Nutritional Management of Pancreatic Cancer

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Learning outcomes

- Background – Incidence, survival, risk factors, symptoms of pancreatic cancer and treatment options
- Nutritional problems associated with Pancreatic Cancer
- How to address nutritional problems
- Case studies

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Poll Question 1

Have you been involved in the Dietetic care of a patient with pancreatic cancer?

YES

NO

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Incidence and Survival

- 5-15% the five year survival globally (Allemani *et al.* 2018).
- NI Cancer Registry (2013) projects that by 2035, there will be a 76% increase in incidence in males and a 108% increased incidence for females

Risk Factors

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Screening and Diagnosis

- Lifetime risk of pancreatic cancer around 1%, population-based screening would not be cost effective and is not recommended (Del Chiaro *et al.* 2014, Poley *et al.* 2009).

- Pancreatic adenocarcinoma has often spread beyond the pancreas by the time it is diagnosed, the majority of tumors originating in the head (60-70%) and the remainder found in equal proportions in the body and tail (Zeni *et al.* 2014).

- Pancreatic head tumors are often detected earlier than those in the body or tail and are therefore associated with increased survival rates (Birnbaum *et al*. 2019).

- Importance to promote awareness of the symptoms of pancreatic cancer to the public and GP's due to the non-specific and often late presentation of the disease

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Staging

- Pancreatic cancer is staged according to the American Joint Committee on Cancer Staging Manual, the 8th edition was published in 2018 revising the tumour/node/metastasis (TNM) system (Chun *et al.* 2018).
- T classification: classifies the size of the tumour
- N classification: classifies the number of nodes
  - N0 (0 metastatic lymph nodes)
  - N1 (1 -3 metastatic lymph nodes)
  - N2 (4 or more metastatic lymph nodes)
- M classification: number of metastatic sites

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Management of Pancreatic Cancer

- **Surgery**

20% 5 year survival with surgery (Hartwig *et al.* 2013)

- **Neo-adjuvant chemo / chemo-radiotherapy (prior to surgery)**

Median overall survival of 18.8 months in the neo-adjuvant group and 14.8 months in the surgery first group (Van Tienhoven *et al*. 2018)

- **Adjuvant chemo (after surgery)**

5 year survival rate of 20.7% with chemo *vs* 10.4% without (Neoptolemos *et al.* 2010)

- **Palliative chemo**

When comparing palliative chemos Folfirinox and Gemcitabine, median overall survival of 11.1 months with Folfirinox and 6.8months with Gemcitabine (Conroy *et al.* 2011).

- **Supportive care**

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Aims of Nutritional Management

- Early intervention
- Management of treatment side effects
- Improve / maintain quality of life
- Management of symptoms of malabsorption
- Improving nutritional intake / minimising weight loss
- Reasonable glycaemic control (where endocrine dysfunction occurs)
- Support for patient and carers

(PENG A Pocket Guide To Clinical Nutrition, 2018)

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Malnutrition and Pancreatic Cancer

- More than 80% of those with pancreatic cancer have significant weight loss at diagnosis and over time develop severe cachexia (Bye *et al.* 2016).
- Cachexia is associated with reduced quality of life, poorer treatment tolerance and decreased survival (*Zalite et al.* 2015).
- Management primarily: high energy and protein diet, food fortification and oral nutritional supplements

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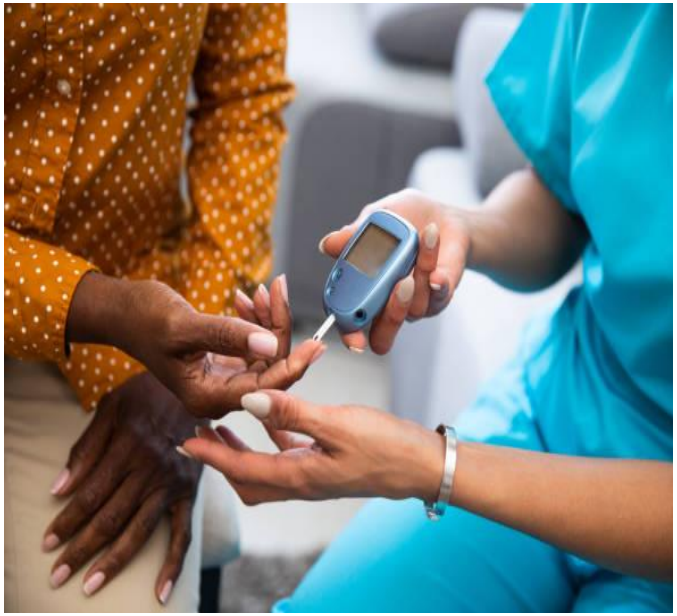
Type 3C Diabetes and pancreatic cancer

Diabetes due to impairment in pancreatic endocrine function, caused by pancreatic exocrine damage.



