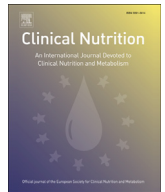




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Review

Enteral access in adults

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SUMMARY

Enteral feeding is widely used for hospitalized patients but is also used for ambulatory persons living at home or in home care settings. Aside from decisions that must be made about appropriate nutrient delivery, choices related to which type of enteral access will be used and the procedures for enteral access surveillance are extremely important. In this paper we review the various techniques for establishment of enteral access in adult patients. Prevention and treatment of potential complications are detailed. The use of protocols that are written by a multidisciplinary nutrition team is mandatory. It is also of vital importance to discuss treatment plans with the patient and care givers, to assure appropriate follow-up, and to consider ethical issues related to enteral feeding.

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1. Introduction

Enteral access allows the short- and long-term delivery of nutrients to the digestive tract of patients who cannot maintain their requirements with oral intake [1]. Enteral nutrition, as opposed to parenteral nutrition, is the modality of choice for artificial nutrition in patients with an accessible and functional digestive tract because it is associated with better clinical outcomes and a lower incidence of sepsis [2]. Short-term access can be achieved with a nasogastric or nasojejunal feeding tube. More permanent access can be obtained surgically or percutaneously, with endoscopic or image guidance, by creation of a gastrostomy, a jejunostomy, or a combination (gastrojejunostomy) [3]. Although the indications for insertion of these devices are similar, there are certain situations in which a particular access device is preferred [4]. The management of Percutaneous Endoscopic Gastrostomy (PEG) in children and adolescents has been recently reviewed by ESPGHAN [5].

The purpose of this article is to provide a review of the use of digestive access for enteral nutrition in adults, including indications and patient selection, preprocedural preparation, technical aspects regarding the procedure, complications, and maintenance of the access.

2. Definitions

A **nasogastric (NG)/nasojejunal (NJ) tube** is a flexible plastic tube that is inserted into the stomach or the jejunum through the nostril.

A **percutaneous gastrostomy (PG)** is the establishment of an artificial access in the stomach, through the abdominal wall, which can be performed surgically (PSG), endoscopically (PEG) or with image guidance. Insertion of the gastrostomy tube can be done via the oral or the abdominal route (Fig. 1(A)).

A **percutaneous jejunostomy (PJ)** is the establishment of an artificial access into the small intestine, through the abdominal wall, which can be performed surgically (PSJ) or endoscopically (PEJ) (Fig. 1(B)).

A **PG with a jejunal extension (PG-J)** is a PG tube through which a thinner tube is inserted to infuse the nutritive solution into the jejunum (Fig. 1(C)).

3. Indications and patient selection

The indications for enteral feeding tube placement include difficulties in swallowing caused by neurologic conditions or head/facial trauma, luminal obstruction in the head and neck area, the esophagus, or the stomach from malignancy, post-operative fistulas in the upper digestive tract, hypercatabolic states such as critical care illness, cystic fibrosis, extensive burn injury, and malignancy,

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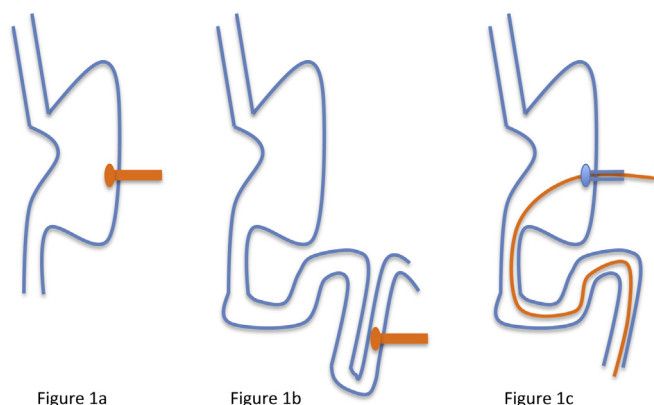


Fig. 1. A) Percutaneous gastrostomy (PG): nutritional access in the stomach through the abdominal wall. B) Percutaneous jejunostomy (PJ): nutritional access in the jejunum through the abdominal wall. The tube is placed in the beginning of the second jejunal loop. C) Percutaneous gastrostomy with a jejunal extension (PEG-J): the jejunal feeding tube is inserted through a percutaneous gastrostomy. Its distal end is located after Treitz's angle.

and malnutrition related to chronic conditions in patients with insufficient oral intake. In most cases, a gastric access is appropriate.

