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Research Article/ Araştırma Makalesi

Percutaneous Endoscopic Gastrostomy Experience: Early and Late Complications

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Purpose: This study retrospectively evaluated the early and late complications of patients who had a percutaneous endoscopic gastrostomy (PEG) tube placed, discussed complication frequency of different diseases and finally pointed on some advices to reduce complications.

Method: The study was conducted with 99 patients who had a PEG tube placed in the endoscopy unit of a training and research hospital. Patients' age, gender, diagnosis, types of early and late complications, and complication development rates were evaluated.

Results: Mean age of the patients was 70.42±16.75(18-94) years and 48.50% were male. Early complications occurred in 11.10%, of which 6.05% were bleeding at the entry site of the PEG tube, and 5.05% were peristomal infection. 39.40% of the patients had late complications, including tube dislodgement in 18%, infection in 8.10%, aspiration pneumonia in 7.10% and other complications in 6%. No complications were observed in 51.50% of the patients, and early or late complications were observed in 48.50% of the patients. 2% of the patients had both early and late complications. The incidence of late complications was significantly higher in patients with Alzheimer's disease (p=0.027).

Conclusion: In the follow-up of patients who had a PEG tube placed in the previous six months, the most common early complication was bleeding in 6.05%, and the most common late complication was tube dislodgement in 18%. Despite its potential complications, the PEG tube is a safe method for long-term enteral feeding. Alzheimer patients are at risk for late complications more than other diseases.

Keywords: Enteral feeding, Percutaneous endoscopic gastrostomy, Early complications, Late complications

1.INTRODUCTION

Percutaneous endoscopic gastrostomy (PEG) is the procedure of inserting a tube directly into the stomach through the abdominal wall to provide nutritional support to patients who have a functional gastrointestinal tract but cannot be fed orally and require long-term enteral feeding.[1] The PEG tube was first used by Gauderer and Ponsky in 1980.[2] PEG is preferred because it does not require surgery, the tube can be used for a long time, and it is cheaper than other feeding methods.[3,4,5] In the literature, the rate of minor complications after PEG tube placement has been reported as 8-30%, and the rate of major complications as 1-4%.[6] Some complications occur immediately, while others develop when the gastrostomy tract matures. Minor complications of the PEG tube include wound infection, buried bumper syndrome (BBS), tube occlusion, tube edge leakage, and tube dislodgement. Major complications are bleeding, necrotizing fasciitis, perforation, ileus, gastrocolic fistula and aspiration pneumonia.[6]

Elderly patients with comorbidities and infections appear to be at higher risk of developing complications.7 Most complications are minor, but major complications, in rare cases, can result in death.[4] Early recognition of complications provides fast

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and effective treatment.[8]

In the literature, studies have been conducted mostly on minor and major complications in patients with PEG tube placed.[9,10] A study in Italy evaluated patients who underwent PEG tube placement for early and late complications.[11] There have been few studies in our country that evaluate early and late PEG complications together.[12]

This study was conducted to evaluate the types and rates of early and late complications associated with PEG tube.

2.MATERIALS and METHODS

2.1.Ethical Statements

Ethics committee approval was obtained before starting the study. (Health Sciences University, Ümraniye Training and Research Hospital Ethics Committee, meeting date: 24 November 2022, decision number: 01/353). All procedures involving human participants comply with ethical standards set by the institutional and national research committee. and the Declaration of Helsinki and its subsequent amendments or comparable ethical standards.

The study was carried out with 99 adult patients who underwent PEG in an endoscopy unit of a training and research hospital between 01.01.2022 and 30.06.2022. The patients' age, diagnosis, demographic characteristics, early and late complications were evaluated in the study. Complications that developed within the first 1 week after PEG tube placement were considered as early complications, and those that developed between 8 days and 3 months were considered as late complications. Early and late complications were recorded retrospectively from patient files. In addition, the caregivers of the patients were called by phone and were asked about any records of hospitalization associated with PEG tubes in different hospitals in the last 3 months.

NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) software was used for statistical analysis. Descriptive statistical methods (mean, standard deviation, median, frequency, percentage, minimum, maximum) were used to evaluate the study data. The fit of the quantitative data to normal distribution was tested with the Shapiro-Wilk test and graphical examinations. The Mann-Whitney U test was used for comparisons between two groups of quantitative variables that did not show normal distribution. Pearson chi-square test and Fisher-Freeman-Halton exact test were used to compare qualitative data. Statistical significance was set at $p<0.05$.

3.RESULTS

Of the 99 patients included in the study, 48.50% were male and 51.50% were female. Their mean age was 70.42±16.75 (18-94) years. PEG placement indications were dementia in 11.10%, malignancy in 14.10%, Alzheimer's disease in 19.20%, stroke in 27.30% and other (drowning, cardiac arrest, dyspnea and trauma) in 28.30% (Table 1).

