



Nutritional Management of Pancreatic Cancer

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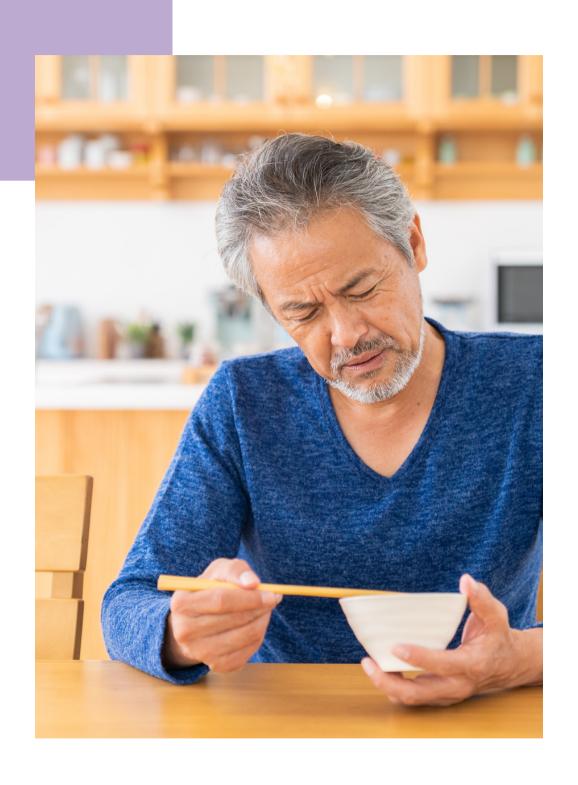
Learning Outcomes

To provide an overview of the nutritional management in patients with pancreatic cancer

To provide an overview of conditions and treatments that can effect nutrition in patients with pancreatic cancer



Managing appetite loss



Poor appetite is a common nutritional challenge for patients with pancreatic cancer. Sometimes surgery, prescription drugs or the cancer itself can change the way food tastes or cause the patient's appetite to decrease

If poor appetite and weight loss persist, doctors may prescribe medication to increase appetite.

It can take several weeks of use before appetite enhancement occurs, so medications should be prescribed for at least 1 month to determine if effective.

Medications may include:

Steroids such as prednisone or dexamethasone Anti-depressants such as mirtazapine

Top tips to Support Poor Appetite

- Little and often approach
- Light exercise pre-meal to stimulate appetite
- Stay hydrated nourishing drinks
- Plan meals and ask family to support with cooking if needed
- Aim to eat meals and snacks at scheduled times, even if not hungry

- Have bowls of nutritious snacks available in frequently used rooms
- 7 Utilise/optimise anti-sickness medications
- Arrange food attractively and make meal times pleasing
- Manage taste changes
- Utilise nutritional supplements as needed

Diet Fortification and Oral Nutritional Supplements

Little and Often

Smaller meals with snacks and nourishing drinks in between

Having drinks separately from meals

Having a pudding once or twice a day such as full cream yogurt, ice cream, cake, custard, rice pudding

Snack Ideas

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sandwiches,
fruit cake, nuts,
bombay mix,
crisps,
cereals
soups
yogurts
finger foods (e.g. sausage rolls, scotch
eggs, samosas)
toasted tea cakes with butter
crackers and cheese
toast + topping (e.g. beans, scrambled
egg, butter)
tinned fruit in syrup
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Enchring Food

Choose full fat/full cream/with sugar foods rather than low fat/low sugar types e.g. full cream yogurts, full cream milk

Add cheese to soups, mashed potatoes, vegetables, pasta dishes, curries

Use butter, mayonnaise, olive oil or salad cream in sandwiches, on potatoes, yams and salads

Add extra butter, margarine or ghee to vegetables, scrambled eggs and bread

Add cream or condensed milk to puddings

Add sugar, jam, honey or milk powder to porridge, breakfast cereals or puddings

Use cooking methods that add oil e.g. frying and if you roast or grill then brush with oil or use an oil spray

Diet Fortification

Mourishing Drinks

Fortified milk

To make fortified milk, mix 4 tablespoonfuls of milk powder into a paste with some milk and stir or whisk the mixture into one pint of milk. This can be used throughout the day in drinks, on cereals, in sauces, to make custard etc.

Using full cream milk (including fortified milk) to make the following drinks:

- Hot chocolate or cocoa
- Coffee and cappuccinos
 - Malted drinks
- Milkshakes or smoothies

(Soya, rice, coconut or almond or semiskimmed milk can be used if dietary intolerances)

Choose fruit juices and sugar containing squashes

Oral Autritional Supplements

Oral Nutritional Supplements (ONS) are widely used within the acute and community health settings for individuals who are unable to meet their nutritional requirements through oral diet alone.

