

## CLINICAL STUDY

**Patient with percutaneous endoscopic gastrostomy**

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**Introduction:** Since 1980, when percutaneous endoscopic gastrostomy was described and performed for the first time, the number of patients with this way of nutrition has been growing. At present, however, these patients are treated not only in intensive care units, but also in follow-up care institutions or in home care.

**Aim:** We want to explain the problems of nutrition via endoscopic gastrostomy to those physicians who take long-term care of these patients.

**Methods:** In our department we introduced percutaneous endoscopic gastrostomy in 1994. A total of 78 PEGs were performed. In all cases the pull technique was used. A condition for percutaneous endoscopic gastrostomy insertion was an unaffected gastrointestinal tract from the stomach in aboral direction. The most frequent indications were: necessity of long-term enteral nutrition in patients during artificial ventilation, neurological patients with lost swallowing reflex, and patients with a tumor in the ENT area with preserved patency for the endoscope.

**Results:** In all cases, the intervention itself was without major complications and no death occurred relating to the intervention. Subsequently, mainly local complications such as decubitus ulcers or maceration around the tube and its accidental removal by a restless patient were noticed.

**Conclusion:** In cases of more than 6-week inability to ingest food per os with otherwise unaffected gastrointestinal tract, it is appropriate to consider the nutrition via PEG. Using this method, it is possible to ensure an adequate access for enteral nutrition for a longer time without risk of complications associated with the nasoenteric tube, with minimum trouble to the patient. (*Fig. 1, Ref. 9.*)

**Key words:** percutaneous endoscopic gastrostomy, gastrointestinal tract, enteral nutrition.

Percutaneous endoscopic gastrostomy (PEG) is an endoscopic method ensuring conditions for enteral nutrition in situations, when oral intake of food is not possible (2, 4, 5, 6). An essential condition for its use are a normal function of the gastrointestinal tract from the stomach in aboral direction and the possibility to insert the gastroscope into the stomach via oesophagus. Alternative methods are feeding by nasoenteric tubes or surgical gastrostomy. The generally accepted principle says that in case of a normally functioning gastrointestinal tract, enteral nutrition is more advantageous than parenteral one. In situations, where enteral nutrition is envisaged to exceed 6 weeks, it is more advantageous to perform PEG. The nasoenteric tube has a lot of disadvantages that manifest themselves increasingly in the course of time. These are especially pressure necroses in the area of the distal part of the oesophagus which can very often be the source of serious bleeding into the gastrointestinal tract. Tubes can also cause upper respiratory tract infections. In comparison with sur-

gically performed gastrostomy, endoscopic gastrostomy is easier to carry out and causes less trouble to the patient. At present surgical gastrostomy can be convenient only in situations, when PEG is contraindicated, such as oesophageal obstruction which makes the passage of the endoscope into the stomach impossible (the most frequent contraindication).

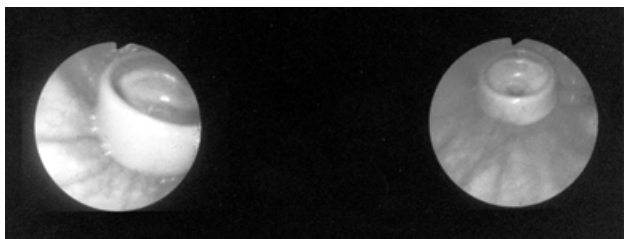
At the 2nd Department of Surgery of the Masaryk University Brno, we have been dealing with endoscopies of the gastrointestinal tract since 1988 (7). Surgeons licensed by the Gastroenterology Association for endoscopy of the upper part of the gas-

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**Fig. 1. Endoscopic view of the gastric mucosa; the silicone retention plate at the end of the tube abuts the inner gastric wall.**

trointestinal tract inserted the PEG tube in 1994 for the first time. After a short period of quantitative decrease of PEGs performed as a consequence of uncleared problems concerning their settlement by the insurance company, the total number of patients treated with this way of enteral nutrition has been growing not only in hospital settings, but also in follow-up care institutions and in home care, too.

### Methods

For percutaneous endoscopic gastrostomy insertion, standard equipment for gastroscopy and a special single use gastrostomy set are needed.

Gastrostomy sets we are familiar with (Fresenius, Wilson Cook) always contained a completed tube and other items needed to perform PEG. The procedure requires two physicians and one endoscopy nurse. At least one physician must be an endoscopist skilled in gastrofiberscopy, the other should be a surgeon. The latter performs follow-up examinations in the postoperative period aiming at revealing possible intraabdominal complications of PEG in time.

The proximal cone of the gastrostomy tube has an integrated fixation loop to be bound to the guide thread. The other end of the gastrostomy tube has a silicone retention plate which serves the fixation inside the stomach (Fig. 1).

The procedure begins with the endoscopic examination of the oesophagus, stomach and duodenum, diaphanoscopy effect of transillumination of the abdominal wall and selection of the appropriate site for the gastrostomy tube insertion, so that an injury to intraabdominal organs, especially to the small bowel and large bowel can be avoided. Having marked the puncture site in a premedicated patient, we inject the local anaesthetic into the given area under sterile conditions. Subsequently, we gently push the puncture cannula through the abdominal wall into the stomach, until the endoscopist can see its end.

