Pancreatic surgery, enteral tube feeding & enzymes

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Introduction

- Statistics
- Anatomy
- Surgical treatment
- Enteral feeding
  - PERT
  - Evidence
  - What happens elsewhere
Pancreatic cancer

- 7 in 10 patients do not have any chemotherapy, radiotherapy or surgery
- 1 in 10 patients will go on to have curative surgery
Resectable pancreatic cancer

- **Stage 1A** means that the cancer is smaller than 2cm.
- **Stage 1B** means that the cancer is larger than 2cm – but is still contained in the pancreas.

- **Stage 2A** cancer is larger than 4cm and started to grow outside the pancreas, but **has not** spread to the lymph nodes.
- **Stage 2B** means the cancer **has** spread to nearby lymph nodes.
Anatomy
Unresectable pancreatic cancer – palliative bypass

- **Gastrojejunostomy**
  - The stomach is connected to the small intestines so food can pass through.

- **Hepaticojejunostomy**
  - Remains of bile duct joined to small intestines.
Unresectable pancreatic cancer

Duodenal stent

Biliary stent

Liver

Bile duct

Gallbladder

Biliary stent

Duodenum

Pancreas

Pancreatic duct
Anatomical areas
Whipples/Pylorus Preserving Pancreatico - Duodenectomy (PPPD)

<table>
<thead>
<tr>
<th>Component</th>
<th>Effect/Percentage</th>
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<tbody>
<tr>
<td>Stomach</td>
<td>Delayed gastric emptying 15-40%</td>
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<tr>
<td>Duodenum</td>
<td>Reduced pancreas-stimulating hormones 100%</td>
</tr>
<tr>
<td>Pancreas</td>
<td>Diabetes 20-50%</td>
</tr>
<tr>
<td></td>
<td>PEI ?</td>
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Distal Pancreatectomy

**PEI incidence**
- 16-60% pre-op
- 20-80% post-op

**Varied results:**
- Amount of pancreas removed/remaining
- Testing methods – e.g. fecal elastase, onset of steatorrhea, prescription of enzymes
- Presence of symptoms – malabsorb up to 55g before!
- Variable timescales – pancreatic atrophy later on
Total Pancreatectomy
PEI incidence and malnutrition

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<thead>
<tr>
<th>Procedure</th>
<th>Incidence</th>
<th>References</th>
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Loss of functional parenchyma
- Asynchrony of enzymes
- Oedema/obstruction at anastomosis
- pH differentials

Loss of duodenum:
- Nutrient absorption
- Cholecystokinin secretion
- Bile flow
- Dumping
- Rapid transit

Effects of surgery
- Raised REE
- Increased protein turnover
- Reduced appetite
- Pain, nausea, sickness
- Drains
- Medications
- ?Infection

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Nutrition support - enteral feeding

Enteral feeding - a key route of nutrition support in pancreatic disease:

- Malignant disease -
  - Prior to surgery
  - Following surgery (e.g. FTT)
Enteral feeding

How do we use PERT alongside enteral feeding?

• ESPEN (2006) recommend peptide feeds in pancreatic disease but patients still malabsorb
  
  • Therefore enzyme replacement therapy needed
  • PERT predominantly designed for oral administration
  
  • ...little evidence to support/guide practice...

• Literature
  • International variability - standards, practices, health insurance
  • Different EN formula
  • Different enzyme preparations, inc different doses
  • In-vitro studies
  • CF populations

• Remember... Goal: Right time, right place, right pH
Evidence...

Ferrie (2011) (Australia) -

- Jejunal tubes: Open capsule, crush microspheres (remove coating), activate with Na bicarb 8.4%, flush,
- or, or dissolve uncrushed microspheres in Na bicarb for ~ 20-30 mins, flush
- add directly to enteral feed

However:

- Crushing granules not advised in UK (Handbook of Drug Administration via Enteral Feeding Tubes, 3rd Ed. 2015)
- Time and labour intensive when patients require regular doses
- Unlicensed use
- Reduced enzyme effect with crushing and dissolving/activating

- Gastric tubes: Open capsule, maintain enteric coating, suspend in thickened acidic fluid eg. "nectar consistency fruit juice", administer

However:

- Consistency of fluid is key to avoid blocked tubes
- Tube lumen size: 10 & 12 Fr use low dose enzymes (eg. 5000IU – not in UK, Hollander 2015 recommends no smaller than 16Fr using beads 0.71-1.6mm in Creon 24000u) = varied advice

Microspheres clumping together
Locally

- Change from Creon, dissolved in Na bicarb, flushed 2-4hourly to Pancrex V mixed with water in gastric and jejunal tubes

- Why?
  - Cost
  - Easier
  - Less labour intensive

- Positive feedback from nursing staff!
### Directions:
1. Stop feed
2. Flush tube with water
3. Add prescribed dose of Pancrex V to a pot
4. Add 15mls water
5. Stir to disperse the Pancrex V powder
6. Draw into syringe and administer via feeding tube
7. Add further 15mls water to pot to ensure residual Pancrex V is dispersed
8. Draw into syringe and administer via feeding tube
9. Flush tube with water
10. Restart feed immediately

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<thead>
<tr>
<th>Pancrex V</th>
<th>Lipase (BP units)</th>
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<tbody>
<tr>
<td>½ level 5ml teaspoon</td>
<td>25000</td>
</tr>
<tr>
<td>1 level 5ml teaspoon</td>
<td>50000</td>
</tr>
<tr>
<td>1½ level teaspoons</td>
<td>75000</td>
</tr>
<tr>
<td>2 level 5ml teaspoons</td>
<td>100000</td>
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</tbody>
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<table>
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<tr>
<th>Starting doses:</th>
<th>NG</th>
<th>2tsp = 100 000u</th>
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<tbody>
<tr>
<td>NJ</td>
<td>1½ tsp = 75 000u</td>
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Adding enzymes to feeds

- Used regularly in some centres in pancreatic malignant and benign disease
- Positive results anecdotally:
  - Less diarrhoea/improved frequency
  - No adverse effects
  - Feeds can split (esp Peptisorb)
  - Hanging times
  - Labour intensive – requires good team understanding

- Recorded results: improved wound healing, increased insulin reqs, less hypos, increased GS/weight (Phillips, Berry & Gettle 2018)
Future

- National online survey of using pancreatic enzymes alongside enteral feeds – watch out!
- Novel products/systems:
  - PERT cartridges – not in UK
  - Relizorb (FDA approved) - small plastic cartridge containing lipase, connects to EN giving set, hydrolyses fat as feed infuses
  - 1 cartridge per 500mls
  - Max 2 cartridges in 24 hours
  - Max rate 120mls/hr
  - Not compatible with feeds with soluble fibre
  - Poor results with TwoCal HN

(Phillips, Berry & Gettle 2018)
References


Thank you!
Questions...
Evaluations...
Lunch!