

# Percutaneous Endoscopic Gastrostomy; The Hacettepe University Hospital Experience

## PERKUTAN ENDOSKOPIK GASTROSTOMİ HACETTEPE ÜNİVERSİTESİ HASTAHANESİ TECRÜBELERİ

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### Summary

*Percutaneous endoscopic gastrostomy (PEG) has been used in patients who have difficulty in swallowing due to various diseases. We report here the indications, complications and outcome of the procedures performed in our unit. The knowledge about the patients between 1990 and 1996 years were obtained from charts about their procedure and follow-up recorded by the physicians who performed them. We used either pull or push method for lute application of gastrostomy tubes according to availability. Forty eight procedures were performed on 41 patients (21 male 20 female), with a median age of 62 years (range 12 - 86 years). Various kinds of cerebrovascular accidents were the indications for PEG. Eight patients (19%) died within 30 days of the procedures because of main disease and two patients (5%) later. There was one (2.5%) mortality if ever attributable to PEG. Seven (17%) patients had early complications (less than 30 days) and 6 (15%) late complications. The median time that the patients used PEG was 106 days (range 1-650 days) excluding the 5 (12%) patients with whom communication was lost during the follow-up. PEG is used in our clinic with an increasing rate in recent years. The raw of morbidity and mortality in our experience are comparable with those in the literature.*

Key Words: Percutaneous endoscopic gastrostomy

T Klin Gastroenterohepatoloji 1999, 10:23-27

The improvement of any disease is possible only with the assurance of an sufficient nutritional status. The nutritional support should be provided via enteral route as soon as possible. The enteral access for critically ill patients means something more than a feeding way. Apart from nutritional

Geliş Tarihi: 26.03.1998

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T Klin J Gastroenterohepatol 1999, 10

### Özet

*Perkiitan endoskopik gastrostomi (PEG) değişik nedenlerle yutma zorluğu olan hastalarda kullanılmaktadır. Burada ünitemizde uygulanmış olduğumuz işlemlere ait endikasyonları, komplikasyonları ve sonuçları rapor etmekteyiz. 1990-1996 yılları arasında işlem yapılan ve takip edilen hastaların bilgileri derlendi, işlem için o an elde edilebilirliğine göre itme "push" veya çekme "pull" tipi gastrostomi kullanıldı. Kırkbir hasta üzerinde toplam 48 işlem gerçekleştirildi. Hastaların 21 tanesi erkek, 20 tanesi ise kadın iken bunların medyan yaşı 62 (aralık 12-86) yıl idi. Değişik serebrovasküler olaylar PEG endikasyonu idi. Sekiz hasta (%19) işlemi takiben 30 gün içerisinde, 2 hasta (%2.5) ise daha sonra primer hastalıklarından ex olmuşlardır. PEG'e bağlı sayılabilecek mortalite yalnız bir hastada (%2.5) görüldü. Yedi hastada (%17) erken (30 günden önce), 6 hastada (Ful5) ise geç komplikasyon gelişti. Daha sonra bağlantı kurulamayan 5 hasta hariç tutulursa, hastaların medyan PEG kullanım süreleri 106 (aralık 1-650) gündür. PEG kliniğimizde giderek artan bir kullanıma sahiptir. Morbidite ve mortalite oranlarımız literatürle karşılaştırılabilir seviyelerdedir.*

Anahtar Kelimeler: Perkiitan endoskopik gastrostomi

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benefit, the enteral feeding prevents bacterial translocation (1), enhances the establishment of local defense of intestine (2) and prevents the septic mortality after a high-risk surgery (3). The only absolute contraindication to PEG is an obstruction anyway along with the gastrointestinal tract.

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21 male and 20 female patients were included in the study between 1990-1996. The records of the first five years were examined retrospectively. The

**Table 1.** The distribution of the cases to according to the years.

Time period	Duration	Cases
At the end of 1992	24 months	10
At the end of 1995	36 months	16
First half of 1996	6 months	2
Second half of 1996	5 months	13
Total	71 months	41

patients who had been included in the last year were followed prospectively, especially the same parameters as previous records. The distribution of the cases to years is seen in Table 1. The data about the indications, previous infections and their treatment before the application of the procedure, PEG related mortality and morbidity, the return of the ability to take orally and the status of gaining weight were all recorded carefully. We could not record the data of five patients after the discharge and not know the fate of PEG. But only several days during hospitalization were known.

