

# Outcomes Of Percutaneous Endoscopic Versus Surgical Gastrostomy In Patients With Chronic Disease

Kronik Hastalık Hastalarında Perkütan ve Cerrahi Gastrostominin Sonuçları

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## ÖZET

**Amaç:** Enteral ve parenteral beslenme için birincil endikasyon, oral alım yetersizliği olan hastaların metabolik gereksinimleri karşılamak ve beslenme desteği sağlanmasıdır. Perkütan endoskopik gastrostomi (PEG) maliyet etkinliği ve kullanım kolaylığı göz önüne alındığında hastaların çoğunda uzun süreli enteral beslenme gerekliliği halinde altın standart yöntem haline gelmiştir. Fakat günümüzde teknik sebepler veya hastaya bağlı faktörler nedeniyle cerrahi gastrostomi gereken hastalar da mevcuttur. Bu çalışmanın amacı cerrahi gastrostomi ve perkütan endoskopik gastrostomi uygulanan hastaların demografik özelliklerinin, işlem sonrası komplikasyonları ve takipleri ile ilgili verileri ortaya koymaktır.

**Metod :** Ocak 2018 - Aralık 2018 tarihleri arasında İstanbul Medeniyet Üniversitesi Göztepe Eğitim ve Araştırma Hastanesi Genel Cerrahi Kliniğinde enteral beslenme amacıyla Stamm gastrostomi ve perkütan endoskopik gastrostomi (PEG) yapılan olgular retropektif olarak değerlendirildi. İki grupta yer alan hastalar işlem esnasında veya sonrasında gelişen komplikasyonlar ve mortalite açısından kıyaslandı.

**Bulgular:** Çalışma dahilinde 72 hastaya gastrostomi uygulandı. 72 hastanın 10'u perkütan endoskopik gastrostomi tekniğine uygun değildi, bu hastalara cerrahi gastrostomi uygulandı. Yaş ortalaması 71,3(20-94) idi ve hastaların 35'i (%48,6) erkek, 37'si (%51,4) kadındı. Toplam 18(%25) hastada komplikasyon görülmüş olup, PEG uygulanan hastaların 15(%24,2)'inde, cerrahi gastrostomi uygulanan hastaların 3(%30)'ünde komplikasyon görülmüştür. Perkütan endoskopik gastrostomi ve cerrahi gastrostomi ile ilişkili en sık görülen komplikasyon yüzeysel cerrahi alan enfeksiyonudur. Hastalarda işleme bağlı mortalite saptanmadı. Bir yıllık takip süresinde 38 hasta primer hastalığı nedeniyle öldü.

**Sonuç:** PEG, yatak başında yapılabilmesi, genel anestezi gerektirmemesi, cerrahi yöntemle kıyasla daha az invazif olması ve benzer komplikasyon oranlarına sahip olması nedeniyle enteral beslenme için güvenle kullanılabilir.

**Anahtar Sözcükler:** Beslenme, Cerrahi Gastrostomi, Endoskopik Gastrostomi

## ABSTRACT

**Objective:** The prime indication for parenteral and enteral nutrition is provided to patients who have oral intake deficiencies for nutritional support. Percutaneous endoscopic gastrostomy (PEG) has become the gold standard method in the case of long-term enteral nutrition in most patients, given its cost-effectiveness and ease of use. However, there are also patients who require surgical gastrostomy due to technical reasons or patient-related factors. This study, data on demographic characteristics, follow-up and post-procedure complications of patients who underwent surgical gastrostomy and PEG were presented.

**Methods:** Patients who underwent PEG and Stamm gastrostomy for enteral feeding between January 2018 and December 2018 at İstanbul Medeniyet University Göztepe Training and Research Hospital Department of General Surgery were evaluated retrospectively. The patients in the two groups were compared in terms of complications and mortality during or after the procedure. The most frequent complication associated with PEG and surgical gastrostomy was superficial surgical site infection.

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Procedure-related mortality was not detected in any patients. During the one-year follow-up period, 38 patients died due to primary disease.

**Results:** Within the study, 72 patients underwent gastrostomy. Ten of 72 patients were not suitable for percutaneous endoscopic gastrostomy technique, surgical gastrostomy was applied to these patients. The mean age was 71,3(20-94) years. Thirty-five (%48,6) of the patients were male and 37 (%51,4) were female. Complications were seen in 18 (25%) patients, and 15 (24.2%) of these have occurred in the PEG group and 3 (30%) of these occurred in the surgical gastrostomy group.

