

Percutaneous Endoscopic Gastrostomy

A Percutaneous Endoscopic Gastrostomy (PEG) is a surgical procedure to place a feeding tube inside of the stomach through the skin under the guidance of an endoscope. A feeding tube is a medical device used to provide nutrition to patients who cannot or refuse to obtain nutrition by swallowing. The state of being fed by a feeding tube is called enteral feeding or tube feeding. Placement may be temporary for the treatment of acute conditions or lifelong in the case of chronic disabilities. Some patients treated using a feeding tube lack the ability to survive on their own without such technology. Many do not know that their swallowing problems or dysphagia can be treated. (Ekberg et al. 2002)

The PEG was first introduced as an alternative to surgical gastrostomy (Gauderer et al. 1980). Conventional wisdom in the late 80's was that aspiration or inadequate oral intake necessitated placement of a PEG tube. (Plonk 2008) Much of this thinking has persisted until today.

A variety of feeding tubes are used in medical practice. They are usually made of polyurethane or silicone. The diameter of a feeding tube is measured in French units (each French unit equals 0.33 millimeters). They are classified by site of insertion and intended use.

A majority of studies that looked at the PEG decision-making process in older adults concluded that the decision is often made at a time of crisis, with incomplete information and no reasonable alternative to tube feeding being perceived. Only about half of the surrogate decision-makers were confident that the patient would have wanted a PEG, a third regretted their decision to place the PEG and only a third would opt to have a PEG themselves. (Callahan et al. 1999; Mitchell et al. 2000) Physicians tend to focus on the complication of the procedure itself rather than on the subsequent benefits and burdens of tube feeding.

Utilization

- More than 200,000 patients every year receive this form of therapy. (Lewis 1990)
- Up to 10% of nursing home residents and as many as 1.7% of Medicare patients over the age of 85 undergo gastrostomy. (Grant et al. 1998)
- In 1999, 34% of severely cognitively impaired residents of U.S. nursing homes had PEG tubes. (Mitchell et al. 2003)

Potential benefits, Determination for placement:

- Under-nutrition in patients admitted with stroke.
- Patients with dysphagia, which precludes safe oral nutrition and persists for long periods without therapy and/or for up to 14 days or longer.
- When surgery or treatment for oral cancer affects the patient's ability to eat. The location of oral cancers, and the resulting damage to the oral / esophageal tissues from treatments, makes weight maintenance and obtaining proper nutrition especially difficult. Cancer of the head and neck has an annual incidence of over

- 41,000 cases in the US and is the most common underlying malignancy in patients on home enteral feedings. (Jemal et al. 2002; Schattner 2003)
- To normalize a person's body mass index (BMI; weight kilograms divided by height in meters squared) or measurement of nutrition status. A BMI outside of the normal range is associated with increased morbidity and mortality. (Calle et al. 1999; Lew and Garfinkel 1979) Normalization of body weight is an effective way to reduce mortality. (Gregg et al. 2003; Williamson 1997; Williamson et al. 1999; Williamson et al. 2000)
 - Benefits are not so clear in patients with dementia or other progressive neurological disease. Published data on outcomes after PEG placement in advanced dementia fail to demonstrate that it prolongs life, improves nutrition, prevents aspiration, improves function, makes the patient more comfortable or improves wound healing. (Finucane et al. 1999; Gillick 2000)
 - There is very little objective data available on quality of life after PEG in the demented population; since tube feeding is associated with increased restraint use, social isolation, increased stool and urine production and, sometimes nursing home admission to manage the feeds, the impact is likely to be negative.
 - Efficacy of PEG placement to provide nutrition in patients with cancer has not been demonstrated. (Klein and Koretz 1994)
 - When drainage of the stomach of accumulated acid and fluids in a person with a blockage between the stomach and the small intestine is necessary.

Procedure

- Anesthesia: Local, usually a lidocaine spray; IV pain reliever and a sedative
- Usually by a general surgeon, otolaryngologist and/or a gastroenterologist working alone or together.
- An endoscope (a long, thin fiberoptic tube with a tiny video camera on its end) is inserted through the mouth and down the esophagus into the stomach. The endoscopic camera is used to produce pictures of the inside of the stomach on a video monitor so that the proper spot for insertion of the PEG feeding tube can be located.
- The surgeon inserts a needle into the stomach at the spot where the PEG tube will be located. Using the endoscope, the gastroenterologist locates the end of the needle inside the body, and encircles it with a wire snare. A thin wire is then passed from the outside of the body, through this needle and into the abdomen. This wire is then grasped with the snare and pulled out through the mouth. Now, there is a thin wire entering the front of the abdomen into the stomach and continuing upward and out the mouth. The PEG feeding tube is attached to this wire outside of the mouth. The surgeon then pulls the wire back out from the abdomen, which pulls the PEG down into the body through the mouth and esophagus. The tube is pulled until the tip of the PEG comes out of the incision in the stomach. There is a soft, round "bumper" attached to the portion of the PEG that remains inside the body; this bumper secures the tube on the inside of the

- body. The outer portion of the tube is secured with a bumper as well. Sterile gauze is placed around the incision site.
- After the tube is placed, a registered dietitian or a nurse who specializes in nutrition assesses the patient to determine their nutritional needs, the amount of calories, protein, and fluids that will be necessary, as well as the most appropriate nutritional formula and how much of that formula will be needed each day. Nutritional products designed for tube feeding are formulated to provide all the nutrients the patient will need including proteins, carbohydrates, vitamins, and minerals. Some even contain dietary fiber and other non-nutritional elements.