Table 1.

Distributions of Descriptive Characteristics (n=99)

			n (%)
Gender	Male		48 (48.50)
	Female		51 (51.50)
Diagnosis	Dementia		11 (11.10)
	Alzheimer		19 (19.20)
	Malignancy		14 (14.10)
	Stroke		27 (27.30)
	Other		28 (28.30)
Age (year)	Mean±Sd	70.42±16.75	
	Median (Min-Max)	75 (18-94)	

Early complications were found in 11.10% of the patients participating in the study. Considering all the patients, bleeding was found in 6.05% of the patients and infection was found in 5.05% as an early complication (Table 2).

Table 2.

Distribution of Complications (n=99)

		n (%)
Early Complication	No	88 (88.90)
	Yes	11 (11.10)
	Bleeding	6 (6.05)
	Peristomal infection	5 (5.05)
Late Complication	No	60 (60.60)
	Yes	39 (39.40)
	Peristomal infection	8 (8.10)
	PEG tube dislocation	18 (18.20)
	Aspiration pneumonia	7 (7.10)
	PEG tube occlusion	1 (1)
	PEG tube perforation	1 (1)
	Buried bumper syndrome	2 (2)
	Peristomal leakage	2 (2)
Early or Late Complication	No	51 (51.50)
	Yes	48 (48.50)
Early and Late Complication	No	97 (98)
	Yes	2 (2)

39.40% of the patients had late complications. Considering all patients, late complications were PEG tube dislodgement in 18.20%, infection in 8.10%, aspiration pneumonia in 7.10%, buried bumper syndrome in 2%, peristomal leakage in 2%, PEG tube occlusion in 1% and PEG tube perforation in 1% (Table 2).

51.50% of the patients participating in the study had no complications compared to 48.50% with early or late complications. 2% had both early and late complications (Table 2).

There was no statistically significant difference between the gender, age and diagnosis of the patients according to the incidence of early complications ($p>0.05$). A statistically significant difference was found between patients'diagnoses according to the late complication incidence. Late complication rate was higher in Alzheimer's disease than other diagnoses ($p<0.05$) (Table 3).

Table 3.

Comparison of Descriptive Characteristics by Late Complications (n=99)

		Late Complications		p
		No (n=60)	Yes (n=39)	
Gender	Male	32 (53.30)	16 (41)	[a]0.231
	Female	28 (46.70)	23 (59)	
Diagnosis	Dementia	8 (13.30)	3 (7.70)	
	Alzheimer	7 (11.70)	12 (30.80)	[b]0.027*
	Malignancy	6 (10)	8 (20.50)	
	Stroke	17 (28.30)	10 (25.60)	
	Other	22 (36.70)	6 (15.40)	
Age (year)	Mean±Sd	69.48±16.66	71.87±17.02	[c]0.376
	Median (Min-Max)	71.50 (21-92)	77 (18-94)	

[a]Pearson Chi-Square Test
[b]Fisher Freeman Halton Test
[c]Mann Whitney-U Test
*p<0,05

4.DISCUSSION

PEG is indicated in patients who need long-term nutritional support, have a functional gastrointestinal tract, but have insufficient oral nutritional intake.[1] Minor and major complications can be seen in patients who are fed enterally with a PEG tube. These complications cause frequent hospitalizations, malnutrition and delay in the healing process.[6]

In our study, which we carried out to examine early and late complications in patients who had a PEG tube placed, patients' mean age was similar to the previous related studies in the literature.[1,9,13,14] Indications for PEG tube placement include cerebrovascular diseases, amyotrophic lateral sclerosis, Alzheimer's disease, dementia and head-neck cancers.[5,8,13,14] When the PEG tube placement diagnoses of the cases were examined in the study, it was seen that 27.30% stroke, 19.20% Alzheimer's, 14.10% malignancy, 11.10% dementia and 28.30% other diagnoses. In a study by Cortes et al. examining PEG tube placements in neurological diagnoses, 33.30% were due to cerebrovascular disease.[13] Alsaeed et al. examined caregivers' experiences of enteral feeding at home and found that PEG tube was placed in 48% of the patients as a result of stroke.[15] In the study by Coşkun and Arı (2019) evaluating the short and long-term results of PEG tubes, 84.40% of PEG tube placements was due to neurological diseases, other indications were multi-trauma, malignancy and septicaemia.[9] The diagnoses of the patients in our study were similar to those in the previous studies.

4.1.Early Complications

In our study, 11.10% of the patients experienced early complications, which included bleeding and infection. Post-procedural bleeding is a rare complication of PEG tube placement. Patients with coagulation disorders and using anticoagulants are at risk for bleeding.[16] An incidence of bleeding up to 2.50% has been reported after the procedure.[17] In our study, bleedings occurred in 6.05% of the patients but were not major bleedings that required transfusion. In the study of Stenberg et al. examining PEG tube complications, minor bleeding was reported in 2% of the cases.[7] Our high rates of bleeding complication result may be due to the use of anticoagulants for ahigh number of patients with neurological diagnoses.