- Hyperglycaemia pre-treatment will create problems
- Generally more relaxed blood glucose targets
- Identify sources of simple sugars in the diet
- Avoid over-restriction of diet
- Refer back to Diabetes Team / Diabetes Specialist Nurses to review pharmacological management

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Pancreatic Exocrine Insufficiency and Pancreatic Cancer

Pancreatic exocrine insufficiency is defined as a reduction of pancreatic exocrine activity in the intestine at a level that prevents normal digestion. (Hoffmeister *et al.* 2015, Toouli *et al.* 2010).

Enzyme	Role
Amylase	Digestion of carbohydrate
Protease	Digestion of protein
Lipase	Digestion of fats

Deficiency in these enzymes causes steatorrhoea, nausea, diarrhoea, post-prandial abdominal pain and bloating, weight loss, vitamin deficienices and hypoglycaemia (if Diabetic).

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When to Start Pancreatic Enzyme Replacement Therapy (PERT) for Pancreatic Cancer

- Any patient with a diagnosis of unresectable pancreatic cancer

(NICE, 2018)

- Any patient with a diagnosis of pancreatic head cancer
- Pre surgery for pancreatic head cancer
- Pre total pancreatectomy
- In patients with cancer of the pancreatic body or tail, in the presence of steatorrhoea or malabsorptive symptoms

(Phillips *et al.* 2021)

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How to Take and Store Enzymes…

- **Stagger capsules throughout meals**
- **Store enzymes below 25 degrees Celsius**
- **Avoid taking with hot drinks or storing in warm environments** (heat denatures the enzymes)
- **Avoid chewing capsules / opening capsules and sprinkling over food** – enzymes can erode the soft tissue and cause mouth ulcers
- **In the presence of swallowing difficulties** – capsules can be opened, and enzymes mixed with acidic food e.g. fruit puree, yoghurt, mashed banana, jam or tomato ketchup. Mouth must be rinsed after with water.
- May require more enzymes with a longer meal / additional courses

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When to Take Enzymes

	Starting dose (units of lipase)
Meals	50,000-75,000
Snacks	25,000-50,000
Additional courses	25,000-50,000
Sip feeds	50,000



Enzymes are required with:

- All meals
- Most Snacks
- Supplement drinks
- Milky/ creamy drinks

Enzymes are not required with:

- Small portions of fruit or veg
- Fizzy drinks / squash / drinks with a dash of milk
- Sugary sweets e.g. jellies / boiled sweets

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How to Monitor Enzymes

Starting dose 50,000-75,000 units with meals, 25-50,000 units with snacks

Increase dose (can double dose)

Request Proton-pump inhibitor to be started

Consider other causes of malabsorption / alternative product

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Other Nutritional Problems

Issue	Management
Delayed gastric emptying	Pro-kinetics as per medical team, good glycaemic control, small frequent meals / snacks / nutritional supplements
Gastric outlet obstruction	Duodenal stenting / palliative bypass surgery
Duodenal stent	Liquid / soft moist diet initially. If gastric emptying normalises, dietary advice for duodenal stent i.e. avoidance of bread, seeds, skin, nuts, husks
Micronutrient deficiencies	Micronutrient screening, supplementation when serum levels low, compliance with pancreatic enzyme replacement therapy
Ascites	Little and often approach. No added salt.
Nutritional intake at end of life	Managing expectations and offering support for patient and carers, accessing other services

