Nutritional Management of Pancreatic Cancer

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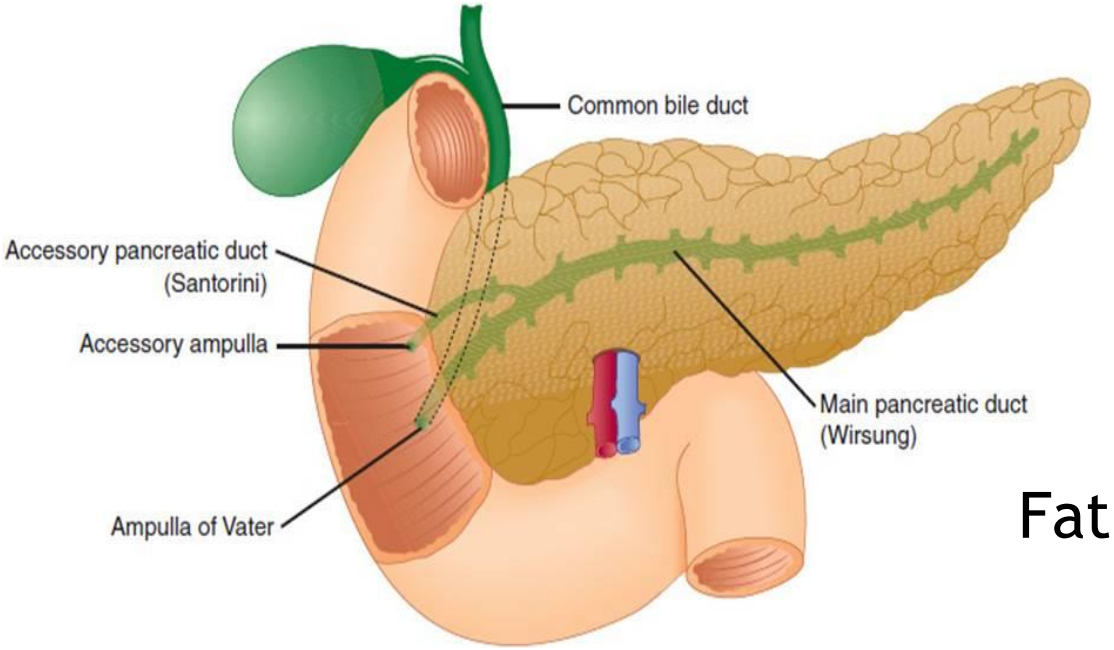
Topics

- Pancreas and its function in digestion
- Pancreatic Enzyme Insufficiency (PEI)
- Prevalence of PEI
- Pancreatic Enzyme Replacement Therapy (PERT)
- Nutritional Management in Pancreatic Cancer

Pancreas and its function in digestion



Endocrine Function (regulates blood glucose)
Beta cells – insulin
Alpha cells – glucagon
Delta Cells - Somatostatin

Fat → Lipases → Fatty Acids

Protein → Proteases → Amino acids &peptides

Carbohydrate → Amylases → Disaccharides

Exocrine Function (secretes digestive enzymes)
Acinar cells – digestive enzymes
Ductal cells - bicarbonate

Pancreatic Enzyme Insufficiency Definition

PEI is defined as a reduction of pancreatic exocrine activity in the intestine at a level that prevents normal digestion

Malabsorption of nutrients → Symptoms, nutritional deficiencies, malnutrition

Over 80% of patients report weight loss at the time of diagnosis

Causes of PEI in pancreatic cancer

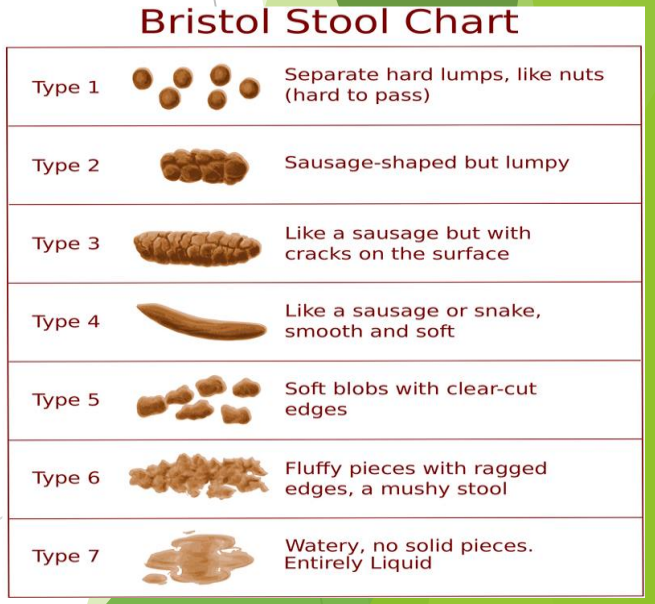
Primary Causes (lack of healthy pancreatic tissue)	Secondary causes (lack of pancreatic stimulation)
Obstruction of the pancreatic duct by a tumour	Abnormal CCK & secretin release
Damage of the exocrine pancreas (in particular pancreatic head)	Changes in intestinal pH following gastric/duodenal resction
Loss of pancreatic tissue following surgery	Asynchrony in the delivery of pancreatic juice following a bypass of the bile duct, pancreas, stomach or duodenum