The most common PEG tube-related complication is peristomal infection with an incidence of 5-25%.[18] Patients with diabetes, obesity, malnutrition, corticosteroid and immunosuppressive therapy are at risk for developing peristomal infection.[19] In our study, 5.05% of the patients had peristomal infection as an early complication (8.10% in late complications). In a study by Boland et al. examining the complications of home enteral fed patients, 46% of the subjects had stoma site infections.[20] In their study evaluating the major complications of PEG tubes, Keji et al. reported wound infection in 9.30% of the cases.[21] In another study by Demirci et al. evaluating PEG applications, peristomal infection developed in 3.50% of thepatients.[23] Our PEG tube peristomal infection findings were similar to the literature.

4.2.Late Complications

In our study, late complications occurred in 39.40% of the patients and included peristomal infection, PEG tube dislodgement, aspiration pneumonia, PEG tube occlusion, PEG tube perforation, BBS, and peristomal leakage. The most common tube-related complications were accidental removal of the PEG tube which may occur during patient care or when the patient pulls it off unintentionally (for example in dementia or delirium).[1] PEG tube dislodgement occurred in 18.20% of the patients in our study. Alivizatos et al. reported PEG tube dislodgement in their study 45.10% examining the long-term complications related to the feeding tube.[23] In the study of Boland et al., PEG tube dislodgement occurred in 24%of the cases.[20] Accidental PEG tube dislodgement in our study was found to be similar to the literature.

The causes of peristomal leaks include infections, gastric hypersecretion, malnutrition, immunodeficiency, and diabetes.[17] In our study, 2% of the patients had a leaking PEG tube. Kenji et al. not-

ed peristomal leakage in 2.10% of their subjects.[21] In a study by Çelik et al. examining the results of patients who had a PEG tube placed, peristomal leakage developed in 3.90%.[10] Peristomal leakage results in our study were also similar to the literature.

Aspiration pneumonia can occur as a result of feeding in supine position, neurological impairment, advanced age and the bolus feeding method. In our study, aspiration pneumonia occurred in 7.10% of the patients compared with 0.80% reported by Kenji et al.[21] and 1.20% by Demirci et al.[23] Our result may be associated with the high number of patients with neurological disorders, the frequent preference of bolus feeding (because of the high cost of pump sets), and the fact that the patient is not given a 30-degree sitting position during feeding.

BBS is seen in approximately 1% of patients with PEG tubes and is a serious complication.[24] In our study, BBS was seen in 2% of the patients compared with 0.30% reported by Kenji et al.[21] and 0.60% reported by Demirci et al.[22] The PEG tube care of two patients who developed BBS was performed by the health personnel in the nursing home in our study, suggesting that the nursing home health personnel do not receive adequate training on PEG care. Our results are similar to the literature, and patients with a PEG tube should be followed closely.

PEG tube occlusion can be seen after enteral feed (hypercaloric nutrition products) and drug administration. As preventive measures, feeding should be intermittent, and the tube should be flushed with 30-60 ml of water regularly before and after drug administration and every four hours in case of continuous (infusion) feeding. PEG tube occlusion has been reported to be between 23 and 35% in the literature.[17] In our study, PEG tube occlusion occurred in 1% of the patients. Boland et al. observed PEG tube occlusion in 30%.[20] In a study by Kartal et al. examining PEG tube complications and outcomes, occlusion of the PEG tube was reported as 2.70%.[25] Based on the results obtained in this study, it can be said that caregivers understood well, the training they received on the necessary precautions to prevent the tube from clogging.

5.CONCLUSION and SUGGESTIONS

In our study, early complications were bleeding and peristomal infection and late complications were PEG tube dislodgement, infection, aspiration pneumonia, BBS, PEG tube leaking, PEG tube occlusion, and PEG tube perforation.

Early and late complications of PEG tube were found to be consistent with the literature. Complications can be prevented by correct positioning of the external plate, good PEG placement technique and evidence-based care interventions in addition to clearly identifying the need for PEG.

To reduce complications, we recommend that caregivers should be given training at frequent intervals, education should be supported by audio-visual tools such as video-DVD, and the educator should observe the caregiver at least once while PEG dressing.

Conflict of interest statement

The authors declared that there was no conflict of interest.

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Ethics approval

The research followed the ethical guidelines established by the Helsinki Declaration and its

later revisions, or those of an equivalent kind. This study was approved by the ethics committee of Umraniye Training and Research Hospital in 24 November 2021 with the letter numbered B.10.1.TKH.4.34.H.GP.0.01/353.

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