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Acceptability and outcomes of percutaneous endoscopic gastrostomy (PEG) tube placement and patient quality of life

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Background/aims: *Since its description in 1980, percutaneous endoscopic gastrostomy has been a widely used method for insertion of a gastrostomy tube in patients who are unable to swallow or maintain adequate nutrition. This study aimed to assess the perspectives of patients/caregivers in our society regarding the acceptability of percutaneous endoscopic gastrostomy tube placement and to evaluate the outcomes.* ***Methods:*** *One hundred consecutive adults referred to our unit to be considered for primary percutaneous endoscopic gastrostomy feeding at Imam Reza Hospital of Tabriz University of Medical Sciences were evaluated prospectively from October 2007 to June 2009. The nutritional status of patients, complications and quality of life were assessed after percutaneous endoscopic gastrostomy insertion for six months. The data were analyzed using SPSS software.* ***Results:*** *Indications for percutaneous endoscopic gastrostomy were neurologic in 66 patients and recurrent pulmonary aspiration in 14 intensive care unit adult patients. Minor complications included percutaneous endoscopic gastrostomy site infection in 8 patients and tube blockage in 5 patients. Oral feeding was resumed in 27% of the patients and the tube was removed subsequently after 3-6 months; 42 patients died due to primary diseases (in 1-6 months). The Quality of Life Index scores pre-percutaneous endoscopic gastrostomy placement and 6 months after percutaneous endoscopic gastrostomy averaged 19.25±11.85 and 30.08±27.74, respectively. A similarly significant difference was also found between mean Quality of Life Index scores pre- and post-percutaneous endoscopic gastrostomy placement ($p<0.005$).* ***Conclusions:*** *Percutaneous endoscopic gastrostomy is a minimally invasive gastrostomy method with low morbidity and mortality rates, and is easy to follow-up and to replace when blockage occurs.*

Key words: Percutaneous endoscopic gastrostomy, complication, indication, quality of life

Perkütan endoskopik gastrostomi (PEG) tüpü yerleştirilmesinin kabul edilebilirliği, sonuçları ve hasta yaşam kalitesine etkileri

Amaç: *Perkütan endoskopik gastrostomi 1980 yılında tanımlandığından beri, yutamayan ve yeterince beslenemeyen hastalarda gastrostomi tüpü yerleştirilmesi için en sık kullanılan yöntemdir. Bu çalışmada toplumumuzda perkütan endoskopik gastrostomi yerleştirilmesinin sonuçlarının ve kabul edilebilirliğinin hastalar ve onların bakımından sorumlu kişilerin bakış açılarından değerlendirilmesi amaçlanmıştır.* ***Yöntem:*** *Tebriz Tıp Bilimleri Üniversitesi Imam Reza Hastanesinde primer perkütan endoskopik gastrostomi beslenmesi için sevk edilen ardışık 100 hasta, Ocak 2007'den Haziran 2009'a kadar prospektif olarak takip edildi. Hastaların beslenme durumları, komplikasyonlar ve yaşam kalitesi değerlendirmeleri perkütan endoskopik gastrostomi tüpü yerleştirilmesinden itibaren 6 ay süresince değerlendirilmiştir. Veriler SPSS kullanılarak incelenmiştir.* ***Bulgular:*** *Perkütan endoskopik gastrostomi endikasyonları 66 hastada nörolojik, 14 hastada yoğun bakım ünitesinde takip sırasında gelişen rekürren pulmoner aspirasyon olarak tespit edildi. Minör komplikasyonlar arasında 8 hastada perkütan endoskopik gastrostomi yeri enfeksiyonu ve 5 hastada tüp tıkanması tespit edildi. Hastaların %27'sinde oral beslenmeye dönülebildi ve tüp 3 – 6 ay süre ertesinde çıkartıldı; 42 hasta primer hastalığa bağlı olarak 1 – 6 ay arasında kaybedildi. Yaşam kalitesi indeksi skorları perkütan endoskopik gastrostomi öncesinde ve takıldıktan 6 ay sonra yapılan değerlendirmelerde sırasıyla ortalama 19,25±11,85 ve 30,08±27,74 bulundu. Benzer olarak perkütan endoskopik gastrostomi öncesi ve sonrası karşılaştırmasında yaşam kalitesi indeksi skorları arasında anlamlı fark tespit edildi ($p<0,005$).* ***Sonuç:*** *Perkütan endoskopik gastrostomi minimal invaziv bir gastrostomi yöntemidir ve düşük morbidite ve mortaliteye sahiptir, takibi ve tıkanma halinde değiştirilmesi kolaydır.*

