

Percutaneous feeding tubes

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Patients who are unable to ingest adequate nutrients by oral intake present a common challenge for family physicians. Feeding difficulties can be caused by many factors, including anatomic, neurologic, and gastrointestinal dysfunction. Long-term nutritional support options include parenteral feeding and percutaneous enteral access. Nasogastric tubes are inappropriate for long-term outpatient use.

Insertion of a feeding tube through the skin into the stomach lumen, known as percutaneous enteral access, can be used for patients unable to maintain adequate caloric intake orally for a prolonged period of time. It is inserted by either of 2 methods: percutaneous endoscopic gastrostomy or an interventional radiology approach. Currently, the radiologic approach is the preferred one, as data have shown that it requires less postprocedural analgesia and is associated with a lower incidence of major complications, a higher success rate (nearly 100%), and greater overall patient satisfaction.¹ This article focuses on radiologically guided feeding tubes.

Indications

Radiologically guided feeding tube placement can be performed as an outpatient procedure by an interventional radiologist (IR). In addition to placing tubes for feeding, this procedure can also be performed when

patients require gastric decompression (often at palliative point of care). The presence of a percutaneous feeding tube does not prevent the patient from eating.

The most common tube insertion site is gastric (gastrostomy or gastrojejunostomy); however, in some cases the feeding tube is inserted directly into the jejunum (jejunostomy tube feeding or J-tube). Feeding the tube directly into the stomach (gastrostomy or G-tube) is the simplest and most physiologic approach, resulting in the greatest degree of satiety. For patients with severe gastroesophageal reflux, who might be at increased risk of aspiration pneumonia, tip advancement into the jejunum (gastrojejunostomy or GJ-tube) might be performed.

Most feeding tubes have a single lumen. Dual lumen tubes are available, and are typically used when both jejunal feeding and gastric decompression are necessary.

Contraindications

Unfavourable anatomy (eg, an unusually high-lying stomach) and previous partial gastrectomy are common contraindications for this procedure. Others (often relative) include uncorrectable coagulopathy, gastric neoplasm, active gastritis or peptic ulcer, gastric varices, and, in some cases, ascites. An IR can advise whether or not the procedure is appropriate for a particular patient.

Preprocedure preparation

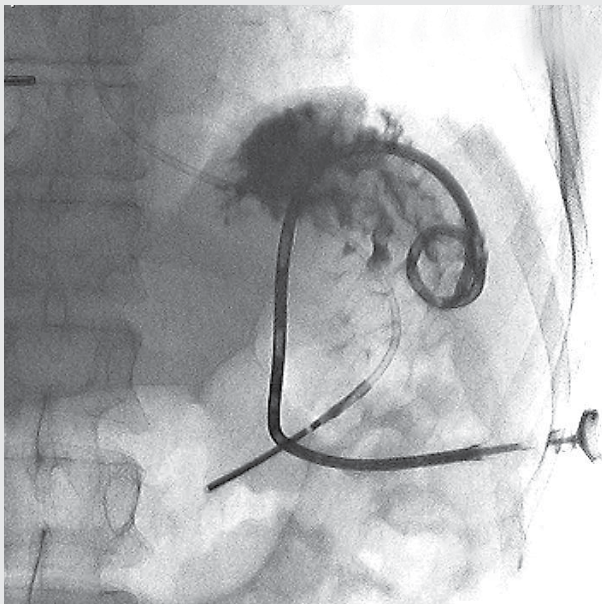
Screening bloodwork (complete blood count, international normalized ratio, and prothrombin and partial thromboplastin tests) should be performed. Consultation with a dietician is suggested to determine the most appropriate feeding regimen and, hence, tube type. If the patient has had gastric surgery or if anatomy is in question a preprocedural computed tomography scan should be obtained. No prophylactic antibiotics are required. Patients must have nothing by mouth for 6 hours preprocedure.

Procedural details

A nasogastric tube is positioned to insufflate the stomach and facilitate gastric puncture. Conscious sedation or analgesia might be administered during the procedure at the discretion of the IR. Ultrasound and fluoroscopy are used to guide placement of the catheter. Typically, the entire procedure is performed in less than 20 minutes.

Serious complications are rare. Acute intraperitoneal infection,² bleeding,³ and injury to an adjacent organ (liver, spleen, or bowel)⁴ are the most important

A fluoroscopic image taken during G-tube insertion



immediate complications. The most common delayed complications are tube occlusion, pericatheter leakage, development of granulation tissue, tube migration, and aspiration.

Postprocedural management

Patients are usually discharged the same day as their procedures. Mild pericatheter site pain is not uncommon; if pain worsens, further investigation might be required. Most centres recommend starting feeds within 24 hours of the procedure, although earlier feeding (after 3 hours) is safe, assuming normal initial recovery.