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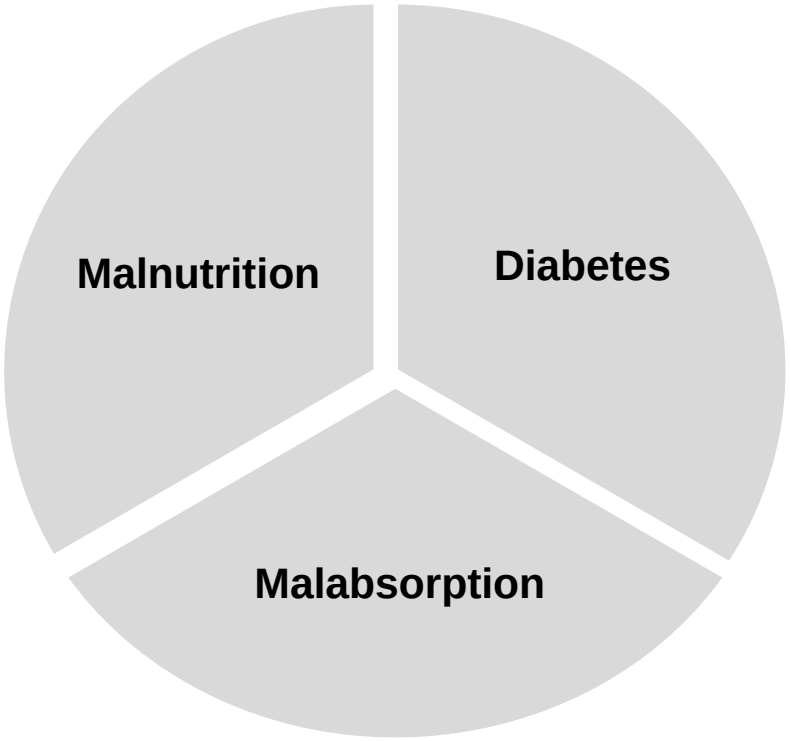
Managing Nutritional Problems



Prioritise

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Patient 1

65 year old female with borderline resectable adenocarcinoma of the pancreatic head

- Weight loss (5% in 3 months)
- Poor appetite (meeting 75% of nutritional requirements)
- Symptoms of malabsorption e.g. steatorrhoea + cramps
- Not on pancreatic enzyme replacement therapy
- Type 3C Diabetes (on Metformin, normal glucose on biochemistry + HbA1C of 55mmol/mol)

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Poll Question 2

What would you prioritise on this appointment? (choose one)

- Malnutrition
- Malabsorption
- Diabetes

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Patient 1

Intervention

- Prioritise education on pancreatic enzyme replacement therapy (consent)
- Arrange script for enzymes
- Patient to check blood glucose pre-meals if able
- Advise patient of hyperglycaemia risk – sign post to relevant health professional for support with pharmacological management
- Can consider high energy and protein diet advice and nutritional supplements on review

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Patient 2

58 year old male with locally advanced pancreatic adenocarcinoma, has had Whipple's and completed adjuvant chemotherapy:

- Weight stable (73kg / BMI 25kg/m2)
- No Diabetes diagnosis (HbA1C normal)
- Exceeding nutritional requirements by approx 15% of energy and protein with diet
- Taking fortisip compact protein x 1 / day
- Stools loose, can be pale / yellow in colour, experiencing excessive wind and bloating
- Taking CREON 25000 x 4 with main meals, x 2-3 with snacks

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Poll Question 3

What would you prioritise on this appointment?
(choose one)

Malnutrition

Malabsorption

Diabetes

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Patient 2

Intervention

- Check compliance with enzymes
  (re-educate or increase dose as appropriate)
- Ensure taking CREON 25000 with sip feeds
- Check if PPI prescribed and compliance (if not, suggest to appropriate health professional)
- Discuss increasing dose of enzymes
- Can check if coeliac screen has been done
- Check blood glucose on review – if absorption improved, glucose could be raised
- Consider stopping sip feeds on review if weight stable or increased

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Patient 3

83 year old male with pancreatic adenocarcinoma. Second line chemo stopped 4 weeks ago. For best supportive care – prognosis measured in weeks. Referred from acute – community dietetic services.

- No new weight available / appropriate. Weight trend declining prior to community dietetic review : 75kg June, 70kg September, 68kg October.

- Currently on 6 CREON 25000 capsules with main meals, 4-5 with snacks / supplements

- Appetite poor, taking Ensure Compact 1-2 / day as able, not meeting nutritional requirements.

- No steatorrhoea / excessive wind / cramps / indigestion reported.