Anahtar kelimeler: Perkütan endoskopik gastrostomi, komplikasyon, endikasyon, yaşam kalitesi

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INTRODUCTION

All people require food to live. Individuals are sometimes unable to eat any or enough food due to illness. The stomach or bowel may not function properly, or a person may have undergone surgery to remove part or all of these organs. Under those conditions, nutrition must be supplied via a different route.

Nutrition can be provided either via tube feedings into the digestive tract (enteral nutrition), or when the digestive tract cannot be used, via an intravenous solution into the veins (parenteral nutrition). Enteral nutrition is believed to be safer and less expensive than parenteral nutrition (1,2).

Gastrostomy and jejunostomy are common methods for long-term enteral feeding. Currently, the three methods of gastrostomy are surgical, radiological and endoscopic gastrostomy (3).

Percutaneous endoscopic gastrostomy (PEG) is suitable for patients with normal intestinal function but defective swallowing and oral nutrition. Indications for PEG application are compatible with surgical gastrostomy, such as stroke, oropharyngeal tumors, defective swallowing, and aspiration (4).

PEG is a simple method for obtaining access to the stomach, while its morbidity and mortality are low. With this method, a catheter is passed through the abdominal wall into the stomach, and both its replacement and follow-up are considered easy.

Since its introduction in 1980 by Gauderer et al.(5), physicians have accepted the PEG in comparison with nasogastric (NG) tube because of its simplicity and lower rate of complications. A fixed guideline for indications varies according to several published studies.

In this study, we intended to use this method in 100 cases with defective oral nutrition and to follow these patients in order to evaluate its efficacy and impact on patient quality of life, and finally, to determine the indications and contraindications. If the findings are in favor of this method, it can be applied as a suitable long-term means of nutrition.

MATERIALS AND METHODS

This is a cross-sectional study in which 100 patients were referred by neurologists, oncologists and gastroenterologists from October 2006 to June 2009. Inclusion and exclusion criteria are described in Table 1.

Firstly, patients (if possible) and their relatives were informed regarding the different methods of nutrition and the complications of each, and then an informed consent was obtained. Biochemical tests such as renal function test and albumin and coagulation tests were performed.

At first, upper endoscopy was accomplished in the endoscopy ward of Imam Reza Hospital. Thirty minutes before insertion, a prophylactic antibiotic (single dose of ceftriaxone, 1 g/intravenous [IV]) was given to each patient.

After detection of a suitable site and application of local anesthesia, an incision was created and a special needle was entered into the stomach. Its transfer via mouth was done by PEG tube. A subspecialist physician performed the procedure in all patients.

The questionnaire was composed of two major parts: patient characteristics and the Quality of Life Index (QOLI). According to previous studies, the questions concerned patient demographics/history, background disease, duration of NG tube use, history of infection and antibiotic usage, laboratory test results, complications of PEG, and also the charts related to QOL. This questionnaire was frequently revised.