Jejunal feeding tubes are used in patients who are unable to tolerate gastric feedings because of gastroparesis, in whom a gastric enteral access tube cannot be inserted because of altered anatomy (such as gastrectomy or Roux-en-Y), have gastric outlet or duodenal obstruction, have a gastric fistula, or severe gastroesophageal reflux disease (Table 1). Concerning the risk of aspiration pneumonia in critical care patients, a meta-analysis showed similar outcome between gastric and jejunal feeding [6]. However, a recent randomized controlled trial in critical care patients concluded that the nasoduodenal feeding group had a higher mean daily calorie and protein intake compared with the nasogastric feeding group, and achieved nutritional goals earlier, due to better tolerance [7]. Therefore, jejunal feeding is an alternative in selected patients who do not tolerate gastric feeding or who have severe reflux and increased risk for aspiration pneumonia. Jejunal enteral feeding has been traditionally recommended for patients with severe acute pancreatitis to avoid pancreatic stimulation. Nevertheless, a meta-analysis of 4 small, randomized controlled trials assessing gastric feeding demonstrated good tolerance and safety [8].

4. Contraindications

Absolute contraindications to enteral access for feeding include non-functionality of the digestive tract, such as bowel occlusion,

ischemia or peritonitis, and severe coagulopathy. Facial and nasal injury precludes insertion of NG or NJ tubes (Table 2).

Gastric or duodenal ulcers with active bleeding and a visible vessel is a relative contraindication for PG. In this case, because of the high risk of bleeding recurrence, it is advised that the procedure be delayed for 72 h. PG insertion in the presence of ascites is challenging and increases the risk of infectious peritonitis [9]. Gastrostomy tubes may be placed successfully after paracentesis if reaccumulation of ascitic fluid can be prevented for a period of 7–10 days following the procedure, to allow the tract maturation. Gastropexy devices can be used to anchor the stomach to the anterior abdominal wall. Another difficulty for PEG is the interposition of other organs between the stomach and the abdominal wall, in which case a PSG might be considered. Placement of a PG in the presence of a ventriculo-peritoneal shunt may increase the risk of ascending meningitis [10]. Anatomic alterations such as an open abdomen, abdominal wall hernias, presence of ostomy sites or drain tubes, and surgical scars may alter the location for PG insertion. Intervening loops can get trapped in scar tissue under the skin; therefore it is safer to choose an insertion point 2–3 cm from the scar. Finally, instable facial fractures can impede PEG insertion; in this case, surgical PG might be preferred to avoid passing through the oropharynx with an endoscope.

5. Pre-procedural assessment

5.1. Patient assessment

The patient should be assessed clinically before the procedure by checking vital signs. If there are signs of volume depletion, it may be appropriate to provide intravenous fluids until the enteral access can be utilized. For high-risk patients, the procedures may need to be performed under anesthesia to provide optimal airway control and hemodynamic monitoring. Patients should be kept nil per os 6 h for solids and 3 h for liquids before the procedure unless the patient is known to have delayed gastric emptying.

5.2. Management of anticoagulant and antiplatelet therapy

The procedure-related bleeding risk must be evaluated with respect to the risk of a thromboembolic event if anticoagulant or antiplatelet therapy is interrupted. Furthermore, differentiating between low- and high-risk procedures is crucial [11,12]. Low-risk procedures include NG or NJ tube insertion, insertion of a J extension through a pre-existing gastrostomy, and tube replacement (PG or PJ) through a mature stoma. Initial creation of a PG or PJ is considered a high-risk procedure.

In cases involving a low-risk procedure, anticoagulant or antiplatelet therapy can be maintained if the patient's international

Table 1
Indications for gastric and intestinal nutritional access placement.

Indications
General indication for enteral nutrition
Impaired swallowing
Obstruction in the head and neck area or in the upper digestive tract
Fistulas in the head and neck area or in the upper digestive tract
Malnutrition
Indications for jejunal access
Severe gastroesophageal reflux disease
Gastroparesis
Severe acute pancreatitis
Altered anatomy (ex.: previous gastrectomy)
Gastric outlet syndrome/duodenal obstruction
Gastric or duodenal fistula

Table 2
Contraindications for nutritional access placement.

Contra-indications for enteral nutritional access placement
Absolute contra-indications
Unfunctional digestive tract (occlusion, pseudocclusion, ileus)
Peritonitis/Mesenteric ischemia
Abdominal wall defects
Severe coagulopathy
Thienopyridines/Vitamine K antagonist
Relative contra-indications
Ascites
Gastric ulcer
Ventriculo-peritoneal shunts
Instable facial fractures
Presence of stomies, drain tubes or surgical scars

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