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Poll Question 4

What would you prioritise on this appointment?
(choose one)

Malnutrition

Malabsorption

Diabetes

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Patient 3

Intervention

Focus is on quality of life :- enjoyment of food and managing malabsorption

Portion sizes have likely reduced, explore pill burden and consider trialling a reduction in pancreatic enzyme replacement therapy doses while monitoring symptoms

If swallowing difficulties experienced, may need to consider opening enzyme capsules and mixing with acidic food

Explore tolerance / enjoyment of nutritional supplements – consider taste fatigue and trialling new product

Consider referrals to other services e.g. palliative care team, social work, occupational therapy etc. if appropriate and desired by patient and family

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Take Home Tips…

- Good working relationships with the multi-disciplinary team
- Knowing who to contact
- Get a thorough baseline assessment – handover to specialist unit if for chemo / chemo-radiotherapy / surgery
- Take the time to educate patients well at first appointment.
- Check and re-check that patients are taking / staggering / storing enzymes appropriately.
- Sip feeds and enzymes
- Take necessary steps to have scripts for enzymes updated for dosage / quantity as required
- Booking timely reviews
- Fridays!
- Weaning down enzymes at end of life
- Simplifying doses – patient dependent

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References

- Allemani, C., Matsuda, T., Di Carlo, V., Harewood, R., Matz, M., Nikšić, M., Bonaventure, A., Valkov, M., Johnson, C.J., Estève, J. and Ogunbiyi, O.J. (2018) Global surveillance of trends in cancer survival 2000–14 (CONCORD-3): analysis of individual records for 37 513 025 patients diagnosed with one of 18 cancers from 322 population-based registries in 71 countries. *The Lancet*, 391 (10125), 1023-1075.
- Birnbaum, D.J., Bertucci, F., Finetti, P., Birnbaum, D. and Mamessier, E., 2019. Head and body/tail pancreatic carcinomas are not the same tumors. *Cancers*, *11*(4), p.497.
- Bye, A., Wesseltoft-Rao, N., Iversen, P.O., Skjegstad, G., Holven, K.B., Ulven, S. and Hjermstad, M.J., 2016. Alterations in inflammatory biomarkers and energy intake in cancer cachexia: a prospective study in patients with inoperable pancreatic cancer. *Medical Oncology*, *33*(6), p.54.
- Chun, Y., Pawlik, T. and Vauthey, J. (2018) 8th Edition of the AJCC Cancer Staging Manual: Pancreas and Hepatobiliary Cancers. *Annals of Surgical Oncology*. 8 (25), 845-847
- Conroy, T., Desseigne, F., Ychou, M., Bouché, O., Guimbaud, R., Bécouarn, Y., Adenis, A., Raoul, J.L., Gourgou-Bourgade, S., de la Fouchardière, C. and Bennouna, J., 2011. FOLFIRINOX versus gemcitabine for metastatic pancreatic cancer. *New England journal of medicine*, *364*(19), pp.1817-1825.

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- Del Chiaro, M., Segersvärd, R., Lohr, M. and Verbeke, C. (2014) Early detection and prevention of pancreatic cancer: is it really possible today?. *World journal of gastroenterology: WJG*, 20(34), 12118.
- Ferlay, J., Colombet, M., Soerjomataram, I., Dyba, T., Randi, G., Bettio, M., Gavin, A., Visser, O. and Bray, F. (2018) Cancer incidence and mortality patterns in Europe: Estimates for 40 countries and 25 major cancers in 2018. *European journal of cancer*, 103, 356-387.
- Genkinger, J.M., Spiegelman, D., Anderson, K.E., Bernstein, L., Van Den Brandt, P.A., Calle, E.E., English, D.R., Folsom, A.R., Freudenheim, J.L., Fuchs, C.S. and Giles, G.G. (2011). A pooled analysis of 14 cohort studies of anthropometric factors and pancreatic cancer risk. *International journal of cancer*, *129*(7), 1708-1717.
- Globocan (2020) *Cancer Fact Sheets C25*. International Agency for Research on Cancer 2020. Available at: https://gco.iarc.fr/today/data/factsheets/cancers/13-Pancreas-fact-sheet.pdf [Accessed 26 April 2021].
- Hartwig, W., Werner, J., Jäger, D., Debus, J. and Büchler, M.W., 2013. Improvement of surgical results for pancreatic cancer. *The Lancet Oncology*, *14*(11), pp.e476-e485.
- Hoffmeister, A., Mayerle, J., Beglinger, C., Büchler, M.W., Bufler, P., Dathe, K., Fölsch, U.R., Friess, H., Izbicki, J., Kahl, S. and Klar, E., 2015. English language version of the S3-consensus guidelines on chronic pancreatitis: Definition, aetiology, diagnostic examinations, medical, endoscopic and surgical management of chronic pancreatitis. *Zeitschrift für Gastroenterologie*, *53*(12), pp.1447-1495.

