. 7.5% $p=0.974$) and distribution of comorbid diseases were similar in the groups (57.7% vs. 52.5% $p=0.726$) (Table 1).

Laboratory parameters before the procedure were similar ($p>0.05$). In the group with early complications, long-term complications (30.8% vs. 6.3% $p=0.001$), catheter dysfunction (19.2% vs. 3.8% $p=0.009$), and withdrawal of the PEG tube (11.5% vs. 0% $p=0.002$) were seen to be more common (Table 2).

Discussion

There is an indication of gastrostomy for the continuation of enteral nutrition in various chronic neurological diseases such as cerebrovascular disease, Parkinson's, dementia, and motor neuron diseases and certain malignancies.^[3] The main purpose of opening a gastrostomy is dysphagia. It is preferred to provide enteral nutrition in patients who cannot have oral intake, especially in patient groups with medium and long-term (more than 4 weeks) nutritional needs.^[4] Available gastrostomy techniques are PEG, percutaneous radiological gastrostomy (PRG), and surgical gastrostomy. PEG procedure, which was first described by Gauderer in 1980, has been widely used all over the world since the day when it was defined.^[5] PEG and PRG are preferred to surgical gastrostomy because of their low morbidity rates.^[6]

The most common indication in patients with PEG in the literature and in our study is chronic neurological diseases.^[5] In our study, PEG was inserted in 41 patients (38.6%) who could not take oral therapy with a diagnosis of chronic neurological disease.

Although PEG insertion is a safe method, serious complications (bleeding, peritonitis, obstruction, perforation, and wound infection) including death can be seen.^[7] Complications that can be seen are divided into two as during and after the procedure. The most common complications that can be seen during the procedure are liver left lobe injury and transcolonic insertion of the PEG catheter. Seeing the transillumination of the endoscope light through the skin reduces the possibility of additional organ injury during the procedure. The correct use of the technique

Table 1. Comparison of demographic and clinical features of groups

	Group2 (There is no complication) (n=80) n (%)	Group1 (There is complication) (n=26) n (%)	p
Gender			
Male	49 (61.3)	18 (69.2)	0.464
Female	31 (38.8)	8 (30.8)	
Indication			
Head and neck cancer	8 (10.0)	2 (7.7)	0.852
Brain tumor	7 (8.8)	3 (11.5)	
Other cancers	9 (11.3)	1 (3.8)	
Head trauma	9 (11.3)	4 (15.4)	
Chronic neurological disease	31 (38.8)	10 (38.5)	
Esophagus cancer	7 (8.8)	1 (3.8)	
Cerebrovascular event	3 (3.8)	2 (7.7)	
Extended ventilation	6 (7.5)	3 (11.5)	
Comorbid disease			
Multiple	15 (18.8)	4 (15.4)	0.726
Single	27 (33.8)	11 (42.3)	
None	38 (47.5)	11 (42.3)	
Abdominal surgery had			
Yes	6 (7.5)	2 (7.7)	0.974
No	74 (92.5)	24 (92.3)	

reduces the possibility of complications during the procedure. The complications that can be seen after the procedure are erythema, tenderness, granulation tissue formation at the entry site, pain, bleeding, hematoma, and PEG catheter removal. If the catheter is inserted too close to the pylorus, it may cause gastric outlet obstruction, and if it is placed too close to the antrum, it may cause gastroesophageal reflux.^[3,8]

The minor complications after PEG insertion are wound infection, hypergranulation tissue around the gastrostomy tube, bleeding from the location of the tube, leakage from the wound site, temporary ileus, pneumoperitoneum, and obstruction or perforation of the tube. The major complications are necrotizing fasciitis, esophageal perforation, gastric perforation, colon perforation, colcutaneous fistula, aspiration pneumonia, and intraluminal bleeding in the stomach.^[9] In the study conducted, the major complications such as peritonitis, abscess, and pneumonia in the early period were observed with rate of 3.4% in patients with PEG and with rate of 5.4% in the late

period. Early minor infection was seen with a rate of 1.7%; late skin deterioration (redness and mild granuloma formation) was seen with a rate of 3.8%.^[10]

Except for dislocation of the catheter, there was no difference between PEG and PRG in terms of minor and major complications. Catheter dislocation was seen in 5% of patients with PEG and 21% of patients with PRG. This has been attributed to the thinner and poorer fixation of the PRG catheter.^[11]

PEG is a successful enteral nutrition method that can be inserted without major complications, even in patients who have undergone major abdominal operations such as small bowel resection, colectomy, pancreaticoduodenectomy, liver lobectomy, and kidney transplantation. In a study comparing those with and without a history of abdominal surgery, it was shown that there was no significant difference in terms of bleeding, tube dislocation, and wound complications.^[12] In our study, it was shown that the history of abdominal surgery was not associated with early complications.

Table 2. Comparison of groups with respect to complication

	Group 2 (There is no complication) (n=80) n (%)	Group 1 (There is complication) (n=26) n (%)	p
Long term complication			
No	75 (93.8)	18 (69.2)	0.001
Yes	5 (6.3)	8 (30.8)	
Catheter disfunction			
No	77 (96.3)	21 (80.8)	0.009
Yes	3 (3.8)	5 (19.2)	
Is there repeated attempt			
No	78 (97.5)	23 (88.5)	0.059
Yes	2 (2.5)	3 (11.5)	
Catheter related after being discharged			
No	71 (88.8)	26(100.0)	0.074
Yes	9 (11.3)	0(0.0)	
30 day mortality after processing			
Yes	1 (1.3)	0 (0.0)	0.567
No	79 (98.8)	26 (100.0)	
90 day mortality after processing			
No	80 (100.0)	26 (100.0)	1.000
Yes	0 (0.0)	0 (0.0)	
Is PEG required			
No	80 (100.0)	23 (88.5)	0.002
Yes	0 (0.0)	3 (11.5)	

In the study, it was stated that a history of diabetes mellitus was associated with chronic complications. Diabetes mellitus is an important risk factor for wound infection after surgical and invasive procedures.^[13] In our study, it is seen that the history of comorbid diseases is not related to early complications.

There are controversial results in the literature regarding the use of prophylactic antibiotics before the processing. In our study, patients were not administered with prophylactic antibiotics.^[14]

The study has several limitations. Because of the retrospective design of the study, some data were missing from the medical records. Therefore, the potential for incorrect assessment of complications cannot be excluded from the study. The present study was conducted at a tertiary referral hospital where the disease severity is higher than that seen in general hospitals. This may change the complication rate.

Conclusion

Long-term complications, catheter dysfunction, and PEG tube withdrawal have been shown to be more common in patients with early complications. Prevention of early complications in patients with PEG can increase the quality of life of patients by preventing complications that may occur in the long term, while also reducing hospital costs.

Disclosures

Ethics Committee Approval: The study was approved by the Erciyes University Clinical Research Ethics Committee, 2020/603, 02.12.2020.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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