Percutaneous Endoscopic Gastrostomy

With Thanks to Prof Stuart Roberts

The Alfred
What is a PEG?

- A PEG is a **P**ercutaneous, **E**ndoscopic **G**astrostomy tube as distinct from a:
  - **R**adiologically **I**nserted **G**astrostomy tube (RIG)
  - Surgical gastrostomy tube

- One of many options for providing enteral feeding:
  - Nasogastric
  - Nasoduodenal/Nasojejunal
  - Endoscopic or radiologically inserted jejunostomy
  - Surgical jejunostomy
  - Cervical pharyngostomy, Oesophagostomy
Why a PEG?

**ORAL NUTRITION:**
- no longer possible
- no longer adequate

**Short-term (unknown duration):**
- no surgery
  - no risk of aspiration: nasogastral tube
  - risk of aspiration: nasojejunal tube

**Long-term (> 2-3 weeks):**
- no surgery
  - no risk of aspiration
    - PEG
    - PEJ/JET-PEG
  - risk of aspiration: NCJ
- surgery

**Prolonged requirement**
Why a PEG?

• The choice of a PEG versus a surgical gastrostomy tube or RIG depends on many factors including\(^1\):
  – Local resources, expertise, and waiting time
  – Anatomical and technical considerations
  – Surgical convenience

Why a PEG

• Comparison between PEG and surgical gastrostomy tubes shows no difference in morbidity and mortality although PEG is less expensive and quicker to insert\(^1\)

• Comparison between PEG and RIG show similar complication rate (10% vs. 13\%)\(^2\)
  – Although PEG’s may be associated with lower rates of infection and peritonitis\(^3\)

1. Stiegemann GV et al. Gastrointest Endosc 1990; 36:1
## Indications (definite)

<table>
<thead>
<tr>
<th>Impaired ability to ingest nutrients:</th>
<th>Impaired absorption of nutrients</th>
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<tbody>
<tr>
<td>Oropharyngeal, oesophageal tumours</td>
<td>Surgical resection/bypass e.g.</td>
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<tr>
<td>Neurological disorders eg cerebrovascular accident, multiple sclerosis, motor neurone disease, trauma, Cerebral Palsy</td>
<td>gastrectomy, small bowel resection</td>
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<td>Malignancy of the gastrointestinal tract e.g. pancreatic cancer</td>
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<td>Inflammatory disorders e.g. Crohn's disease</td>
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<td>Short bowel syndrome</td>
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<td></td>
<td>Gastrointestinal fistulae</td>
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<td>Radiation enteritis</td>
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<td><strong>Swallowing disorders</strong></td>
<td><strong>Increased/specialised nutrition requirements</strong></td>
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<tr>
<td>Oropharyngeal dysphagia eg stroke, neurodegenerative conditions, head and neck cancer</td>
<td>Chronic pulmonary disease eg Cystic Fibrosis</td>
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<td>Chronic renal failure</td>
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<td>Anorexia nervosa</td>
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<td>HIV/AIDS</td>
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<td>Metabolic and haematological disorders</td>
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<td>Trauma</td>
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</table>
Indications (possible)

- Malignancy
- Persistent vegetative state
- HIV/AIDS
- Replace nasoenteric feeding
- Enable transfer to long term facility
- Gastric decompression: gastroparesis, outlet obstruction

Contraindications (absolute)

- Inability to safely perform upper GI endoscopy
  - Obstructing oesophageal tumour or stricture
  - Haemodynamic instability or sepsis
  - Intra-abdominal perforation
  - Active peritonitis
  - Anaesthetic CI
  - Uncorrected coagulopathy

- Marked ascites

- Gastric outlet obstruction (unless for decompression)

- Total gastrectomy

- Gastric malignancy

Contraindications (relative)

- Terminal illness / advanced dementia
- Portal hypertension / gastric varices
- Oesophageal malignancy (seeding risk)
- Partial gastrectomy
- Prior abdominal surgeries (adhesions)
- Hepatomegaly (left lobe), Splenomegaly
- Morbid obesity
- Large hiatus hernia, severe GOR(D)
- Peritoneal dialysis

Mortality/morbidity influence by indication

- Recent study of 1518 Patients with PEG’s inserted over a ten year period
  - Overall 30 day mortality = 7.6%
  - Mortality by disease group
    - Dementia = 23.5%
    - Non head/neck cancer = 18.5%
    - Learning disability = 14%
    - CVA = 12.3%
    - Neurodegenerative disease = 4.4%
    - Head & neck cancer 2.5%

Colby & Burch. Gut 2015
Pre-procedure management

• Informed consent

• Anaesthetic review (if GA required)

• FBE to assess platelet count: should be > 50,000

• Antiplatelet agents
  – Aspirin safe to continue
  – Clopidogrel cease 7D prior (liaise with parent unit re safety)

• Anti-coagulants
  – Warfarin: If indicated switch to low MW heparin
  – Low MW heparin: cease 6-8 hours prior
  – Direct acting oral anticoagulants (Dabigatran, rivaroxaban, apixaban): cease 24 hrs prior in those with normal renal function