The QOLI and KFS (Karnofsky Functional Scale) forms, which were clinical evaluations with emphasis on physical performance, were completed for each case. According to the scoring method, a normal individual without symptoms or signs would

Table 1. Inclusion and exclusion criteria

Inclusion criteria:
• Patients with swallowing difficulties for at least 1 month
• Life expectancy more than 3 months
• No contraindication for enteral nutrition
• An informed consent by patients' relatives for PEG application
Exclusion criteria:
• Prior gastric surgery
• Pregnancy
• Tense ascites
• Gastroparesis
• Previous subtotal gastric resection
• Irreversible gastric or pancreatic cancer
• Severe gastroesophageal reflux
• Gastric outlet obstruction

be scored as 100, with the score reducing with the appearance of symptoms. A very ill patient in critical condition requiring hospitalization would be scored as 20 and an exitus patient as 0.

Patients were followed in the first week, and at 3 months and 6 months after PEG instrumentation. The satisfaction rate was also determined among patients and their relatives.

After data collection, SPSS software was applied. Chi-square and paired t-test were used for analysis.

RESULTS

Among 100 cases, 36 (36%) of the patients were female and 64 (64%) were male. The mean age of the patients was 59.73±18.16 years (range: 17-85 years).

Sixty-six percent of patients suffered from cerebrovascular attack (CVA). Fourteen percent were intensive care unit (ICU) patients (lung and neurology ICU of Imam Reza Hospital), and the risk of aspiration was high. Trauma, Guillain-Barré syndrome (GBS) and obstructive esophageal tumors were the other causes, as illustrated in Figure 1.

The mean period of dysphagia was 90.32±100.80 days (3 months), ranging from a minimum of 7 days and maximum of approximately 2 years. In 88 cases, the NG tube was tried for a mean of 57.88±58.23 days prior to PEG instrumentation. Forty-three (43%) patients suffered from hypertension while 4 (4%) had diabetes mellitus. Thirteen (13%) had comorbidity of diabetes mellitus, hypertension and cardiac disease. In 58 of the patients, dementia was prominent.

Complications of the PEG Instrumentation

Infection at the incision site was a major complication (8 cases). The second most frequent complication was mechanical obstruction of PEG (5 cases), which led to PEG replacement. Other rare complications were aspirative pneumonia, bleeding, peritonitis, ileus, and leakage (Figure 2).

Peritonitis and ileus occurred in one patient: A 47-year-old man, with the diagnosis of carbon monoxide poisoning and loss of consciousness, was hospitalized one month before PEG placement. His prognosis was poor and a tracheoesophageal fistula had occurred. Prior to PEG instrumentation, jejunostomy-induced peritonitis occurred, leading to abdominal irrigation. Infection of the PEG-incision site developed due to peritonitis after PEG placement. The patient died one year later.

Follow-Up

In 8 cases, PEG was removed due to mechanical obstruction or restlessness of patients.

In 27 cases (27%), after a mean 270 days (9 months) of PEG instrumentation, oral nutrition was restored by physicians and the PEG was discarded.

In 22 cases (22%), nutrition through PEG was continued after 6 months of instrumentation.

Forty-two cases (42.4%) died after a mean of 146.31 days. The shortest lifespan after PEG instrumentation was 1 day and the longest was more than 4 years. All of the 42 exitus patients died due to matters not related to PEG.

In the study of the causes of death, chi-square test failed to determine any significant relation between the background diseases that led to PEG instrumentation and death (p=0.442).

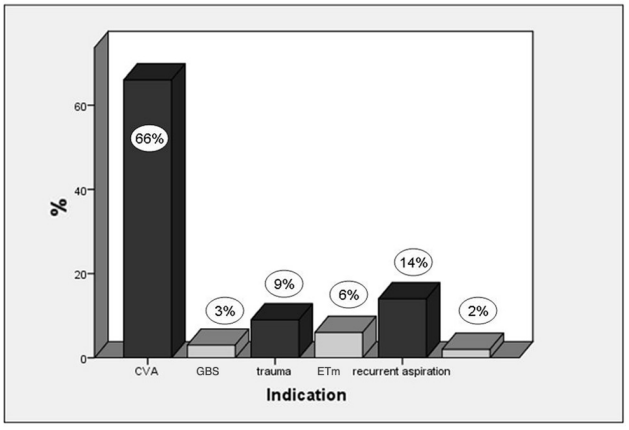

Figure 1. Indications for PEG placement (CVA: Cerebrovascular attack; GBS: Guillan-Barré syndrome; ETM: esophageal tumor)