**Conclusion:** Compared with SG, PEG has become the preferred method in enteral nutrition due to its cost-effectiveness, low morbidity rate and ease of use.

**Keywords:** Nutrition, Surgical gastrostomy, Endoscopic gastrostomy

## INTRODUCTION:

Chiefly indications for PEG include cerebrovascular disease, progressive neurologic disorders and head and neck cancer or trauma (Lee, 2014:117). Enteral feeding aims to provide nutritional support to meet the metabolic requirements of patients with the inadequate oral intake (Miller, 1986:543). Enteral tube feeding is the preferred method in patients with a functional gastrointestinal tract. Infection and thromboembolism of the intravenous route are preferred because of their high cost, inability to provide enteral stimulation and the risk of weakening of the intestinal defence barrier. On the other hand, providing nutrition through the enteral route protects the intestinal flora and immunological functions. It's much more tolerable, economic, and safe than parenteral nutrition (Ponsky, 1981:9). Percutan endoscopic gastrostomy(PEG) has become the gold standard for enteral access in the majority of patients compared to surgical gastrostomy SG (Bankhead,2003:607).

The PEG procedure was first performed by Gauderer et al in 1980 as an alternative to surgical gastrostomy (Gauderer, 1980:872). Our aim was a retrospective short and long term analysis of demographic data and outcomes of PEG or SG in hospitalized patients. Besides, this study aimed to identify and compare PEG and SG-related outcomes and complications.

## METHODS:

Patients who underwent percutan or surgical gastrostomy due to inadequate oral intake were included in this retrospective study. We reviewed the medical records of 72 patients who underwent PEG or SG procedure during the period from January 2018 to December 2018 in İstanbul Medeniyet University Göztepe Training and Research Hospital Department of General Surgery. 72 patients who met our criteria were included in the study. The demographic data of the patients, complications, and mortality rate during and after procedures were compared.

SG was performed in the case of contraindications for PEG tube placement such as obstructive oesophageal tumours, ascites, peritonitis, peritoneal carcinoma, serious coagulation disorders, previous gastric surgery.

The PEG procedure was performed at the surgical endoscopy unit or bedside intensive care unit. Patients fasted

for 8 hours before the procedure and feeding on gastrostomy was started 24 hours after the procedure. SG procedures were performed with general anaesthesia in the operating room. All patients who underwent gastrostomy were administered intravenous prophylactic antibiotics half hours ago from the procedure. Nutrition training of the patients with gastrostomy tube was given by the nutrition nurse until discharge.

## PEG procedure:

In the endoscopic technique, a gastroscopy was performed first, then the stomach was inflated with a sufficient amount of air and the puncture site was determined. The skin and subcutaneous were passed under local anaesthesia and the cannula was advanced to the stomach under gastroscopy. The guidewire was sent to the stomach through the cannula and caught with forceps. The peg tube was pulled into the stomach with the help of a guidewire. The tube was then withdrawn from the abdominal wall, the silicone disc leaning against the stomach wall. Pull technique was used in all PEG tubes. **(Figure 1).**

## SG technique:

All cases were operated under general anaesthesia and the gastrostomy tube was inserted with a midline incision using the standard Stamm-gastrostomy technique (figure 2). After reaching the abdomen, the ease of approaching the stomach wall to the upper peritoneum was tested. A purse-string suture containing a non-absorbable suture was placed in the middle anterior wall of the stomach. In the center of the purse-string suture, an incision was made at right angles to the long axis of the stomach. The gastrostomy tube was placed inside the stomach. purse-string suture ligated. The gastrostomy tube was removed from the abdominal wall through a second incision.

## RESULTS:

Our study included 72 patients (35 male, 37 female), with an average age of 71,3 years (20-94). 10 patients had PEG contraindications such as coagulopathy, a history of gastrectomy, morbid obesity or ascites. The patient's indications for enteral nutrition included a variety of diseases



such as neurological diseases, respiratory insufficiency advanced stage larynx, or gastrointestinal cancer (**Table 1**).