Peritonitis is a rare but serious complication that most often results from infusion of enteral feeds into the peritoneal cavity via a displaced feeding tube. Patients should not be fed if there is a suspicion of tube malposition or dislodgement; if they complain of increasing abdominal pain or tenderness; or if increasing pneumoperitoneum or free fluid is observed on appropriate imaging. These patients should be referred to IRs.

If a tube is removed or falls out, the tract should be preserved by prompt placement of a soft, straight tube such as a Foley catheter or red rubber catheter (a nurse or physician can easily do this at the bedside to protect the access site until an IR consultation can be obtained). Formal replacement of the feeding tube can then be performed on a semielective basis without the need for a repeat puncture and its associated risks.

Postprocedural reflux and emesis are rare, and might be ameliorated by revision of the GJ-tube. Residual nausea can be treated with antiemetic medications.

Maintenance

Patients or caregivers should check the puncture site every few days and monitor for infection or leaks. The tube entry site should be cleaned with saline-soaked gauze to remove dried feeding material or secretions, and a dressing should be applied and changed daily. Most hospitals offer nurse consultation sessions, in which the patient or family member will be taught how to properly clean, dress, and care for the tube insertion site, and how to deliver feeds.

Tubes should be flushed briskly with 20 mL of water before and after every feed to prevent occlusion by dried formula. Feeding bags and syringes should be cleaned thoroughly after every feed, and can be washed with warm, soapy water then rinsed and allowed to drip dry. Equipment that has begun to deteriorate should be replaced.

Patients should be counseled as to which drugs can be administered via their feeding tube; extended release, slow release, encapsulated, and coated pills will not be properly absorbed. Crushed pills should be avoided; liquid formulations are preferable. If a liquid form is unavailable, some crushed pills can be administered if first dissolved in warm water.

Liberal flushing of the tube with water before and after each use is the best way to prevent tube blockage. Around 30 to 50 mL of a cola-based soda beverage (effective because of high acidity) can also be used to flush the tube, even daily, to help prevent blockages. Tubes that frequently occlude should be replaced with a larger calibre tube.

Some tube types can be replaced by the patients' caregivers or family physicians, while others should be replaced by the IRs; the IRs will give the patient the relevant information regarding these situations.

Delayed complications

Feeding-tube blockage is most often caused by crushed pills, and is more likely to occur in small-bore catheters.

Pericatheter leakage of gastric contents can occur, especially in patients with G-tubes. The most important prevention is localized skin care using a barrier cream.

Granulation tissue at the skin entry site can be fulgurated with silver nitrate sticks. Using a larger tube can minimize tube movement and subsequent skin irritation.

Insertion site infections—typically superficial—might also occur. Most cases resolve with local wound care and antibiotics. Deep stomal infection is less common (<1% of patients) and can usually be successfully treated with antibiotics (often a broad-spectrum combination, such as cephalexin and amoxicillin-clavulanate) and close observation.

Aspiration occurs in less than 2% of patients and can increase the risk of pneumonia. This risk can be lessened either by advancing a G-tube into the jejunum, or by initial placement of a GJ-tube in patients with a high likelihood of aspiration.

Tube removal

Occasionally the need for percutaneous feeding is temporary. When a patient can obtain adequate nutrition by oral intake for a prolonged period of time (at least 2 to 4 weeks), without risk of aspiration or other complication (confirmed by a clinical nutritionist or dietitian), the feeding tube can be removed.

Balloon-tipped tubes can usually be removed at home or in a physician's office. The balloon should first be deflated with a 10-mL syringe. If it does not fully deflate or if the tube does not come out easily and

On-line resources

Canadian Interventional Radiology Association:
www.ciraweb.org

Society of Interventional Radiology: www.sirweb.org.

Radiologic Society of North America: www.rsna.org

Radiology Info: www.radiologyinfo.org

without resistance, the balloon should be reinflated and the patient referred to an IR for removal. All other tube types (cope loop, Malecot, mushroom-tip, and percutaneous endoscopic gastrostomy tubes) should be removed by IRs. ✱

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Competing interests

None declared

References

1. Wollman B, D'Agostino HB, Walus-Wigle JR, Easter DW, Beale A. Radiologic, endoscopic, and surgical gastrostomy: an institutional evaluation and meta-analysis of the literature. *Radiology* 1995;197(3):699-704.
2. Yeung EY, Carmody E, Ho CS. Gastrostomy, jejunostomy, and cecostomy. In: Taveras JM, Ferrucci JT, editors. *Radiology, diagnosis, imaging, and intervention*. Philadelphia, PA: Lippincott, Williams & Wilkins; 1995. p. 1-8.
3. Yeung EY, Ho CS. Percutaneous radiologic gastrostomy. *Baillieres Clin Gastroenterol* 1992;6(2):297-317.
4. Thornton FJ, Varghese JC, Haslam PJ, McGrath FP, Keeling F, Lee MJ. Percutaneous gastrostomy in patients who fail or are unsuitable for endoscopic gastrostomy. *Cardiovasc Intervent Radiol* 2000;23(4):279-84.

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