PANCREAS CANCER ACADEMY

Pancreatic Cancer Academy

Nutritional Aspects in Pancreatic Cancer Patients

Andrea Davis,

Specialist Dietitian at Cancer Nutrition

Friday 29th November 2019

Vienna

CECOG ACADEMY

PANCREAS CANCER ACADEMY

CECOG ACADEMY

Declaration of conflict of interest:

I have no commercial disclosure

CECOG ACADEMY

Overview

- Nutrition and pancreatic cancer
  - Nutritional risk factors
  - Malnutrition
  - Nutritional assessment
- Nutritional management:
  - Pancreatic enzyme replacement therapy
  - Diabetes management
  - Nutrition support
  - Late effects of cancer treatment

CECOG ACADEMY

Nutritional risk factors

- There is **STRONG** evidence that being overweight or obese **INCREASES** the risk of pancreatic cancer (increases by 10% per 5 unit rise in BMI)

- There is **SOME** evidence that these factors **INCREASE** the risk of pancreatic cancer:

- red meat (increases by 29% per 120g/day of red meat in men)
- processed meat (17% increased risk per 50g per day)
- foods containing saturated fatty acids (11% increased risk per 10g saturated fat per day)
- alcoholic drinks (>3 drinks per day)
- foods and beverages containing fructose (increases by 22% per 25g/day of fructose)

(World Cancer Research Fund International 2012)

CECOG ACADEMY

Why is good nutrition important?

- Reduces the risk of developing cancer
- Maintain the body's store of nutrients
- Maintain weight
- Maintain strength & energy
- Prevent or reverse nutritional deficiencies
- Maximize quality of life
- Helps the immune system to function more effectively
- Improves tolerance to cancer treatments & their related side-effects
- After cancer treatment, it helps reduce the risk of new cancers and other diseases

CECOG ACADEMY

Malnutrition

- ‘A state of nutrition where a deficiency or imbalance of energy, protein and other nutrients causes measurable adverse effects on tissue/body form, function and clinical outcome’.

- Malnourished if:

– Body mass index <18.5 kg/m2

– Unintentional 10% weight loss in last 3-6 months

– Body mass index <20 kg/m2 with weight loss > 5% in last 3-6 months

(NICE guidance CG 32 Nutrition Support in Adults)

- Cachexia associated with a reduced QOL, reduced survival and treatment failure in pancreatic cancer (Ozola et al, 2015)

CECOG ACADEMY

Malnutrition

- Pancreatic cancer and its treatments including surgery can result in malnutrition.

- **80-85%** of patients with pancreatic cancer are thought to be malnourished (Okusaka et al. 1998, Bachman 2009, Ronga et al. 2014)

- **1 in 3 patients have lost >10% of body weight at diagnosis** (Davidson et al, 2004)

CECOG ACADEMY

Nutritional Screening

- Nutritional screening tools should be used to identify patients at risk of malnutrition (e.g. Malnutrition Universal Screening Tool)

- Assessment within 24 hours of admission and weekly after. Can be adapted for clinic settings.

➢ **Ideally, 100% of pancreatic cancer patients should be referred to a specialist dietitian for assessment.**

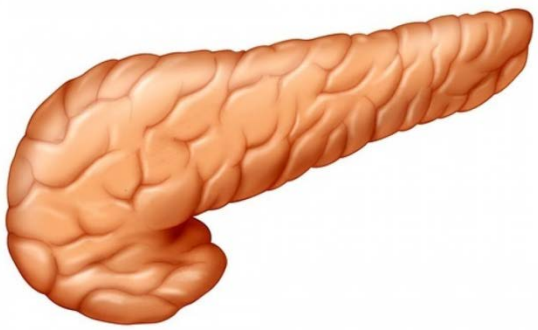
CECOG ACADEMY

The Pancreas and Nutrition

The pancreas is an elongated gland located behind the stomach which contains 2 types of tissue:

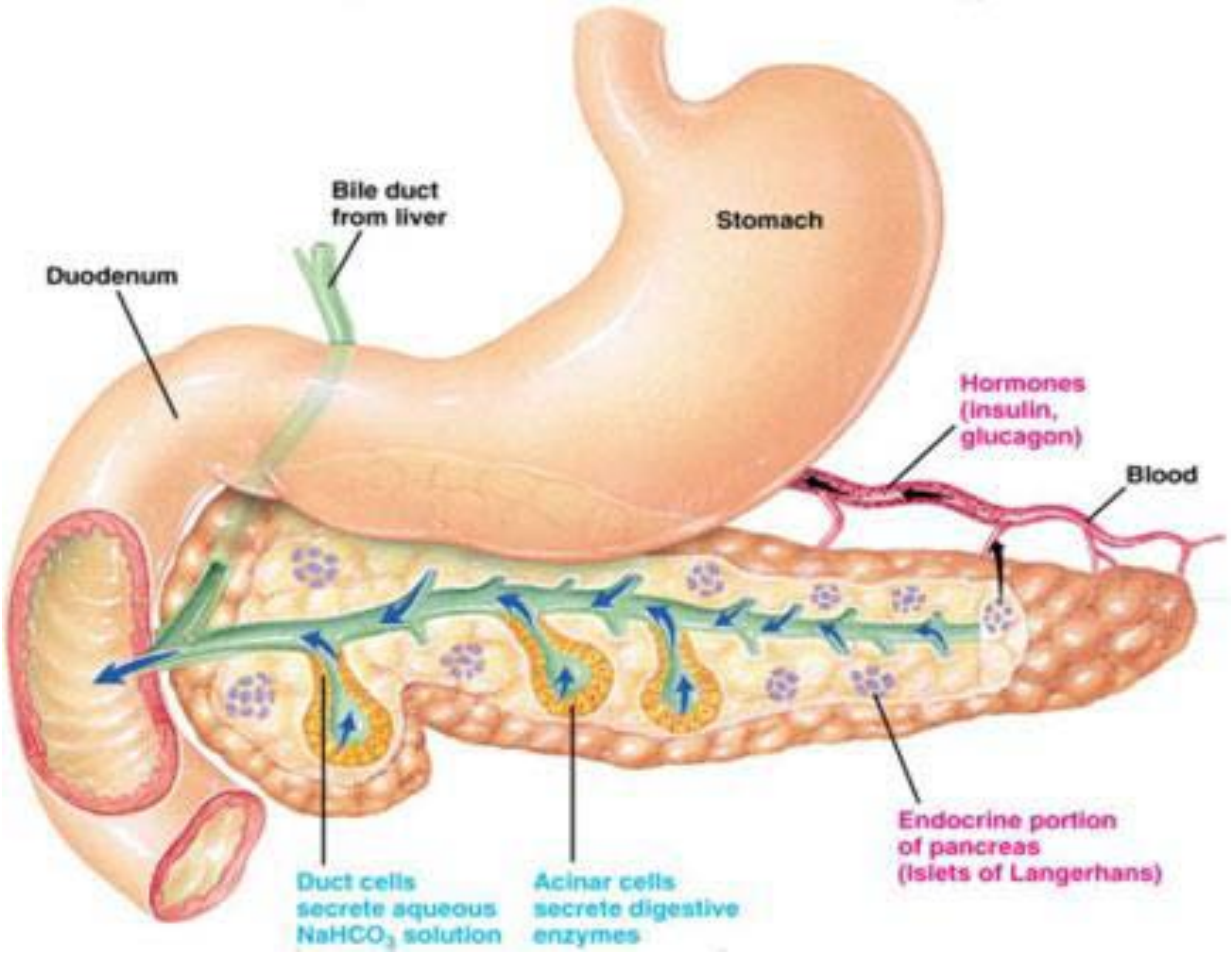
- Exocrine tissue: produces digestive enzymes that are secreted into the small intestine
- Endocrine tissue: produces hormones insulin and glucagon which manage our blood glucose levels

- Over 95% of pancreatic cancers are adenocarcinomas of the exocrine pancreas.