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- Neoptolemos, J.P., Stocken, D.D., Bassi, C., Ghaneh, P., Cunningham, D., Goldstein, D., Padbury, R., Moore, M.J., Gallinger, S., Mariette, C. and Wente, M.N., 2010. Adjuvant chemotherapy with fluorouracil plus folinic acid vs gemcitabine following pancreatic cancer resection: a randomized controlled trial. *Jama*, *304*(10), pp.1073-1081.
- Northern Ireland Cancer Registry. (2013). *Cancer incidence trends 1993-2013 with projections to 2035.* Available: https://www.qub.ac.uk/research-centres/nicr/FileStore/PDF/NIrelandReports/Filetoupload,531911,en.pdf#page=151. Last accessed 24th Oct 2021.
- Pancreatic Cancer UK. (2021). *Risk factors for Pancreatic Cancer.* Available: https://www.pancreaticcancer.org.uk/information/risk-factors-for-pancreatic-cancer/. [Accessed 30th May 2021].
- Phillips, M. Freeman, K. McGeeney, L. Griffin, O. Dann, S. (December 2018). Pancreatic disease in adults. In: Vera E. Todorovic MBA MSc.BSc. RD and Bruno Mafrici MSc. BSc. RD. (Ed). *PENG Parenteral & Enteral Nutrition, A Pocket Guide To Clinical Nutrition*. UK: British Dietetic Association. p.19.17
- **Phillips ME, Hopper AD, Leeds JS, et al Consensus for the management of pancreatic exocrine insufficiency: UK practical guidelines BMJ Open Gastroenterology 2021;8:e000643. doi: 10.1136/bmjgast-2021-000643**

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- *Poley, J.W., Kluijt, I., Gouma, D.J., Harinck, F., Wagner, A., Aalfs, C., Van Eijck, C.H.J., Cats, A., Kuipers, E.J., Nio, Y. and Fockens, P. (2009) The yield of first-time endoscopic ultrasonography in screening individuals at a high risk of developing pancreatic cancer. American Journal of Gastroenterology, 104(9), 2175-2181 Roberts, K.J., Bannister, C.A. and Schrem, H., 2019. Enzyme replacement improves survival among patients with pancreatic cancer: Results of a population based study. Pancreatology, 19(1), pp.114-121*
- Shi, C., Hruban, R.H. and Klein, A.P. (2009) Familial pancreatic cancer. *Archives of pathology & laboratory medicine*, 133(3), 365-374.
- Tseng, D.S., Molenaar, I.Q., Besselink, M.G., van Eijck, C.H., Rinkes, I.H.B. and van Santvoort, H.C., 2016. Pancreatic exocrine insufficiency in patients with pancreatic or periampullary cancer: a systematic review. *Pancreas*, *45*(3), pp.325-330.
- Toouli, J., Biankin, A.V., Oliver, M.R., Pearce, C.B., Wilson, J.S. and Wray, N.H., 2010. Management of pancreatic exocrine insufficiency: Australasian Pancreatic Club recommendations. *Medical journal of Australia*, *193*(8), pp.461-467.
- Van Tienhoven, G., Versteijne, E., Suker, M., Groothuis, K.B., Busch, O.R., Bonsing, B.A., de Hingh, I.H., Festen, S., Patijn, G.A., de Vos-Geelen, J. and Zwinderman, A.H., 2018. Preoperative chemoradiotherapy versus immediate surgery for resectable and borderline resectable pancreatic cancer (PREOPANC-1): A randomized, controlled, multicenter phase III trial.

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- Zalite, I.O., Zykus, R., Gonzalez, M.F., Saygili, F., Pukitis, A., Gaujoux, S., Charnley, R.M. and Lyadov, V., 2015. Influence of cachexia and sarcopenia on survival in pancreatic ductal adenocarcinoma: a systematic review. *Pancreatology*, *15*(1), pp.19-24.
- Zeni, L.B., Russi, R.F., Fialho, A.F., Fonseca, A.L.P., Sombrio, L.S. and Rocha, I.C. (2014) Morbidity and mortality of pancreatic tumors undergoing surgical treatment. *Arquivos Brasileiros de Cirurgia Digestiva*, 27(4), 275-279.

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