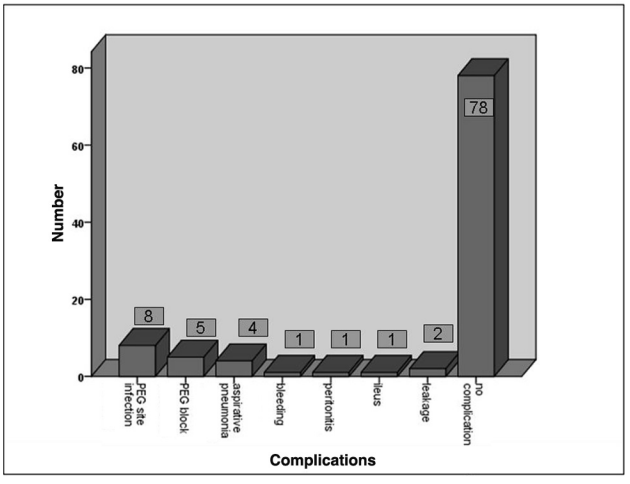

Figure 2. Complications associated with PEG

Seventy-nine patients were not able to articulate and 52 were cared for by first-degree relatives; 34 of them were hospitalized in the ICU ward or were under the supervision of nurses.

With the exception of 3 cases that died shortly after PEG instrumentation, leading to negative reactions/perceptions among their relatives, most of the patients and especially their relatives were satisfied with this method.

In the 3 aforementioned cases, no document was found refusing PEG placement.

In an open question designed to determine the differences between the PEG and NG tubes, the relatives of the patients confirmed that the PEG was more comfortable, easy, more acceptable, and less problematic.

When queried whether the patient would make the same decision again regarding PEG placement, 72 responded yes and 7 no; 21 did not respond.

Quality of Life Index

The mean and median scores of QOLI were 19.25±11.85 and 12.77, respectively, before PEG placement. The highest and lowest scores were 57.62 and 11, respectively. Thirty-five of the cases had the lowest score at the beginning of the study.

The mean, median and highest and lowest scores obtained at least 6 months after PEG placement were 32.08±27.74, 38.2, 88.07, and 0. Prior to PEG placement, 69 patients scored 10-19, indicating that 69% required hospitalization and supportive care and that death was imminent in some. During the follow-up, 32 scored 0, which was equal to death. Thirty-one patients scored higher than 50, and 5 of them exceeded 80, indicating complete recovery. When comparing the mean QOLI scores before and after PEG placement using paired t-test, a significant difference was observed, with higher scores after PEG placement ($p<0.005$).

DISCUSSION

In this study, the indications and possible complications of PEG were also investigated. This study observed a 100% success rate for PEG insertion. Sadik Memon et al. (6) found the same results. In other studies, the failure rate was lower than 10%.

Most of the patients were older than 55 years, and the mean age was 59. In the studies of Anis et al. (8) and Verhoef et al. (9), the mean ages were 63 years and 67 years, respectively. Indications for PEG placement were neurological in 66% of cases, particularly stroke, and this was compatible with previous studies (Table 2) [80% reported by Sadik Memon et al. (6), 65.9% by Erdil et al. (10) and 67% by Klose et al. (11)]. According to nearly all the studies on PEG, neurological disorders were the leading causes of dysphagia (11-13).