The most common procedure-related complication was wound infection in our study (9, %12.5). Other complications were spontaneous catheter extraction (3, %4.17), temporary leakage from gastrostomy site (3, %4.17), and wound infection + leakage from gastrostomy site (3, %4.17), which were all well managed minor complications (Table 1). Complications occurred in 3 (%10) SG patients. In the PEG group, there were 15 complicated patients. Catheters were changed in 7 patients in the PEG group and 1 patient in the SG group. Reasons for replacing catheter in the PEG group were spontaneous catheter extraction (3, %4.17), wound infection (2, %2.78), leaking from the gastrostomy site (2, %2.78). One patient in the SG group was changed by catheter leakage. (**Table 1**) The catheter change of 2 patients in the PEG group was performed as SG.

Catheter requirement was eliminated in 2 patients in the PEG group and catheter was closed in these patients.

Thirty-eight (%52.8) patients died in follow-up, 32 of these patients were in the PEG group, 6 of patients in the SG group. Eleven patients died in the first 10 days after the procedures. There was no procedure-related death. Ten of these patients were in the PEG group and 1 in the sg group. (**Table 1**)

#### DISCUSSION:

PEG is a widely used technique in patients with insufficient enteral oral administration or without oral intake. Many clinical studies have clearly demonstrated that PEG is superior to older surgical gastrostomy procedures (Bankhead, 2003:607; Ljungdahl, 2006:1248). Perioperative morbidity, which was seen at around 50% in the early days of PEG, gradually decreased with the spread of the procedure (Bankhead, 2003:607; Ljungdahl, 2006:1248; Apelgren, 1989:596). Compared to the nasogastric tube of PEG, the risk of developing pneumonia is less and lower probability of intervention failure, which makes the PEG method more effective and safe. If a short-term enteral feeding is planned, a nasogastric tube may be preferred. In long-term enteral feeding, PEG is more advantageous (Gomes, 2015). Too many studies have been done to evaluate PEG efficacy in many patient groups (Lucendo, 2014:529; Manukyan, 2011:28). PEG is a safe way for patients with both low and high body mass index (Manukyan 2011:28; Bochicchio 2006:409).

Most of the authors support their advantages over enteral parenteral nutrition, as intestinal motility disorders are avoided, mucosal atrophy development is prevented, and gastrointestinal system integrity is preserved. Surgical gastrostomy technique has been used for more than a hundred years, but minimally invasive techniques have become popular in recent years (Mahawongkajit, 2020:117; Rahnamai-Azar, 2014:7739). The peg technique is considered to reduce the cost, procedure time, and general anaesthesia requirement. Since laparotomy is avoided, this approach is considered safer than surgical placement. In this

study, complication rates of 24% after PEG and 30% after SG were observed. In the prospective randomized study of Steigmann et al. comparing 57 SG and 64 PEG patients, the PEG complication rate was 25% and the SG complication rate was 26% (Stiegmann, 1990:1). In a prospective study of Ljungdahl et al. with 70 patients, the complication rate of the PEG was 42.9% and the complication rate was 74.3% (Ljungdahl, 2006:1248). In a single-centre study by Grant et al. In 1988, he studied 125 peg and 88 sg procedures. The PEG group had lower complication rates. (PEG, 8.8%; SG, 23.9%) (Grant, 1988:598).

In conclusion, both PEG and SG have similar complication rates, but PEG is a minimally invasive and safer technique than SG. If there is no contraindication for the patient who needs to be inserted enteral feeding catheter, PEG should be the first choice.

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Table 1: Demographic data and indications of and PEG an SG

	PEG	SG	TOTAL
<b>Population (n)</b>	62	10	72
<b>Sex (n)</b>	62	10	72
Male	28	7	35
Female	34	3	37
<b>Age</b>	72,4 (27-94)	64,5(20-89)	71,3(20-94)
<b>Indication ( n)</b>			
Neurologic disorders	46	0	46
Respiratory insufficiency	11	0	11
Advanced stage larynx or upper gastrointestinal malignity	5	10	15

Table 2- Mortality and complication rates of gastrostomy patients

	PEG	SG	TOTAL
<b>Mortality (n)</b>	32	6	38
First 10 day	10	1	11
10-30 day	9	2	11
Over 30 days	13	3	16
<b>Complications(n)</b>	15	3	18
Wound Infection	7	2	9
Gastrostomy site leakage	2	1	3
Wound Infection + Gastrostomy site leakage	3	0	3
Catheter extraction	3	0	3

**Figure 1:** SG tube placement



**Figure 2:** Gastric mucosa after percutaneous endoscopic gastrostomy tube placement

