

Diet and Pancreatic Enzyme Replacement Therapy

Anna Burton

Specialist Pancreatic Dietitian

Leeds Teaching Hospital NHS Trust



Leeds Cancer
Centre

Symptoms which affect nutritional status

Patient and carers struggle with the lack of dietary information and support.

(Gooden and White, 2013)

- **Weight loss**

- 80 – 90% patients present with weight loss at time of diagnosis
- 40% exceed 10% unintentional weight loss
- 40% of patients at time of surgery have cancer cachexia (Bachmann et al, 2008)

- Loss of appetite
- Abdominal pain
- Abdominal bloating
- Jaundice
- Maldigestion
- Vomiting
- Taste and smell changes
- Food aversions



Affects quality of life due to reduced functional status.



Causes of weight loss

- Metabolic change mediated by cytokines reduce appetite and increase energy expenditure
- GI Symptoms
- Endocrine insufficiency
- Exocrine insufficiency



Symptoms of fat maldigestion (Steatorrhoea)

- 90% reduction in function before evidence of maldigestion
- Lipase is the most sensitive to a shortage.
- Occur before carbohydrate and Protein maldigestion.
- Absorption occurs in duodenum

Pale
Floating
Difficult to flush
Greasy
Sticky
Large volume stool
Diarrhoea
Foul smelling
Wind and bloating

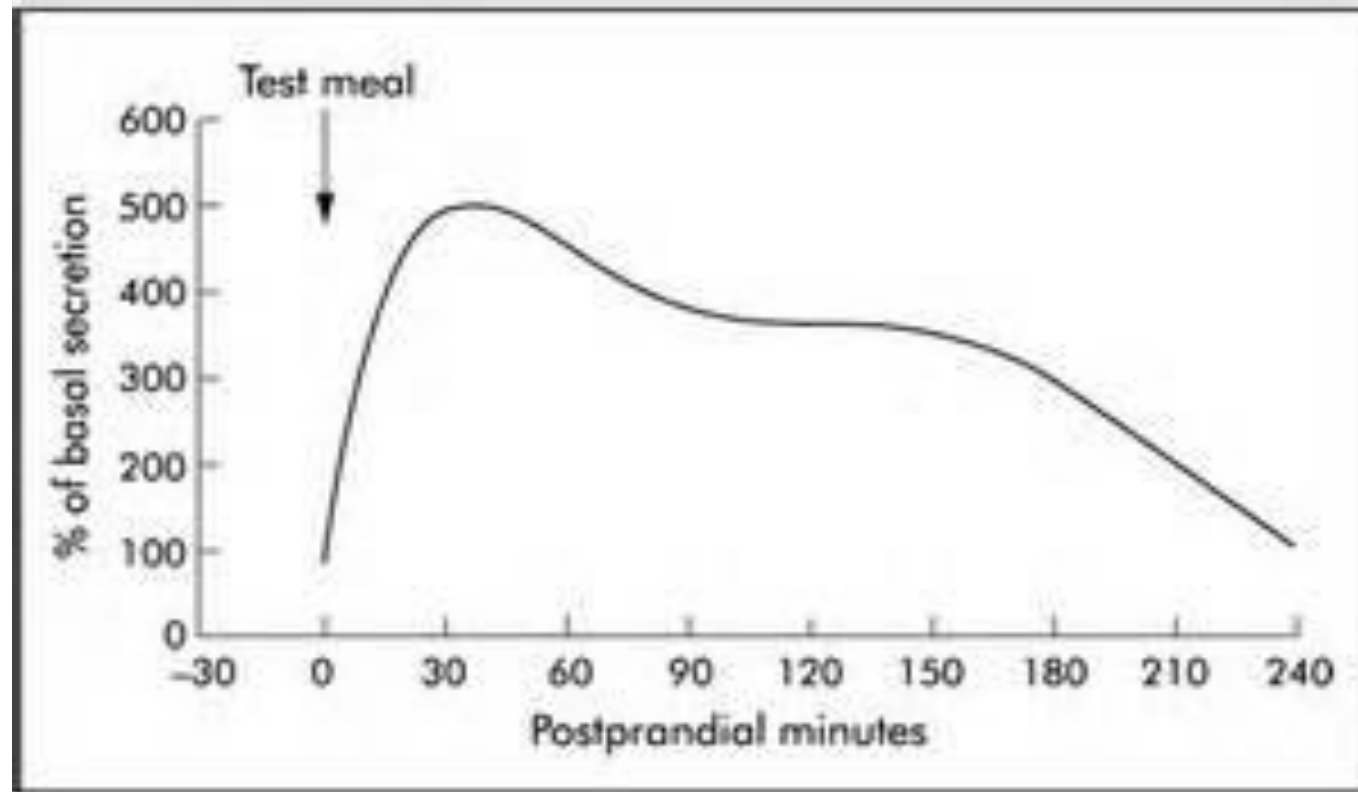


- Normal stool has <7g fat/day
- Severe fat maldigestion > 15g fat/day
- Visible oil in stool indicates 30 – 40g fat/day
- Up to 55g of fat in stool per day without symptoms