Symptoms of PEI

Assessment	Symptoms
Abdominal Symptoms	Abdominal pain, bloating, increased wind/flatulence, burping, nausea, reflux, increased frequency/urgency of stools **Steatorrhea - bulky, oily, orange/yellow/chalky, foul smelling, undigested food, stain the toilet bowl, float, difficult to flush**
Endocrine function	Hypoglycaemia Reduced insulin requirements in patients already on insulin therapy Sudden deterioration in glycaemic control in usually well controlled patient
Nutritional Assessment	Unexplained weight loss Weakness/fatigue Sarcopenia & loss of muscle function Restricting fat intake/ overall food restriction
Biochemical disturbances	Fat soluble vitamin deficiency (A, D, E, K) Low serum selenium, zinc, magnesium, potassium, phosphate Osteopenia/osteoporosis

Masking of symptoms:

- Low fat diets
- Medications e.g. opiates/iron replacement



Diagnosis of PEI

- Coefficient of fat absorption
- Breath tests
- Faecal Elastase (FE-1)
- Clinical Symptoms/Imaging & Nutritional Status

Incidence of PEI

- Inoperable pancreatic cancer – 50-100% (Bartel et al (2015).

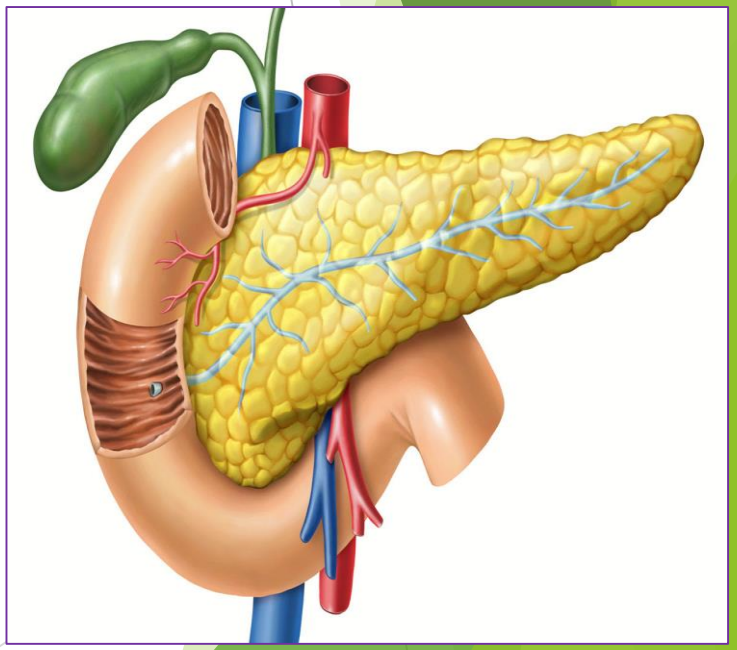
- Operable pancreatic cancer (Philips, 2015)

12% following central pancreatectomy

20% following distal pancreatectomy

20-45% pre-op for head of pancreas tumours

70-98% following pancreatico-duodenectomy



Pancreatic Enzyme Replacement Therapy (PERT)

World J Gastroenterol. 2019 May 28; 25(20): 2430–2441. PMCID: PMC6543241
Published online 2019 May 28. doi: 10.3748/wjg.v25.i20.2430 PMID: 31171887

Contribution of pancreatic enzyme replacement therapy to survival and quality of life in patients with pancreatic exocrine insufficiency

Peter Layer, Nataliya Kashirskaya, and Natalya Gubergrits

ELSEVIER
Pancreatology
Volume 19, Issue 1, January 2019, Pages 114-121

Enzyme replacement improves survival among patients with pancreatic cancer: Results of a population based study

K.J. Roberts [a], C.A. Bannister [b], H. Schrem [c]

ELSEVIER
Pancreatology
Available online 25 May 2021
In Press, Corrected Proof

Pancreatic enzyme replacement therapy in patients with pancreatic cancer: A national prospective study

The RICOCHET Study Group on behalf of the West Midlands Research Collaborative [1, 2]

Who needs PERT?

