Radiologic, Endoscopic or Surgical Gastrostomy: Complementary or Competing techniques?

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Learning objectives

To know the different ways to place a gastrostomy: Radiological, endoscopic and surgical, with their advantages and disadvantages.

To review the indications, contraindications, technique, management and complications after percutaneous radiologic gastrostomy.
Background

The nutrition of a patient with inability to feed orally is one of the mainstays of treatment.

When the digestive system is functioning this way is preferred instead of parenteral nutrition, mainly by motility disorders of the digestive and mucosal atrophy that the latter generates.

Enteral routes are preferred for nutritional support of patients requiring alternative feeding. The enteral route is the more physiological approach and can be done through nasogastric, nasoduodenal and nasojejunal nutrition which are suitable for short periods of time, as well as being very uncomfortable for the patient are often associated with gastroesophageal reflux and aspiration. For nutrition for a prolonged time is chosen gastrostomy, which can be performed by surgery or less invasive local anesthesia and/or sedation.

There are three methods of placing a gastrostomy: surgical, percutaneous endoscopic and percutaneous radiological control.

The surgical gastrostomy is usually done by the Stamm technique. It involves a laparotomy making a small incision in the stomach and the introduction of a tube of silicone/rubber (Malecot or Pezzer catheter) placed perpendicular and sutured carefully to avoid leakage peritoneum.

Percutaneous procedures are first choice before your surgery due to technical facility, require no general anesthesia, avoids morbidity associated to laparotomy and be, therefore, of lower cost. Therefore the laparoscopic gastrostomy is performed to patients who can not be operated or patients due to anatomical factors are not candidates for minimally invasive techniques.

Percutaneous endoscopic gastrostomy (PEG). The stomach is insufflated generously using the air channel on the endoscope. Next, the abdominal wall is transilluminated using the endoscope light. This is visible externally as a bright red or orange light on the abdominal wall, later an horizontal incision is made at the marked site and passed a guide through this incision into the stomach. This is captured by the endoscope and removed to the mouth of the patient getting two extremes, oral and abdominal, next the tube is pushed over the wire through the esophagus and out via the gastric wall, externalizing the tube to the abdominal wall.
The PEG offers certain advantages over the radiologic gastrostomy. Allows perform of biopsies and may introduce higher caliber tubes, but has a major limitation: many of the causes that preclude oral intake are significant stenosis of the upper digestive tract of various etiologies, which often also prevents realization of the PEG.

The radiological gastrostomy is quick and simple and is performed under fluoroscopic guidance. The technique involves inflating the stomach with air through a nasogastric tube previously inserted (or in case of severe stenosis 4F catheter: 1.3 mm diameter placed during the procedure), then performs a puncture in the anterior wall stomach with a needle and then advances a rigid wire into the stomach and finally expands tract. After the dilatation a gastrostomy catheter No. 12 or 14 French is advanced into the stomach, and is fixed to the skin.

This procedure lasts approximately 10-15 minutes and can start the enteral route the next day. Peritonitis is a complication but with a good aseptic technique the incidence decreases to less than 5%.

INDICATIONS.

The causes of dysphagia are many, being the neurological pathology the most common cause which include cerebrovascular disease, neurodegenerative diseases such as Alzheimer's and Parkinson and hypoxic encephalopathy.

Also patients with head and neck tumors, abnormal esophageal or gastric motility as those occurring in diabetes mellitus or scleroderma, chronic debilitating diseases such as cystic fibrosis, hydrocephalus and congenital heart disorders, among others, may require enteral nutrition for long periods of time can even be definitive. Patients with eating disorders or other psychiatric disorders may also need ultimately the tube placement for enteral nutrition.

CONTRAINDICATIONS

ABSOLUTE:
• Coagulation disorders uncorrectable. It is necessary INR lower than 1.5 and more than 80,000 platelets.

• Anatomical factors: impossibility of approach due to interposition of structures: The main contraindication to perform radiologic gastrostomy is colon interposition between the abdominal wall and stomach, less frequent interposition of left hepatic lobe in massive hepatomegaly. Stomach that does not descends below the costal margin after distension with gas (also for endoscopic approach).
• Previous surgeries. It is absolutely contraindicated in the case that the distortion anatomical hinders to correct gastric distension chamber.

• Ventriculoperitoneal shunt because of the high risk of infection.

RELATIVE:
• Ascites. Not contraindication if the amount of ascites fluid is small. In cases of massive ascites is an absolute contraindication due to the high probability of leakage peri-tube with the consequent risk of peritonitis.

• Portal hypertension with varices. There is a high risk of hemorrhage.