Then we remove the puncture needle from the cannula and insert a guide thread instead of it.

We grip the thread with biopsy forceps which passed through the working channel of the endoscope into the stomach. Then we draw the thread out through the mouth together with the endoscope. Here we connect the loop of the gastrostomy tube to the thread and by pulling on the distal end of the thread in front of the abdominal wall the gastrostomy tube passes already without the endoscope through the mouth and oesophagus as far as

the stomach. The guide thread pulls the tube (the so-called pull technique which is used most frequently).

After entering the stomach, the tube is pulled out through the abdominal wall until the retention plate abuts the inner gastric wall.

The proximal cone of the gastrostomy tube with the integrated fixation loop in front of the abdominal wall is cut off and the tube is fixed by the external fixation plate. Endoscopic gastrostomy is a safe method; if performed correctly, without any serious complications.

If the GIT is normally functioning and the stomach is accessible for a gastroscopy, PEG is most frequently indicated in patients with:

- 1) long-term artificial ventilation,
- 2) tracheoesophageal fistula,
- 3) lost swallowing reflex due to a neurological disorder,
- 4) oesophageal tumor or tumor in the ENT area, with preserved patency for the endoscope.

As the most frequent contraindications we list:

- 1) peptic ulcer,
- 2) ascites,
- 3) thick abdominal wall making the diaphanoscopy effect impossible,
- 4) peritoneal carcinosis,
- 5) disorders of passage from the stomach in aboral direction.

Immediately after insertion, the gastrostomy tube serves for 24 hours only as a drainage of gastric juice. After one day, it may be used for enteral feeding. A specially defined diet is given into the tube. If it is more advantageous, it is possible to insert another tube through the gastrostomy and further through the pylorus into the duodenum and right to the jejunum with the help of an endoscope. In this way, PEGJ (percutaneous endoscopic gastrojejunostomy) is created. Apart from more effective nutrition, PEGJ is preferred in unconscious patients because of prevention of regurgitation and pulmonary aspiration.

### Results and complications

In the period of time as mentioned, we performed PEG in a total of 78 patients. Indications were as follows: swallowing disorders in patients with neurological diseases, tumors in the ENT area, impossibility of oral food intake during long-term artificial ventilation, and tracheoesophageal fistulas in pressure necroses after endotracheal intubation.

We recorded only one complication during the procedure: the plastic cannula was pierced by the needle because of too small skin incision and insufficient protrusion of the needle and therefore the cannula remained bent in the abdominal or gastric wall and the needle reached the stomach without it. After the mistake had been found, it was necessary to use another set; the further course of the intervention was standard.

We did not encounter any injury to intraabdominal organs not even in patients after abdominal operations.

As far as the complications after the intervention are concerned, we observed a tendency to the development of decubitus

ulcers at the site where the external fixation plate developed pressure to the skin several times. As a prevention, timely loosening of the compression of the abdominal wall (24 hours after the intervention) was always performed.

On the other hand, leakage of gastric contents around the tube sometimes occurred. Subsequent short-term stronger compression of the external fixation plate eliminates the leakage. Sometimes we must face the patient's manipulation with the fixation mechanism of the tube or even its accidental removal which is always very uncomfortable. Such an event occurred in our department on day 4 after PEG insertion. We tamponaded the stoma; it closed spontaneously, and with a certain time delay we applied another set.

### Discussion

Percutaneous endoscopic gastrostomy is a relatively inexpensive alternative to nasogastric tube feeding or to surgical gastrostomy. It is a safe method with a long-term effect and small number of mostly mild complications.

General practitioners can most frequently encounter patients with PEG in some follow-up care institutions, social institutions or possibly in home care, too. When caring for the gastrostoma, maximum effort should be made to preserve the patency of the stoma. According to the width of the tube, it is possible to use common, but blenderized and diluted foods, or some of the available commercial enteral diets. In cases where tube blockade already occurred, we try to open up the tube again as soon as possible. It can be done either with a sterile guide wire or just a massive irrigation of the tube. Care of the skin around the gastrostomy tube where sometimes symptoms of local inflammation or decubitus ulcers may occur, is important as well. These can be treated by standard procedures (3, 8, 9). The tube should be well sealed to eliminate leakage of gastric juice around the tube. On the other hand, excessive pressure to the skin resulting in the development of decubitus ulcers should be avoided.

When we regard that PEG is often encountered also in uncooperative patients with various kinds of treatment, general practitioners must manage the situation when a patient accidentally removed the tube himself. If the cause of the indication for PEG persists, it is possible to try to insert the tube again exploiting the original stoma in a department dealing with this method. An alternative is to wait until the stoma closes spontaneously and to insert another set subsequently.

If the cause of the indication for PEG disappeared and the patient can ingest food per os, PEG can be relatively easily removed. After cutting off the fixation at the abdominal wall, the central part falls into the stomach and is eliminated "per vias naturales." The fistula is tamponaded and it closes spontaneously after several days.

In cases of more than 6-week inability to ingest food per os with otherwise unaffected gastrointestinal tract, it is appropriate to consider the nutrition via PEG. Using this method, it is possible to ensure an adequate access for enteral nutrition for a longer time without risk of complications associated with a nasogastric tube, with minimum trouble to the patient. Moreover, enteral nutrition via PEG is cost-effective as compared to parenteral nutrition.

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