In our study, a cardinal complication of PEG placement was peritonitis in one patient. PEG site infection and mechanical obstruction of the instrument were the other complications. In the study of the Sadik Memon (6), among 50 patients, cardinal complications included peritonitis (1 patient) and aspiration (2 patients). The minor complications were wound infection, accidental tube removal and mechanical obstruction. Erdil et al. (10) in a study on 85 patients in 2004 reported 14 major complications in less than 30 days in 10 patients and 18 long-term complications in 12 of them. Incision site infection, nausea, vomiting, local pain, and leakage were the major short-term complications, and mechanical obstruction, leakage and peritonitis were the long-term complications. All causes of death were due to background disease and not related to PEG.

In the study of Kohli and Bloch (14), the mortality rate of PEG placement was 2%. In other studies, early and late mortality rates were 8-26% and 13-60%, respectively (9,15). Continuation of nutrition via PEG, PEG discard due to relative recovery, beginning of oral nutrition and/or death were similar to results of other studies.

Table 2. Indications of percutaneous endoscopic gastrostomy in some studies

Authors	Publication year	Number of patients	Neurogenic (stroke) (%)	Aspiration pneumonia (%)	Esophageal tumors (%)	Trauma (%)	Encephalopathy (%)	Other indications (%)
Sadik Memon (6)	2005	50	80	8	4	6	-	2
Erdil (10)	2005	85	65.9 (18.8)	4.7	4.7	12.9	5.9	14.9
Klose (11)	2003	60	67 (43.3)	-	10	1.6	1.6	19.8
Our study	2007	100	(66)	14	3	9	2	6

In the study of Sadik Memon et al. (6), PEG was discarded due to recovery in 12% of cases, and the instrument was functional during the follow-up process. In our study, oral nutrition was restored in 27 patients.

Regarding the evaluation of the QOL in patients (QOLI), Klose (11), an investigator who assessed QOL after PEG placement, reported that only 19 of the 60 patients in the study were capable of completing the Gastrointestinal Quality of Life Index (GIQLI). The GIQLI measures the patient's subjective impression of the restriction in his or her QOL. In patients with central nervous system diseases and in geriatric patients, this can be difficult. Alternatively, when the nursing staff and relatives are questioned, a positive effect on QOL is documented in up to 80% of the patients. However, such data are not comparable with direct questioning of the patient.

Borgaonkar and Dormann (16,17) found that the evaluation of QOL is quite difficult due to the health status of the patients. The physician's view is crucial, but the patient's interpretation regarding his/her condition can be important.

In our study, 58% of the cases had dementia, and 80% could not answer the questions themselves. Only 20 patients were able to respond to questioning. As Klose (11) emphasized, we considered the answers of the relatives in the statistical analyses. The mean QOLI score was 19 prior to PEG placement, which means the majority of patients required hospitalization.

The mean QOLI score was approximately 32 after at least 6 months of PEG placement. Although QOLI was 0 in 32 cases after 6 months, due to death, a significant increase in the mean score was detected after PEG placement.

In stratification of the scores, except for the exitus patients scored as 0, the remainder of the cases presented prominent enhanced QOL.

Anis (8) evaluated the acceptance of this method in addition to its complications. In that study, 60% of cases or their relatives were satisfied and would use the method again, if necessary. Eighty-four percent found the method easy for feeding. Sixty-three percent considered it cosmetically acceptable, and 60% believed that PEG tube increased survival.

In our study, with the exception of the 3 cases that died shortly after PEG placement, in which PEG was cited by the relatives as the cause, satisfaction was achieved (particularly among relatives). In an open question designed to determine the attitude toward the PEG method, it was found to be comfortable, with a high level of acceptance, in comparison to the NG tube.

In the study of Lowe (18), the morbidity and mortality rates of PEG in 317 cases were compared to the results of 75 cases with open gastrostomy. No significant differences were determined regarding complications, morbidity and mortality. Despite the above-mentioned possible complications/difficulties, PEG was considered better due to the simplicity of its application and no requirement for general anesthesia.

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