Pancreatic enzyme response to a meal

Lipase, amylase, trypsin and chymotrypsin

(Taken from Keller and Layer, 2005)



Lipase secretion rates

(Adapted from Keller and Layer 2005)

	Interdigestive	Maximal	2 hours postprandial
U/min	1000	3000 – 6000	2000 – 4000
U/hour	60 000	180 000 – 360 000	120 000 – 240 000



Preparations

Manufacturer	Product name	Lipase /U	Enteric coated
Abbott (Mylan)	Creon 10 000	10 000	Yes
	Creon 25 000	25 000	Yes
	Creon 40 000	40 000	Yes
	Creon micro	5000/g	gastro resistant granules
Merck	Nutrizym 22	22 000	Yes - minitables
Janssen - Cilag	Pancrease HL	25 000	Yes - minitables
Essential	Pancrex granules	5000 /g	No
	Pancrex V capsules	8000	No
	Pancrex V 125 capsules	2950	No
	Pancrex V Forte tablets	5600	Yes
	Pancrex V Powder	25 000/g	No
	Pancrex V tablet	1900	Yes

Pancreatic enzyme replacement therapy (PERT)

- Source: pigs pancreas (allergy and religion)
- Gelatine capsule containing enteric coated granules
- Temperature and ph sensitive
- No clear maximum treatment guidelines
 - 400 000 units of lipase per day
 - 10 000 units per kg/day
 - 5000 – 4000 IU lipase per g fat



• Lowest effective dose

Right time, right place..... Right ph

- **Goal..... enough active enzymes in the duodenum with food**
- 80 000 with a meal and 40 000 with a snack/nutritious fluids/supplements
- Adjust to fat content of meal
- Take before, during and at the end of a meal (Dominguez-Munoz, 2013)
- Small amount of cold liquid
- Take capsules whole (do not sprinkle on food, crush or chew)
- If need to open – mix microspheres with acid fruit puree
- Omit enzyme with small portions of fat free foods/fluids
- Varies from patient to patient:
 - Functional pancreatic tissue
 - Differing amounts of fat in the diet
- **Side effects** – Flatulence, abdominal bloating, nausea, mouth ulcers, anal irritation
- Constipation ?due to improved digestion.
- Fibrosing colonopathy (50 000 U lipase/kg/body weight)



Unresolved symptoms

- Check compliance and understanding
- “sounds like a lot”
- ? Is dose sufficient
- Add PPI (lipase active ph 5.5)
- Fat content of diet and MCT
- Anti diarrheal agent
- Difficult to normalize fat digestion
- Consider other causes: small bowel bacterial overgrowth, bile salt malabsorption, coeliac disease (Bustillo et al 2009)



Nutritional support

Nutritional assessment and advice

- No fat restriction
- Little and often
- High protein and high kcal
- Food fortification
- Nutritious fluids
- Oral nutritional supplements (Colomer et al 2007 & Bauer et al 2005)



Improving nutritional status

- Manage symptoms
- Treat pancreatic exocrine and endocrine insufficiency
- Provide nutritional support
- Correct micronutrient deficiency (Vitamin A, E, D, K, selenium, copper, zinc, magnesium, Iron, folic acid)
- Treat pain – effect on mobility
- Exercise – lean body mass (Fearon, 2014)



Chemotherapy



Quality
of
Life



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References

- Bachmann et al (2008) Cachexia worsens prognosis in patients with resectable pancreatic cancer. *J Gastrointest Surg* 12 1193-1201.
- Bauer and Capra (2005) Compliance with nutritional prescription improves outcomes in patients with unresectable pancreatic cancer. *Clinical Nutrition* 24 (6) 998-1004
- Bustillo et al (2009) Small intestine bacterial overgrowth: an underdiagnosed cause of diarrhoea in patients with pancreatic cancer. *JOP* 4. 10 (5) 576 -8
- Colomer et al (2007) N3 fatty acids, cancer and cachexia: a systematic review of the literature. *Br J Nutr* 97 (5) 823-831
- Dominguez-Munoz (2011) Pancreatic exocrine insufficiency: diagnosis and treatment. *J Gastroenterology Hepatol* March 26 Suppl 2:12-6
- Gooden and White (2013) Pancreatic cancer and supportive care — pancreatic exocrine insufficiency impacts on QOL. *Support Care Cancer* 21 1835-1841
- Hardt et al (2008) Is pancreatic diabetes (type 3c diabetes) under diagnosed and misdiagnosed? *Diabetes Care* (31) 2 5165-5169
- Keller J and Layer P (2005) Human pancreatic exocrine response to nutrients in health and disease. *Gut*; 54.