NICE Guidelines - Pancreatic Cancer in Adults
Offer enteric coated pancreatin with unresctable Cancer
Consider enteric coated pancreatin before and after pancreatic cancer resection

Box 1 Diagnosis of PEI

PEI is highly likely with high benefit from PERT: no further test required as significant benefit from treatments and the negative predictive value of FEL-1 is not strong enough to prevent starting treatment

- Head of pancreas cancer
- Pre-surgery and post-surgery for head of pancreas cancer with or without pylorus preserving operation
- Total pancreatectomy

Starting PERT

- 25,000 units with snacks, 50,000 units with meals
- Provide verbal & written education
- Taken with all meals, snacks, milky drinks and nutritional supplements
- Dose adjustment
- Taken at the beginning of the meal and the dose spread out throughout the meal
- Swallow with a cold drink
- Store below 25 degrees
- Gain consent – all are of porcine origin
- Difficulty swallowing – smaller capsules/opened and mixed with yoghurt/acidic fruit puree

If symptoms still exist

- Assess Compliance
- Assess timing
- Storage – below 25 degrees
- Assess adequacy of dosages
- Prescribe PPI
- Consider changing the brand
- Differential diagnosis: Coeliac, bile acid malabsorption, small bowel bacterial overgrowth, food intolerance , lactase deficiency, infective diarrhoea

Various brands

Creon 10,000,25,000

Nutrizyme 22,000

Pancrex V powder

Pancrease HL capsule

Nutritional Management

- High energy/protein diet
- Food fortification
- Advising a little and often approach to eating and drinking
- Daily multivitamin and mineral supplement and a calcium and Vitamin D supplement
- Low fat diets – not appropriate
- Avoid very high fibre diets
- Nutritional supplements
- Nourishing Drinks
- PERT

Long-term follow-up

	Patients who have undergone curative treatment for malignant disease
Anthropometric and functional assessment	► Body weight ► Grip strength ► Mid-arm muscle circumference as appropriate ► CT scans can be assessed for muscle mass if available ► 6-min walk tests/sit-to-stand function tests if more detailed functional assessment is required ► DXA scans should be carried out every 2 years
Clinical	►Assessment of bowel symptoms: stool frequency, colour ► Presence of abdominal bloating/wind ► Postprandial abdominal pain ► Factors impacting on QoL ► Change in medication (especially opioids and anti-emetic/ anti-diarrhoeal medications) ► Compliance with treatment ► Implementation of lifestyle advice (smoking, alcohol cessation, weight-bearing exercise, sunlight exposure)

(Consensus for the management of pancreatic exocrine insufficiency: UK practical guidelines,2021)

Biochemical Monitoring

Fat soluble vitamin status
Vitamin A, D, E &
Clotting studies (Vitamin K)

Markers of ongoing diarrhoea
Magnesium, Potassium

Bone Profile
Calcium
Phosphate
Parathyroid hormone

- **Aneamia Screen**

Iron studies

Ferritin & CRP

Vitamin B12

Folate

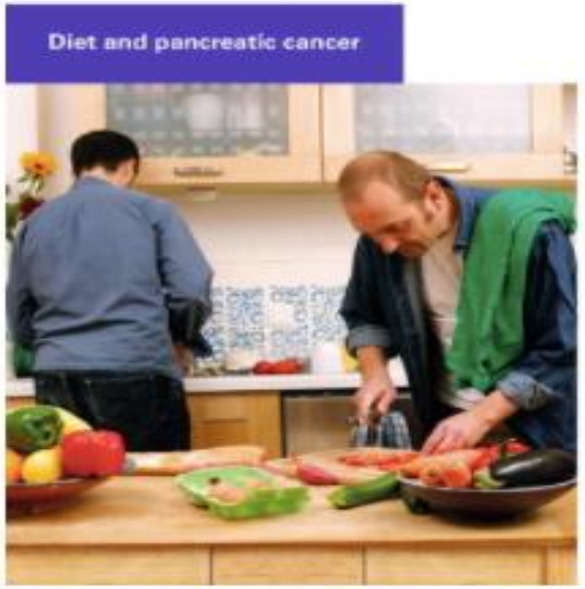
Haemaglobin

Other micronutrients
Zinc, selenium, copper

Glycaemic control
Random glucose
HbA1c

Useful resources

Pancreatic Cancer UK



Pancreatic disease

BMJ Open Gastroenterology

Consensus for the management of pancreatic exocrine insufficiency: UK practical guidelines

Mary E Phillips [1], Andrew D Hopper,[2] John S Leeds [3], Keith J Roberts [4], Laura McGeeney,[5] Sinead N Duggan,[6] Rajesh Kumar[7]