

PEG Feeding Tubes - Indications and Management

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Percutaneous endoscopic gastrostomy (PEG) feeding tubes were first described in 1980 for use in children^[1]. **PEG feeding tubes** are now increasingly used for enteral nutrition for children and adults. PEG may be used with a jejunal extension^[2].

PEG feeding is used where patients cannot maintain adequate nutrition with oral intake. However, the simplicity of PEG feeding has led some to be concerned about its use when there is little or no clinical benefit^[3].

There are sometimes ethical factors to consider (see 'Ethical dilemmas', below)^[4]. Several court cases have considered use of PEG feeding in patients who have lost the capacity for self-determination.

Indications

PEG is the preferred route of feeding and nutritional support in patients with a functional gastrointestinal system who require long-term enteral nutrition^[5].

Adults^[2]

Indications include difficulties with oral intake often where obstruction to the upper airway or gastrointestinal tract makes passing a nasogastric tube difficult:

- Neurologically unsafe swallowing:
 - Acute ischaemic or haemorrhagic stroke: in patients with acute stroke, gastrostomy feeding should be considered at 14 days post-stroke.
 - Chronic progressive neuromuscular disease.
- Failure of feeding:
 - Dementia; however, there is insufficient evidence to suggest that enteral tube feeding is beneficial in patients with advanced dementia^[6]. There is presently no evidence to suggest long-term survival rates improve in patients with advanced dementia who undergo PEG placement for dysphagia^[7].
 - Cystic fibrosis: PEG feeding is safe, efficacious and acceptable in children and adults with nutritional failure due to cystic fibrosis but should be carried out only in the context of close co-operation between cystic fibrosis chest physicians and an enteral feeding team.
 - Peritoneal dialysis: PEG insertion can improve nutritional status but increases the risk of fungal peritonitis and failure of dialysis. PEG insertion can be undertaken in patients on peritoneal dialysis. Dialysis should be stopped for three days and prophylactic antifungal therapy given.
 - Oro-pharyngeal and oesophageal malignancy: enteral tube placement into the stomach may hinder surgical techniques in oesophageal cancer and should be avoided if curative resection is planned.

PEG tubes may also be indicated in other clinical situations such as malignant bowel obstruction^[8], head injury, Crohn's disease, fistulae, other causes of short bowel syndrome, AIDS and HIV encephalopathy, and severe burns.

Children^[1]

In the past, it was considered that the lower limit of body weight to insert PEG tubes should be 10 kg but PEG has been reported to be inserted safely in infants with a weight as low as 2.3 kg. The use of PEG may be indicated for children with:

- Neurological disorders with inability to swallow or dysphagia.
- Craniofacial abnormalities.
- Oncology problems with malnutrition.
- Other clinical conditions that lead to wasting and malnutrition - eg, chronic kidney disease, cystic fibrosis, metabolic problems, chronic infection such as HIV, cardiac disorders, short bowel syndrome and Crohn's disease.

Contra-indications to PEG^[9]

- Absolute contra-indications for use of PEG in adults:
 - Active coagulopathies and thrombocytopenia (platelet count less than $50 \times 10^9/L$) must be corrected before tube insertion.
 - Anything that precludes endoscopy (such as haemodynamic compromise, sepsis or a perforated viscus).
- Absolute contra-indications for using PEG in children are bleeding disorders, severe ascites, peritonitis, pharyngeal or oesophageal obstruction and during periods of acute severe illness^[1].
- Relative contra-indications for use of PEG in adults include acute severe illness, anorexia, previous gastric surgery, peritonitis, ascites, and gastric outlet obstruction.

Cautions^[2]

- Infection: active systemic infection increases the risk of early mortality and morbidity post-PEG placement. Elevation of serum CRP is the most accurate prognostic indicator of poor outcome.

- Other comorbidity: poorer outcome with increased PEG site and systemic infection have been reported in patients with diabetes mellitus, chronic obstructive pulmonary disease and low albumin levels.
- Ventriculo-peritoneal shunts: placement of PEG tubes increases the risk of shunt infection but this risk decreases with increased time between shunt insertion and PEG insertion. Prophylactic antibiotics may further reduce the infection risk.
- Anatomical considerations: in patients with severe kyphoscoliosis, the stomach is often intrathoracic. This particularly applies to patients with cerebral palsy. Radiological and endoscopic approaches may be impossible. A combined laparoscopic and endoscopic approach can be tried but this requires a general anaesthetic, which also represents a considerable risk for the patient.

PEG insertion method^[2]

- In the majority of patients in whom there is an indication for percutaneous enteral tube feeding, an endoscopic gastrostomy is the procedure of choice.
- The treating doctor has a duty to obtain informed consent from competent patients and to undertake adequate consultation with those closest to patients not competent to make the decision^[10].
- PEG tube placement should be carried out under full aseptic technique.
- Antibiotic prophylaxis is indicated to prevent skin site infection.
- In areas of high meticillin-resistant *Staphylococcus aureus* (MRSA) prevalence, oro-pharyngeal colonisation should be identified and managed prior to PEG tube placement.