CECOG ACADEMY

The Pancreas and Nutrition



Function:

- Exocrine: pancreatic enzymes, sodium bicarbonate and fluid (1.2-1.5L)
- Endocrine: insulin and glucagon

Pancreatic enzyme insufficiency (PEI)

- Defined as the condition in which the amount of secreted pancreatic enzymes is insufficient to maintain normal digestion

- **Affects 80–90% of patients with pancreatic cancer** (Keller & Layer 2005)
- Affects 55-100% of patients following pancreatic head resection (Keller & Layer 2005, Jang et al 2002, Yusua et al 2012)
- Affects 19-80% of patients following distal pancreatectomy (Ianono et al 2013, Belyave 2013, Yusua et al 2012)

❖ Results in malnutrition!!

CECOG ACADEMY

Causes of PEI

- Tumour location affecting flow or production of digestive enzymes:
  - Mass in head of pancreas, ampullary tumour, dilated pancreatic duct, duodenal tumour

- Lack of pancreatic stimulation
  - Gastric resection, duodenal resection

- Surgery
  - Pancreatectoduodenectomy (Whipple's procedure), pancreatectomy (total or partial), palliative by-pass surgery

CECOG ACADEMY

Diagnosis of PEI

- Underdiagnosed and under-treated
- Mild to moderate PEI have a non-specific presentation
- Classic symptoms appear in severe PEI so consider PEI before steatorrhoea develops
- A pragmatic diagnostic approach combines symptoms, risk factors, nutritional assessment and measurement of faecal elastase level
- Pancreatic imaging helpful to diagnose PEI

CECOG ACADEMY

Faecal Elastase Test

- Elastase is a pancreatic enzyme that is highly stable during passage through the GI tract
- Requires a single stool sample
- Measures the amount of elastase enzyme that is left in the stool

- Sensitivity 77-100%
- Specificity ~93%

*Compromised in patients with small bowel disease or Type 1 diabetes

*Risk of false positive result in diarrhoea and other intestinal disorders

- Cheap, non-invasive and becoming more prevalent in clinical practice

CECOG ACADEMY

Faecal Elastase Level

>200ug/g : No PEI

<200ug/g : Mild PEI

<100ug/g : Severe PEI

- Test not affected by PERT
- Highly sensitive to detect mod-severe PEI
- Not accurate on watery stools

Symptoms of PEI

- Pale, loose floating stools (steatorrhoea)
- Difficult to flush/ offensive smelling stools
- Yellow or orange colour stools/ oily
- Wind
- Bloating
- Abdominal gurgling
- Abdominal pain or cramps
- Nausea
- Vitamin deficiencies
- Unintentional weight loss
- Low bone mineral density

However… these symptoms can often be masked by other medications and self imposed fat restrictions

CECOG ACADEMY

Symptoms of PEI

- Initially presents with bloating, wind, abdominal discomfort and diarrhoea (Lohr et al. 2017)
- Steatorrhoea and weight loss develop late in PEI when pancreatic lipase is <10% (DiMagno et al. 1973)
- PEI can cause reduced survival in patients with pancreatic cancer (Partelli et al. 2012)

CECOG ACADEMY

Pancreatic Enzyme Replacement Therapy (PERT)

- Digestive enzymes made from a pig's pancreas
- Used to treat PEI
- Started on diagnosis of pancreatic cancer and may also be needed after surgery (can check faecal elastase level)

Minimum starting dose for pancreatic cancer and after surgery:

- 75,000 units with meals
- 50,000 units with snacks
- And PPI (due to reduced production of bicarbonate)

(Dominguoz-Munoz 2018)

CECOG ACADEMY

PERT

- PERT helps to improve:

- absorption of macro and micronutrients
- symptoms
- nutritional status
- quality of life
- tolerance to treatment
- survival

(Bruno et al 1998, Davidson et al 2004, Domínguez-Muñoz JE et al. 2018)

- In patients with unresectable pancreatic cancer and significant weight loss at diagnosis (>10% bodyweight within 6 months), **PERT was associated with longer survival** (Domínguez-Muñoz JE et al. 2018)

CECOG ACADEMY

PERT

- Examples include Creon, Nutrizym, Pancrex, Pancrease HL (capsules or granules)
- Should be taken at the start of or during meals and snacks

CECOG ACADEMY

Monitoring

Any improvement in symptoms and weight?