• GERD
TECHNIQUE AND SUBSEQUENT MANAGEMENT: (Fig. 1-21)

Procedure preparation:

The patient will fasted for 12 hours. Before starting, should be placed to the patient a nasogastric tube or angiographic catheter 5 or 4Fr. in the room, through the mouth or nose into the stomach to insuflarlo during procedure.

Location of the percutaneous access. -
With the patient supine, the fluoroscopy can specify the entry point (below the left costal margin) on which inject local anesthetic after sterilization of the area.

The puncture of the stomach should take place in the junction of the superior two thirds with the lower third, avoiding the arterial arcades of greater and lesser curvature.

Prior to puncture inflates the stomach with air to bring it closer to the abdominal wall and push the colon caudally. The insufflation provides further rigidity of the gastric wall thus facilitates performing the procedure.

Access and placement. -
Can be performed an abdominal ultrasound to delineate the contours of the liver and stomach and identify the surrounding structures near to the site of puncture.

During the puncture verify the intragastric location of the needle, injecting contrast, and passes a rigid guidewire which is wrapped in the fundus. After the path will dilate to reach definitive size.
To facilitate fixation of the stomach to the abdominal wall, may be employed gastropexy sutures (three-point fixation).

After completion of the technique can remove the nasogastric tube.

Complications.-
Minor
• Peri-tube leakage.
• Migration and tube rupture
• Wound infection.
• Abdominal pain.

Major
• Perforation of viscera.
• Peritonitis, being the most serious. But less than 0.3%.
• unusual bleeding
• Aspiration

Death.
Fig. 1: Radiological gastrostomy. Patient supine. Abdominal ultrasound is performed to identify and mark the left hepatic lobe and the adjacent structures to the puncture site.

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Fig. 2: Radiological gastrostomy. Patient supine. Sterile preparation is performed in the anterior abdominal wall into the stomach area.

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**Fig. 3:** Radiological gastrostomy. Instrumentation: Catheter gastrostomy No. 12Fr., Teflon dilators, rigid guide (Amplatz), local anesthetic, scalpel, contrast.

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Fig. 4: Radiological gastrostomy. Puncture site is selected, subcostal, to left of the midline, the area is anesthetized.

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Fig. 5: Radiological gastrostomy. It performs a small incision in the puncture area.

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Fig. 6: Radiological gastrostomy. Puncture is performed posterior to insufflation of the stomach with air through a nasogastric tube previously inserted.

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**Fig. 7:** Radiological gastrostomy. Puncture is performed posterior to insufflation of the stomach with air through a nasogastric tube previously inserted.

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Fig. 8: Radiological gastrostomy. Fluoroscopic control at the puncture site. gastric distention is verified.

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Fig. 9: Radiological gastrostomy. After having verified the location of the puncture needle, we proceed to introduce the same until enter the gastric lumen.

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**Fig. 10:** Radiological gastrostomy. Proceed to insert the puncture needle, then inject contrast through the same to verify intragastric location.

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**Fig. 11:** Radiological gastrostomy. Passed to a rigid guide wire and wrap around the gastric fundus.

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Fig. 12: Radiological gastrostomy. Passed to a rigid guide wire and wrap around the gastric fundus.

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**Fig. 13:** Radiological gastrostomy. It performs a fluoroscopic control to verify the location of the rigid guide.

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Fig. 14: Radiological gastrostomy. Dilation of the way until to reach the definitive size.

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**Fig. 15:** Radiological gastrostomy. Dilation of the way until to reach the definitive size.

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**Fig. 16:** Radiological gastrostomy. The gastrostomy catheter No. 12Fr. is inserted.

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Fig. 17: Radiological gastrostomy. The gastrostomy catheter No. 12Fr. is inserted.

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Fig. 18: Radiological gastrostomy. Proceed to fixation of the gastrostomy catheter and remove the rigid guide.

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Fig. 19: Radiological gastrostomy. After inserting the catheter, proceed to roll up and set the pigtail.

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Fig. 20: Radiological gastrostomy. Contrast is injected to confirm the correct position of the gastrostomy catheter.

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**Fig. 21:** Radiological gastrostomy. Confirms the correct position of the gastrostomy catheter.

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Conclusion

- The percutaneous gastrostomy under fluoroscopic control is a good alternative to nasogastric tube because of its simplicity, usefulness, safety, low cost, easy care and maintenance possibility for long periods of time.

- The placement of gastrostomy via minimally invasive technique has replaced the surgery due of its lower morbidity and mortality.

- The radiological and endoscopic techniques are similar in terms of successes and limitations, unless stenosis exists which prevents the passage of the endoscope where the radiological way is better.

- The surgical placement still used in those cases in which due to anatomical difficulties is not possible performing the minimally invasive techniques.
References


