

# Ultrasound Can Facilitate Percutaneous Endoscopic Gastrostomy Tube Insertion in the Non-Transilluminated Abdominal Wall

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## ABSTRACT

Percutaneous endoscopic gastrostomy (PEG), first described in the 1980s, is an enteral nutrition route used for long-term nutrition in patients who cannot be fed by mouth for various reasons but have no gastrointestinal disturbance. It is inserted percutaneously into the stomach with the aid of an endoscope. However, the light of the scope may not be seen in some patients due to certain reasons (obesity, prior operations). In this case, it is not safe to send the needle through the abdominal wall. Ultrasound can facilitate the procedure and also reduce adjacent organ injury.

**Keywords:** Percutaneous endoscopic gastrostomy, ultrasonography, endoscopy

## ÖZ

Ultrasonografi rehberliğinde perkütan endoskopik gastrostomi takılması

Perkütan endoskopik gastrostomi (PEG), ilk kez 1980 yılında tanımlanmış, çeşitli sebeplerle ağız yoluyla beslenemeyen ancak gastrointestinal bozukluğu olmayan hastalarda uzun süreli beslenme amacıyla kullanılan bir enteral beslenme yoludur.

PEG uygulaması işleminde bilindiği gibi endoskopun translüminasyon ışığı rehberliğinde set içinden çıkan iğnenin karın duvarından mideye gönderilerek yapılmaktadır. Ancak bazı hastalarda çeşitli sebeplerle (obezite, geçirilmiş batin ameliyatı) bu ışığı görmek mümkün olmamaktadır. Bu durumda karın duvarından mideye iğneyi göndermek güvenli olmamaktadır. Bu durumda ultrasondan faydalanmak hem işlemi kolaylaştırmakta hem de oluşabilecek komşu organ hasarını azaltmaktadır.

**Anahtar kelimeler:** Perkütan endoskopik gastrostomi, ultrason, endoskopi

## Introduction

Percutaneous endoscopic gastrostomy (PEG) is the modality of a long-term enteral feeding route that was first described by general surgeon Ponsky and pediatric surgeon Gauderer in 1980 (1,2). Initially, they had developed this procedure in pediatric patients with a neurological impairment (3). Since then, the PEG placement method has been developed. There are 3 different methods commonly used in the application of PEG: the pull method, push method, and introducer method.

The most commonly used technique is the “pull method,”

which includes the placement of the gastrostomy tube into the stomach after insufflations of the stomach by gastroscope. After administration of local anesthesia and sedative drugs, a large-bore needle is inserted into the gastric lumen with the aid of translumination by the gastroscope light. After seeing the tip of the needle in the stomach lumen, a guidewire is passed through the needle into the stomach and grasped with a snare. The grasped guidewire is withdrawn through the mouth. The gastrostomy tube is sutured to the guidewire and pulled back into the stomach. Subsequently, the placement of

the tube is controlled by endoscope and the tube is fixed to the anterior abdominal wall (4).

Push and introducer methods are beyond the scope of this article; hence procedural details of these methods will not be discussed here.

Complications related to PEG can be divided into 3 subcategories: endoscopy-related, procedure-related, and delayed complications (5).

Endoscopy-related complications include hemorrhage, perforation, aspiration, and oversedation related to the drugs used during the procedure (6). Surgery may be necessary in some of these complications. Procedure-related complications (ileus, pneumoperitoneum, infection, bleeding, and injury of adjacent organs) may emerge after a certain time (7). Lastly, delayed complications are gastric outlet obstruction, dislocation of PEG tube, peristomal leakage, ulceration of the skin, peritonitis, and buried bumper syndrome (in which the internal bumper migrates towards the skin from gastric lumen) (8).

## Use of Ultrasound in Peg Procedure

As mentioned above, the PEG procedure may cause complications. We can avoid some of these, especially injury of adjacent organs, by using ultrasound in the procedure. Normally, PEG tube placement is performed after insufflation of the stomach with air and insertion of a needle through the anterior abdominal wall.