If not, consider:

- Storage, timing, brand of PERT
- Need to increase dose further?
- Need a proton pump inhibitor?
- **If constipated, start laxatives rather than decreasing PERT dose**

- **If ongoing symptoms and on high dose of PERT, consider other causes such as bacterial overgrowth, bile acid malabsorption, Abx related diarrhoea, treatment related diarrhoea, IBS, IBD, coeliac, lactase deficiency, dumping syndrome**

CECOG ACADEMY

Type 3c diabetes

- **Can be a consequence of surgery or disease:**

– Total pancreatectomy (100%)

– Whipples (18%)

– Distal pancreatectomy (31%)

(Burkhart et al, 2015)

- Pancreatic exocrine insufficiency may mask diabetes

- Check for symptoms e.g. excessive thirst/urination, failure to gain weight despite good oral intake and adequate PERT dose

CECOG ACADEMY

Diabetes Management

- Typical healthy eating messages do not apply
- Blood glucose levels can be managed by medications rather than over-restricting dietary intake

Blood glucose levels may rise as PERT doses increase!

CECOG ACADEMY

Nutrition Support

- **Oral nutrition support** (food first approach, if gut is working)

- **Enteral nutrition:**

- Nasogastric feeding (take PERT orally if possible)
- Naso-jejunal feeding (if gastric outlet obstruction, PERT via feeding tube)

- **Total parenteral nutrition** (via the bloodstream, high infection risk)

- Inadequate or unsafe oral and/or enteral nutritional intake
- A non-functional, inaccessible or perforated gastrointestinal tract)

CECOG ACADEMY

Managing long term effects of cancer treatment

CECOG ACADEMY

Small Intestinal Bacterial Overgrowth:

- The presence of excessive bacteria in the small bowel

- Affects ~10% of the normal population
- Higher incidence likely in cancer patients:
- occurs in 25% of patients during the acute phase of radiotherapy
- a cause of diarrhoea in up to 15% of patients after radiotherapy.
- 10–15% patients with negative tests still have SIBO.

(Guidance: The Practical Management of the Gastrointestinal Symptoms of Pelvic Radiation Disease, 2014)

Symptoms:

- Abdominal discomfort, bloating, diarrhoea, malabsorption, nausea

CECOG ACADEMY

Risk factors for SIBO

- Long term use of narcotics
- PPIs (proton pump inhibitors)
- Previous upper GI surgery
- Previous radiotherapy to abdomen or pelvis (can disrupt bowel contraction patterns)
- Small intestinal motility disorders
- Ileocaecal valve resection
- Immunodeficiency syndromes or reduced immune system (during and after chemotherapy)
- Diabetes and other diseases eg. Jejunal diverticulosis, scleroderma, chronic pancreatitis, Crohn's disease.

CECOG ACADEMY

Small Intestinal Bacterial Overgrowth:

- Diagnosed using Hydrogen Breath test
- Methane breath test for patients with constipation (may get false negative with Hydrogen breath test)

- Treatment with antibiotics

- Benefit of probiotics after to reduce the risk of recurrence?
- Benefit of elemental/low FODMAP diet?

(Andreyev HJN et al. 2016)

CECOG ACADEMY

Bile Acid Malabsorption (BAM)

- A defect in the enterohepatic circulation of bile acids.
- Loose, watery, urgent diarrhoea (sometimes green)
- Diagnosed using a SeHCAT scan
- Trial of bile acid sequestrant (Colestyramine/Colesvelam)
- Dietary fat restriction/anti-diarrhoeal medication (Mild BAM)

(Watson et al. 2015, Andreyev HJN et al. 2016)

CECOG ACADEMY

Treatment of BAM

Treatment:

Options include:

1. Dietary fat reduction
2. Anti-diarrhoeal medication
3. Bile acid sequestrant

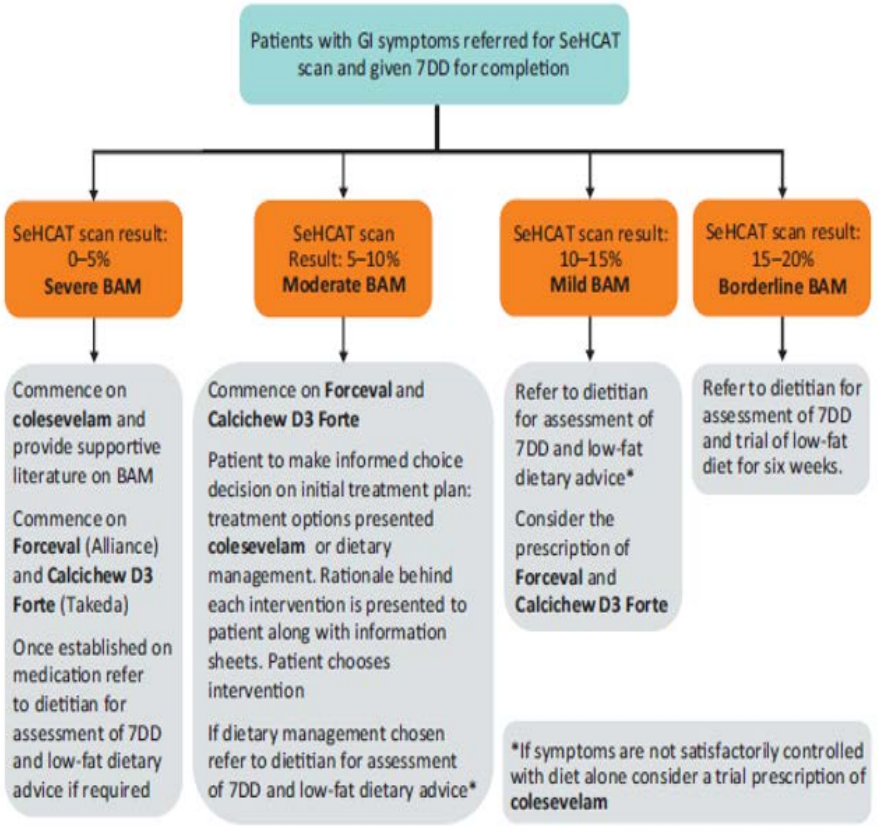


Fig 1. Algorithm for the management of suspected BAM. 7DD = 7-day dietary diary; BAM = bile acid malabsorption; GI = gastrointestinal; SeHCAT = ^{75}selenium homocholic acid taurine.

CECOG ACADEMY

Risk Factors for BAM

- Pancreatic enzyme insufficiency
- High dose chemotherapy
- Pelvic radiotherapy
- Upper GI resectional surgery including ileal disease/resection (common after Whipple's resection)
- Pancreatic disease
- Crohn's or coeliac disease
- Colecystectomy
- SIBO
- Idiopathic

(Guidance: The Practical Management of the Gastrointestinal Symptoms of Pelvic Radiation Disease, 2014, Barkun et al. 2013. Bile acid malabsorption in chronic diarrhea: Pathophysiology and treatment, Can J Gastroenterol Vol 27 No 11)

CECOG ACADEMY

Dumping Syndrome

- Small bowel distension, abdominal cramps, osmotic diarrhoea, bloating, nausea, dizziness or headache

- Manage with little and often meal pattern, avoiding very sugary foods and having lower glycaemic index carbohydrates

If in doubt refer to gastroenterology!

CECOG ACADEMY

References

Andreyev HJN, Norma AR, Oates J, Cunningham D. Why do patients with weight loss have a worse outcome when undergoing chemotherapy for gastrointestinal malignancies? Eur J Cancer. 1998;34:503–509

Andreyev HJN, Muls A., Shaw C. et al Guide to managing persistent upper gastrointestinal symptoms during and after treatment for cancer Frontline Gastroenterology 2016 0: 1-19

Bachmann J., Ketterer K., Marsch C. et al Pancreatic cancer related cachexia: influence on metabolism and correlation to weight loss and pulmonary function BMC Cancer 2009; 9 255

Bruno MJ, Haverkort EB, Tijssen GP, et al. Placebo controlled trial of enteric coated pancreatin microsphere treatment in patients with unresectable cancer of the pancreatic head region. Gut1998;42:92-6

Burkhart R., Gerber S., Tholey R. et al Incidence and Severity of Pancreatogenic Diabetes After Pancreatic Resection Journal of Gastrointestinal Surgery 2015 19: 217-25

Davidson W., Ash S., Capra S. et al on behalf of the Cancer Cachexia Study Group. Weight stabilisation is associated with improved survival duration and quality of life in unresectable pancreatic cancer Clinical Nutrition 23: 239-47

DiMagno EP, Go VL, Summerskill WH. Relations between pancreatic enzyme outputs and malabsorption in severe pancreatic insufficiency. N Engl J Med. 1973 Apr 19;288(16):813-5.