Children^[1]

- In children, PEG tube insertion is performed under general anaesthesia. A single dose of intravenous antibiotic is given.
- After insertion of the gastroscope into the stomach and a gentle insufflation of air, the most transluminant point of indentation on the anterior abdominal wall is marked.

- After sterilising the skin of the anterior abdominal wall and infiltration of this point with local anaesthesia, a skin incision is made and a trocar with a needle is pushed through into the stomach under complete endoscopic visualisation.
- A thread or a guide wire is inserted through the trocar after removing the needle and this thread is then snared. The endoscope is then withdrawn with the snare holding the thread.
- A suitably sized PEG tube is then connected to the thread and the thread is pulled from the skin incision pulling the tube into the patient's mouth through the oesophagus, to be retained in the stomach by the internal bolster. An external bolster is placed loosely on the skin.
- The position of the inner opening of the tube should be checked by endoscopy.
- In the past, commencing use of the tube has been delayed until 24 hours after insertion. There is now evidence that delaying use of the tube has no advantage over early feeding.

Benefits of PEG feeding

PEG feeding provides valuable access for nutrition in patients with a functional gastrointestinal system. Its high effectiveness, safety and reduced cost underlie increasing worldwide popularity^[11]. Benefits include:

- It is well tolerated (better than nasogastric tubes).
- Nutritional status is improved.
- Ease of usage over other methods (nasogastric or oral feeding) reported by carers.
- Satisfactory use by home carers^[12].
- Low incidence of complications.
- Reduction in aspiration pneumonia associated with swallowing disorders.
- Cost-effective relative to alternative methods, particularly when reasonably long survival is expected.

Management after insertion

- Education of carers and patients is essential to reduce tube problems and complications.
- A number of studies indicate the support and education of patients should be multidisciplinary, involving:
 - Nurses (wound care and ostomy expertise).
 - Dieticians (nutritional advice and support).
- Ongoing care involves:
 - Inspection and maintenance of the access device (see 'Care of PEG tube', below).
 - Wound care advice.
 - Nutritional support and advice.

Care of PEG tube

This routine care can be performed by the patient and/or the carers with suitable training. After about 10 days following insertion asepsis is not required.

- Examine the skin for infection/irritation around the site.
- Note the measuring guide number at the end of the external fixation device.
- Remove the tube from the fixation device and ease away from the abdomen.
- Clean the stoma site with sterile saline.
- Dry the area with gauze.
- Rotate the gastrostomy tube to prevent adherence to sides of the track.
- Re-attach the external fixation device to the abdomen.
- Attach the gastrostomy tube gently to the fixation device and position as before according to the mark/number on the tube.
- Avoid use of bulky dressings.

Complications^[9]

Immediate (within 72 hours)

- Endoscopy-related:
 - Haemorrhage or perforation.
 - Aspiration.
 - Oversedation.
- Procedure-related:
 - Ileus.
 - Pneumoperitoneum.
 - Wound infection.
 - Wound bleeding.
 - Injury to the liver, bowel, or spleen.

Delayed

- Gastric outlet obstruction.
- Buried bumper syndrome (migration of the internal bumper of the PEG tube into the gastric or abdominal wall).
- Dislodged PEG tube.
- Peritonitis.
- Peristomal leakage or infection.
- Skin or gastric ulceration.
- Blocked PEG tube.
- Tube degradation.

- Gastric fistula after removal of the PEG tube.
- Granulation around site of insertion of the PEG tube.

Ethical dilemmas

The incidence of dementia is increasing and maintaining nutritional status can become difficult and expensive as the disease progresses. Patients with dementia often receive feeding tubes when hospitalised for acute illnesses, contrary to their wishes and those of their families.

Research indicates that there is little benefit from aggressive nutritional support with no measurable improvements in life expectancy, weight or reduction in complications (for example, pressure sores and aspiration)^[13].

PEG tubes are often used inappropriately because of unrealistic and inaccurate expectations of what they can achieve^[14]. Feeding tubes have been too often inserted in patients who will not benefit from them and whose quality of life in a terminal stage of illness will be adversely affected. Multidisciplinary care and educational programmes have been found to reduce the numbers of patients receiving feeding tubes inappropriately^[15].

PEG insertion should not be performed for adults for administrative convenience or to save money, time or human resources unless there will be an improvement in the quality of life rather than just maintaining life. However, when used for the care of children, it may be agreed to insert PEG tubes to save time for the caregivers and improve the quality of life for the family as a whole, despite knowing that the underlying disorder (eg, severe cerebral palsy) will not improve^[1].

Some hospitals now have nutrition teams and PEG requests are reviewed by this team and a consultant to assess whether PEG insertion is appropriate.

Prognosis

- There have been few long-term follow-up studies. Clearly the overall mortality rate after PEG insertion is high because of the underlying medical problems^[16].

- A five-year prospective study showed both few complications from the procedure itself and improved nutritional status^[3].

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