• Fasting for at least 8 hours

• Mouth care
Antibiotic prophylaxis

- All patients should receive prophylactic antibiotics to reduce the risk of peri-stomal infection
- Choice of antibiotic depends on MRSA risk:
  - Low MRSA risk
    - IV cephazolin 2 gm 30-60 min pre-procedure
    - IV Clindamycin 900 mg within 60 min of procedure (in those with penicillin or cephalosporin hypersensitivity)
  - High MRSA risk
    - IV ceftriaxone 1 gm 30-60 min pre-procedure
    - IV vancomycin 15 mg/kg (max 2 gm) infused over 60 min

Banerje S et al. Gastrointest Endosc 2008; 67:791
PEG tube types

Initial tubes (bumper)  Replacement tubes (balloon)

Low profile (balloon/bumper)
PEG insertion kit

- Kit contains:
  - +/- local/syringe
  - introducer
  - +/- Prep & drape
  - Guidewire
  - Endoscopic snare
  - Scalpel/scissors
  - PEG
  - External Bumper
  - Connecting ports
PEG Techniques

- Pull vs push technique
- No outcome difference
- Pull
  - Most popular approach
  - Featured in this talk
- Push
  - Popular for radiologic approach
  - Similar to laparoscopic insertion technique
Pull Technique

- Guidewire placed in stomach
- Guidewire brought retrograde through patient’s mouth
- PEG tube pulled through abdominal wall
PEG: Basics

- 2-person team needed with endoscopist plus assistant
- Gastric insufflation to bring stomach in apposition to anterior abdominal wall
- Placement of catheter into gastric lumen
- Passage of guidewire into stomach
- Placement of gastrostomy tube
- Verification of proper position
Patient Preparation

- Monitoring
  - ECG/heart rate
  - Blood Pressure
  - Pulse Oximetry

- Position
  - Supine
  - Lateral Decubitus

- Medications
  - Local pharyngeal anesthesia
    - Lignocaine spray
  - Deep sedation
  - Analgesia
Upper Endoscopy

- Routine flexible upper endoscopy
- *Complete* endoscopy recommended
  - 36% incidence of anomalies
  - Some may affect procedure
  - Aspirate gastric contents
  - Gastric insufflation
Confirm safe position

- Transillumination through skin suggests no other viscera interposed
- Transillumination button ("high beams") on light source
- May be difficult in obesity
  - Can assist with digital pressure
Confirm Position

• Endoscopist watches while assistant indents abdominal wall at proposed insertion

• Should see simultaneous indentation of gastric mucosa

• Failure to see
  – Reassess position
  – Intervening viscera
  – Impossible apposition
  – Inadequate insufflation
Site Preparation

- PEG kit opened after endoscopic confirmation of entry site
- Select anticipated PEG site
  - Entry ~2 cm below costal margin
- Prep left upper quadrant with antiseptic prep of choice and drape
Surgical Technique

• With area prepped and draped, reconfirm insertion site

• Inject local anaesthetic
  – 5 ml 2% lignocaine
  – Skin and SQ
  – Fascia

• Make incision (0.5-1 cm)
Endoscopist

- Retrieves snare, PEG tube from kit

- Advances snare into biopsy channel of endoscope
Initial access

- Insert needle/catheter assembly
- Safe tract technique
  - Continuous aspiration via syringe
  - Return of air without seeing the needle in stomach signifies malposition
  - Remove, retry
Access

- Remove syringe/needle
- Cover catheter to prevent loss of insufflation
- Advance guidewire into stomach
Endoscopist

- After wire passed through catheter, endoscopist uses snare to grasp wire
- Wire advanced
- Snare/wire pulled out of mouth with endoscope as a unit
Endoscopist

- Endoscopist secures PEG tube to mouth end of guidewire
- PEG internal bumper can be snared to allow easy passage of endoscope
- Assembly passed back into stomach
PEG Tube Position

• Guidewire pulled through skin incision
• PEG follows, tract dilated by conical dilator at end of PEG
• Counter traction at skin level with non-dominant hand facilitates passage
PEG Tube Position

- PEG tube advanced
  - Two resistance points
    - GE Junction
    - Final position @ gastric mucosa
- Usually in position when external marker between 2-4 cm at skin level
PEG Tube Position

- Guidewire cut at tapered end of tube
- External bumper applied over tube and slid to skin surface
- Bumpers should prevent movement but not blanch skin
- Relook endoscopy is usually done to confirm no blanching of mucosa
Completion of Procedure

- Snare placed into biopsy channel
- Endoscope removed
- Wound often cleaned with antiseptic prep or antibiotic cream
- Sterile dressing placed around external bolster
- Tube cut to appropriate length
- Adapter secured to cut end of tube
Immediate post-procedure management

- Patient care: rest in bed for 1-2 hrs post anaesthetic
- NPO for 4 hours post-procedure
- Water bolus (50 mls) via syringe hourly through tube for 2 hours
- Assuming water tolerated commence enteral feeding around 6 hours post-placement