Dominguez-Munoz J. Pancreatic Enzyme Therapy for Pancreatic Exocrine Insufficiency Gastroenterology & Hepatology 2011: 7(6) 401-3 • ESPEN, ESPEN guidelines on enteral nutrition: Pancreas 2006

Domínguez-Muñoz JE, Nieto-Garcia L, López-Díaz J, Lariño-Noia J, Abdulkader I, Iglesias-Garcia J. Impact of the treatment of pancreatic exocrine insufficiency on survival of patients with unresectable pancreatic cancer: a retrospective analysis. *BMC Cancer*. 2018;18:534. doi:10.1186/s12885-018-4439-x.

References

ESPEN Guidelines on Enteral Nutrition: Surgery including organ transplantation. Weimann A, Braga M, Harsanyi L, Laviano A, Ljungqvist O, Soeters P, DGEM (German Society for Nutritional Medicine)., Jauch KW, Kemen M, Hiesmayr JM, Horbach T, Kuse ER, Vestweber KH, ESPEN (European Society for Parenteral and Enteral Nutrition).
Clin Nutr. 2006 Apr; 25(2):224-44

Keller J, Layer P Human Pancreatic exocrine response to nutrients in health and disease Gut 2005 54vi1-vi28

Lohr et al. 2017. United European Gastroenterology evidencebased guidelines for the diagnosis and therapy of chronic pancreatitis. United European Gastroenterology Journal 2017, Vol. 5(2) 153–199

Perinel J[1], Mariette C, Dousset B, Sielezneff I, Gainant A, Mabrut JY, Bin-Dorel S, Bechwaty ME, Delaunay D, Bernard L, Sauvanet A, Pocard M, Buc E, Adham M. Early Enteral Versus Total Parenteral Nutrition in Patients Undergoing Pancreaticoduodenectomy: A Randomized Multicenter Controlled Trial (Nutri-DPC). Ann Surg. 2016 Nov;264(5):731-737

Prado CM, Baracos VE, McCargar LJ et al. Sarcopenia as a determinant of chemotherapy toxicity and time to tumor progression in metastatic breast cancer patients receiving capecitabine treatment. Clinical Cancer Research 2009; 15(8) 2920-6

Pancreatic Section of the British Society of Gastroenterology, Pancreatic Society of Great Britain and Ireland, Association of Upper Gastrointestinal Surgeons of Great Britain and Ireland, Royal College of Pathologists, Special Interest Group for Gastro-Intestinal Radiology Guidelines for the management of patients with pancreatic cancer periampullary and ampullary carcinomas Gut 2005;54 v1-v16

Partelli S., Frulloni L., Minniti C., Bassi C., Barugola G., Dónofrio M., Crippa S., Falconi M. Faecal elastase-1 is an independent predictor of survival in advanced pancreatic cancer. Dig. Liver Dis. 2012;44:945–951. doi: 10.1016/j.dld.2012.05.017.

CECOG ACADEMY

References

Ronga I., GallucciF., Riccardi F., Uomo G. Anorexia-cachexia syndrome in pancreatic cancer: recent advances and new pharmacological approach Adv Med Sci 2014; 1 1-6

Watson L., et al Management of bile acid malabsorption using low-fat dietary interventions: A useful strategy applicable to some patients with diarrhoea-predominant irritable bowel syndrome? Clinical Medicine 2015 15: (6) 536-540

World Cancer Research Fund/American Institute for Cancer Research. Continuous update projectexpert report 2018. Diet, nutrition, physical activity and pancreatic cancer. Available at dietandcancerreport.org

Yusua Y., Murakami Y., Nakamura H et al. Histological loss of pancreatic exocrine cells correlates with pancreatic exocrine function after pancreatic surgery. Pancreas 2012; 41 928-33

CECOG ACADEMY

Thank you for listening….

Any questions?

CECOG ACADEMY