After preparation of the abdomen and administration of sedative drugs, a complete upper gastrointestinal endoscopy is performed. The stomach is insufflated with air, causing apposition of the stomach to the anterior abdominal wall. A preliminary examination is carried out with a superficial probe of the USG at this stage (Figure 1A). The air of the stomach is aspirated and the lumen is filled with 300-400 cc water after the basic image has been taken (Figure 1B). A small incision is made into the skin of the midepigastrium after designation of the area by ultrasound following application of a local anesthetic. A large-bore needle of the PEG tube is inserted into the gastric lumen under ultrasound guidance (Figure 1C and D).

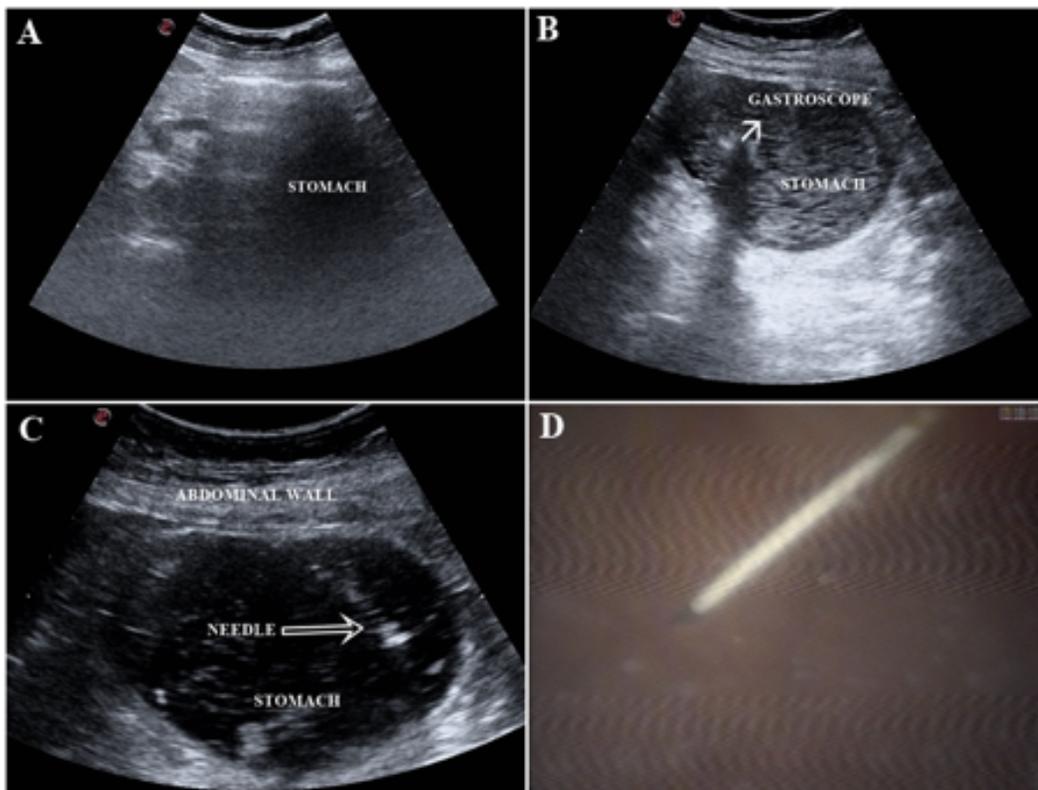


Figure 1: PEG tube insertion with the help of ultrasonography. (A) Air-insufflated stomach. (B) Stomach is filled with water after aspiration of air (the gastroscope is indicated by a white arrow). (C and D) A large-bore needle of the PEG tube is inserted into the gastric lumen under ultrasound guidance (long white arrow shows needle in the stomach)

The water in the stomach is aspirated without changing the position of the needle. A guidewire is threaded through the needle and grasped with an endoscopic snare. The endoscope-snare-guidewire is withdrawn through the mouth as a single unit. The gastrostomy tube is then secured to the guidewire, pulled back into the stomach and taken out through the anterior abdominal wall. Then the placement of the internal bumper is confirmed by gastroscopy. The external bumper is used to keep the tube stable. Aspiration of the air and insufflation of water take about 3-4 minutes.

## Conclusions

Although percutaneous endoscopic gastrostomy is a valuable therapeutic option to provide long-term enteral nutrition for patients who are unable to meet their nutritional requirements orally, the procedure may give rise to complications like

adjacent organ injury. USG usage in this procedure may decrease the incidence of such type of complications.

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