Utilizing the PEG for feedings

- The patient should be upright, no less than thirty degrees, to minimize the risk of regurgitation and aspiration, and they should be kept upright for thirty to sixty minutes after feeding.
- To prevent complications (abdominal cramping, nausea and vomiting, gastric distension, diarrhea, aspiration), food should be infused slowly. It may take more than an hour to administer one feeding session, as the drip mechanism is kept at very slow settings.
- Sometimes continuous feeding is preferable. With this method, a feeding pump is set up and connected to the PEG tube. The formula is infused over a prescribed period of time into the patient. The risk for aspiration is decreased because less formula is given during a more prolonged period of infusion.
- Using an attached bag system to contain the liquid diet for feeding is a secondary method by which food is allowed to drip slowly into the tube though “gravity feeding.” With this technique, there is greater freedom in that feedings can be done anywhere, at any interval, and medications may be administered through the PEG tube utilizing this method. Under the drip-feeding method, feedings are usually performed every four to six hours.
- Clogging of tubes is regularly reported, especially in small-bore tubes. Tubes should be flushed with water before and after feeding during intermittent delivery, and every 4 to 8 hours during continuous feeding. This is done with a syringe full of water which is attached directly to the tube. Multiple flushing with the syringe will ensure a free flowing system.
- The patient may experience bloating either before or after feeding. If this occurs, the stomach and intestinal tract should be decompressed. Removing the adapter feeding cap from the tube and allowing the PEG to be open to air can easily accomplish this. Encouraging the patient to cough will also facilitate decompression.



- Scrupulous oral care is imperative in preventing problems, and must be attended to frequently, especially in patients who are provided with total nutritional support through the PEG tube. Daily brushing of the patient's teeth, gums and tongue must be performed. The patient's lips should be routinely moistened, and if necessary, lubricated with petroleum jelly to prevent cracking.
- The incision area must be observed daily for redness, swelling, necrosis or purulent drainage, and the skin must also be cleaned daily. It helps to routinely apply an antibacterial ointment to the insertion site after cleaning to prevent infections such as Neosporin.

Risk Factors for Complications associated with PEG placement

- Outpatient follow-up of patients who have had PEG tubes inserted is often inadequate and variable in different institutions. (Lowry and Johnston 2007)
- Stress
- Obesity
- Smoking
- Excess consumption of alcohol
- Use of narcotics or other mind-altering drugs
- Use of certain prescription medications, including muscle relaxants and sedatives, anti-hypertensive, insulin, beta-adrenergic blockers, cortisone
- Prior surgeries that involved or may have made positioning the abdomen difficult (such as a gastrectomy).

Possible Complications

- While the PEG placement procedure itself is considered low risk (<1% mortality), mortality in the 30 days following PEG placement is around 22%. (AGA 1995; Janes et al. 2005)

- 60-day mortality in hospitalized patients with advanced dementia who receive a PEG is 40%. (Meier et al. 2001)
- Contrary to common belief, survival of demented patients is not extended by the placement of a PEG. (Gillick 2000; Murphy and Lipman 2003)
- Mortality rates in ALS patients are similar to those in demented patients at 25%. (Chio et al. 1999; Forbes et al. 2004; Mitsumoto et al. 2003)
- Mortality at 1 year of stroke patients with PEG tubes is 60%. (Ha and Hauge 2003)
- Fewer than half of patients survive for a year or more and very few return to living in their own homes. (AGA 1995)
- PEG-related complications are reported in up to 70% of patients. (AGA 1995)
- PEG-related complications lead to hospitalization or death in 3% to 11% of cases. (AGA 1995)
- Aspiration is one of the most common problems associated with tube feeding and may be related to reflux of gastric contents or continued aspiration of saliva. (AGA 1995)
- Aspiration pneumonia is reported in about 20% to 30% of PEG-fed patients and is a frequent terminal event. (AGA 1995)
- Early feeding may keep patients alive but in a severely disabled state when they would otherwise have died.
- Routine reports of feeling depressed, hopeless and utter despair after PEG tube placement.
- Wound infection around the tube.
- PEG tube occlusion, dislodgment or malfunction.
- Excessive tension on the tube may also result in pressure necrosis (death of an area of tissue) of the interior abdominal wall.
- Bowel perforation – a hole in the wall of the intestine
- Gastrocolic fistula – an abnormal opening connecting the stomach and the colon
- Peritonitis – inflammation of the lining of the abdomen
- Septicemia – an infection affecting the entire body, caused by the spread of microorganisms and their toxins through the circulating blood
- Leakage at the tube insertion site
- Abdominal bloating
- Nausea
- Diarrhea
- Damage to nearby structures, most commonly the colon, can occur with percutaneous techniques.
- The tube can migrate distally and obstruct the pylorus, leading to gastric outlet obstruction.

Cost of Tube Feedings

- Most commercial formulas range from \$1.00 to \$2.00 per can.
- Average number of cans needed per day for most patients is 6-8 cans.

- Homemade recipes can average \$5.00 to \$8.00 per day.
- The average daily cost of PEG-tube feeding and labor to provide feeding is close to \$90.
- Insurance reimbursement is not always available and usually only under certain circumstances.
- Average number of days of PEG tube feeding is 180. (Callahan et al. 2001)
- Estimated cost of providing 1 year of feeding via PEG is \$31,832. The main components of this cost include the initial PEG procedure, enteral formula and hospital charges for major complications. (Callahan et al. 2001)
- Feeding patients via PEG often results in cost shifts in terms of the primary payor. (Callahan et al. 2001)
- In 2003, the total annual cost to Medicare just for enteral feeding supplies was more than \$670 million. This figure represents almost 6% of the total Medicare budget for DME supplies for that year.

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