The PEG procedures were performed at gastrostomy room for most of the patients. All the patients in the study had neurological problems as the cause of dysphagia. For some patients whose mobilization are difficult, the procedure was performed at the bedside. Conscious patients were treated with IV midazolam 2-5 mg for sedation. After the transillumination of the abdominal wall by the endoscopy, the optimum place for insertion was controlled by the endoscopist with the finger pressure of second physician. The cleaned abdominal wall was locally anesthetized. Pull or Push types of tubes (20 F silicone gastrostomy feeding tube, BARD interventional products division, USA) were both used successfully according to the local availability at the time of the procedure. It was noted that the skin incision should be at least 1 cm so that no tissue pressure and necrosis might occur. The placement of inner bulb of the tube was controlled and the outer safety is placed so that neither an indentation was allowed over skin nor a loose placement. In the 2 years, patients who had not been taking antibiotics already for other reasons (like aspiration pneumonia, sepsis, urinary tract infections), took 2 g cefazolin IV prophylactically. The patients were started to be fed after 24 hours.

In the statistical analysis, to compare the pre and post PEG aspiration rates, we used Me Nemar test. We compare parametric variables between two groups by Student T test and rates by khi-square test.

## Results

There were 48 procedures performed on 41 patients (21 male 20 female) with a median age of 62 years (range 12-86). We had one pediatric patient who had experienced cerebral trauma after a traffic accident. She started to take orally after 154 days of PEG feeding and the tube was removed. Twenty of 48 procedures were performed in the last year.

Indications are shown in Table 2. All of our patients were suffering from neurological diseases. Cerebral infarction, cerebral hemorrhage, subarachnoid bleeding, head trauma after traffic accidents were the most common etiologies in the order of frequency.

Eight patients (19%) died within 30 days of the procedures and two patients (5%) later. Three of early deaths were from aspiration pneumonia, one from asphyxia at the first attempt of feeding, the others from the progression of the primary disease. There was one (2%) mortality if ever attributable to PEG. This patient was the one who died of aspiration and asphyxia secondary to this, after the first attempt of feeding. Both of two late mortalities were due to primary disease.

The morbidity and complications are shown in Table 3. Seven (14%) patients had early complica-

**Table 2.** The distribution of etiologic diseases

Etiology	Number	%
Cerebral infarction	17	40.8
Cerebral hemorrhage	10	26.4
Subarachnoid bleeding	4	9.6
Trauma (Traffic accident)	2	4.8
Myasthenia gravis	2	4.8
Amyotrophic lateral sclerosis	1	2.4
Hipoparathyroidism and mitochondrial myopathy	1	2.4
Atrial fibrillation and embolus	1	2.4
Intracranial mass	1	2.4
Meningioma	1	2.4
Multiple Sclerosis	1	2.4
Total	41	100

Table 3. The morbidity and complications of procedures

	Pre PEG	Early (<30 days)	Late (>30 days)
Aspiration pneumonia*	15(36%)	1(2.5%)	-
PEG Complications			
Leakage		2 (5%)	-
Wound infection		3 (7%)	2 (5%)
Aspiration		1 (2.5%)	-
Distention		1 (2.5%)	-
Obliteration		-	2 (5%)
Migration		-	2 (5%)
Total		7 (17%)	6 (15%)
Total Mortality		8 (19%)	2 (5%)
PEG related mortality		1 (2.5%)	-

\* $p < 0.05$  *Mc Nemar*

tions (less than 30 days) and 6 (12%) late complications. Among early complications, there were 2 leakages, 3 wound infections, 1 aspiration and 1 gastric distention. The late complications included 2 wound infections, 2 tube obstructions and two migrations (buried bumper syndrome). Of all the complications only one case(2%) experienced aspiration pneumonia and could be considered as a major complication. All other complications were minor. None of other major complications of PEG like peritonitis, gastric hemorrhage, perforation and necrotizing fasciitis were not encountered.

Eleven patient started to take orally and the tubes were removed. The removal of inner bulb was done endoscopically in all cases. The gastrocutaneous fistula in all cases were closed at most in three days completely without any problem. The median duration with PEG in this group was 90 days. The tubes of 5 patients were replaced. In two patients tube replacement took place two times, once in three patients. The reasons of replacement were wound infection in two cases, buried bumper syndrome in two cases, tube obstruction in two cases and accidental tube damage in one case.

The median period between the time of oral intake inability and procedure is 21 days (range 7 -75 days). The median time that the patients used PEG was 106 days (range 1-650 days) excluding the 5 (12%) patients with whom communication was lost for the follow-up. The patient utilizing PEG for 650 days have needed two tube replacement during this period due to tube obstruction. She is a myasthenia

gravis patient and still uses PEG without any problem.

A striking finding in our study is the high incidence (38%) of aspiration pneumonia before the application of PEG. The rate of development of aspiration pneumonia after PEG is 5%. All of these patients were fed by nasogastric tube (NG).

Wound infections were treated with systemic antibiotics and local care. In two cases, we had to replace them. In case of leakage, we stop feeding for a few days or in one case we turned it into a gastrojejunostomy, by passing a small bore tube through the gastrostomy till beyond the Treitz ligament. After 20 days of feeding via gastrojejunostomy, we removed jejunostomy tube and no leakage recurred.

We paid a special attention to patients whose oral intake had returned. We compared in Table 4 some of the parameters between these patients and those who were not be able to take orally again during the follow up period. The patients who were able take orally again was significantly younger, and they had a longer duration of PEG utilization. There were no difference about the sex, the antibiotic usage and the time period before PEG application.

### Discussion

Since Gauderer et al. first described PEG (4), there has been a growing experience in the literature on this issue. In recent years, as the physicians

**Table 4,** The comparison of patients whose oral intake returned and whose not

Variable	group gained oral intake n=11	group not gained oral intake and dead n 10	p
Age (Median)	53	65	0.006*
Sex			
Male	7	5	0.66
Female	4	5	
PEG utilization duration	90	35	0.004*
Duration before PEG	25	21	0.57
Prophylactic antibiotic			
positive	3	4	0.65
negative	8	6	

\*p&lt;0.05

taking care of these type of patients learns more about how to handle various problems of PEG, the frequency of the application continues to increase . The same is true for us (5,6). At the moment, there are centers expanding the indications for PEG such as gastric decompression needed for obstruction secondary to intraabdominal malignancies (7).

In literature, head and neck malignancies consist of an important portion of etiology (8,9). We didn't have any. We think that as relevant physicians become familiar with the procedure more and more, we would also find such patients.

Karly (17%) and late (15%) complications included wound infections, leakage, distention, obliteration, migration and aspiration. The overall complication (major plus minor) ratio is around 20-42% in literature (5,10). Most of these could be managed medically. Eleven patients (26%) gained their ability to take orally. This group was found to be younger than those who died of various reasons. This is not surprising because the older the patient, the more he was influenced by aging process thus atherosclerotic changes. In elderly, primary neurological pathologies are more prone to progress.

Our 20% early death rate is comparable with the literature 9 which is 8-22%. The most frequent cause of mortality is aspiration pneumonia. Secondly, we encountered the progression of primary disease as the cause of death. Before the PEG procedure we detected aspiration pneumonia with a high frequency of 38%, while it is 5 % after PEG (p <0.05, Mc Nemar) Taylor and colleagues declared that aspiration pneumonia was the leading cause

among 97 deaths (11). To solve this problem, in those patients who are expected not to take orally at least in the next 30 days. We believe one should perform PEG immediately. Although PEG does not abolish aspiration completely, it decreases to an important extent (12).

In patients who have a narrow entrance point on abdominal skin, minor complications like leakage and wound infection occur more frequently and easily. The pressure that PEG tube exerts on around tissue causes a necrotic process. On this necrotic base both leakage and infections more readily supervenes. Again, this unnecessary pressure is the cause of tube migration (buried bumper syndrome). When we had paid a special attention to open a larger orifice (on skin not in deeper layers) we saw no infection and leakage occurred.

Recently, especially radiologically placed gastrostomy tubes according to local expertise are alternatives for PEG. But, the ability to examine the tract is an advantage unique to PEG. In a study, almost a third of patients were detected to have problems with gastrointestinal tract during PEG. These included pharyngeal pouch, hiatal hernia, esophagitis, antral gastritis and duodenitis (10). However, in a recent meta-analysis, authors declares that the success rate, mortality and morbidity rates of radiologically placed gastrostomy are comparable even superior to PEG (13). Comparing with the surgical gastrostomy, PEG is superior because PEG does not need general surgery, is cost effective, has lower mortality and morbidity rates (14,15).

Nasogastric tubes are clearly known to cause problems such as aspiration, epistaxis, sinusitis, local irritation and intolerance to procedure. Nasoenteric tubes (NET) on the other hand are small in caliber and easier to tolerate. However, in a study it was seen that only 12% of NETs had been in use at the end of 6 weeks (16).

When PEG and Percutaneous endoscopic jejunostomy or gastrojejunostomy are taken into consideration, some suggest to prefer jejunal access. It is especially true for etiologies like diabetic gastroparesis or dysphagia secondary to acute cranial trauma, both of which can cause gastric distention. It is said that after three weeks the access can be turned into gastrostomy from jejunostomy (17,18).

In summary, we believe that the evaluation of patients' fate about their oral intake should be made without losing time. Because nasal routes are hard to tolerate and invites much more aspiration events which is the leading cause of death if it progresses to pneumonia. The PEG orifice closes readily after removal, so there should be no hesitation about performing an earlier PEG as soon as a neurological pathology developed disturbing swallowing function.

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