ONS may be prescribed in the short term during acute illness, but also for individuals with long term chronic conditions. The role of ONS is to complement nutritional intake, and simultaneous information around improving oral intake should be provided.



Juice Style	Volume ranges from 200-220ml with an energy density of 1.25-1.5kcal/ml. They are fat free (but still require PERT)
Milkshake Style	Volume ranges from 125-220ml, energy density ranges from 1-2.4kcal/ml. Also available with added fibre.
High-energy powders	Volume ranges from ~125-350ml, ideally made up with full cream milk to give an energy density of 1.5-2.5kcal/ml.
Soup	Volume ranges from 200-330ml. Some are ready mixed and others are a powder and can be made up with water or milk to give an energy density of 1–1.5kcal/ml.
Semi- solid/dysphagia ranges	Range of presentations from thickened liquids (stage 1 and 2) to smooth pudding styles (stage 3), with an energy density of ~1.4-2.5kcal/ml.
High Protein	Range of presentations; jellies, shots, milkshake style containing 11-20g of protein in volumes ranging from 30–220ml.
Low volume high concentration (shots)	These are fat and protein based products that are taken in small quantities (shots), typically 30-40ml as a dose taken 3-4 times daily.

Enteral Feeding

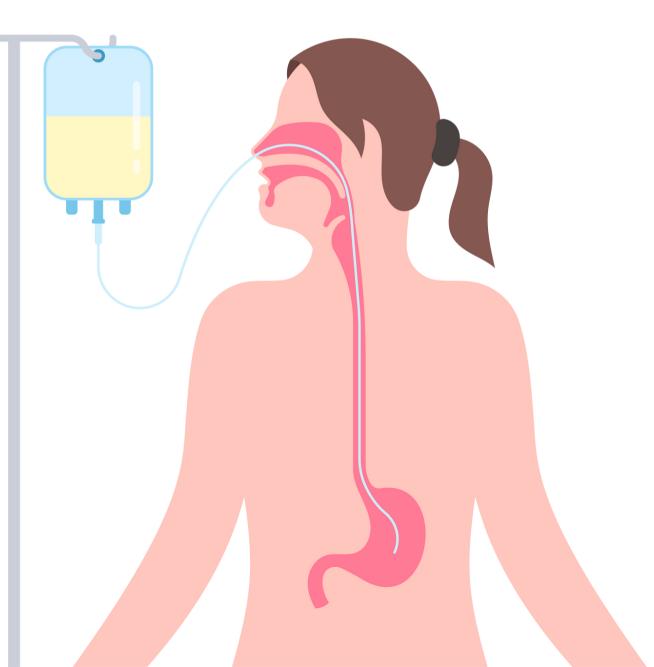
NICE Guideline N85: For people who have had pancreatoduodenectomy and who have a functioning gut, offer early enteral nutrition rather than parenteral nutrition.

UK Practical Guidelines (2021): Where needed, enteral feeds should be peptide and medium-chain triglyceride-based.

Peptide feeds contain proteins that have been enzymatically hydrolyzed to dipeptides and tripeptides. These hydrolyzed proteins are often combined with higher medium-chain triglyceride, making then easier to absorb and utilise., especially in the presence of malabsorption.

Peptide feeds require less PERT to achieve complete lipolysis than polymeric feeds, therefore most patients will not require PERT with peptide feed.

Where malabsorption symptoms persist, enzymes can be flushed via the feeding tube every 2 hours or added to the feed itself.



PERT can be difficult to administer with enteral feeds, as granules may clog tubes.

Powdered preparations are available and are first choice when using PERT with feeds.

Both acid and temperature impact the efficacy of PERT. The addition of a PPI can be useful if PERT is not effective.

Powdered PERT administered via NG will need PPI as enzymes will be denatured.

Box 2 Administration of PERT with enteral feeds

Powdered enzymes and feeding tubes NB. Once mixed, use all products immediately. Do not leave to stand

Giving PERT as flushes: mix 1 g scoop pancreatin powder (Pancrex V Powder, Essential Pharmaceuticals, UK) with 50 mL sterile water. Shake well and immediately flush via a feeding tube. Do not give with other medication. Do not flush between the feed and the enzyme as this will reduce the mixing of the feed with the PERT. Administer every 2 hours hours throughout enteral feeding, increase dose of PERT if needed.

Mixing PERT with feed: add 1–2 g Pancrex V Powder directly to the feed in a feeding reservoir. Shake well. Hang straight away and for 4 hours hours only, increase dose of PERT if needed. (NB. Some feeds congeal when PERT is added - discuss with a tertiary centre dietitian prior to adding PERT to feed)

1g pancex = 25,000 units lipase

Stent Dietary
Advice



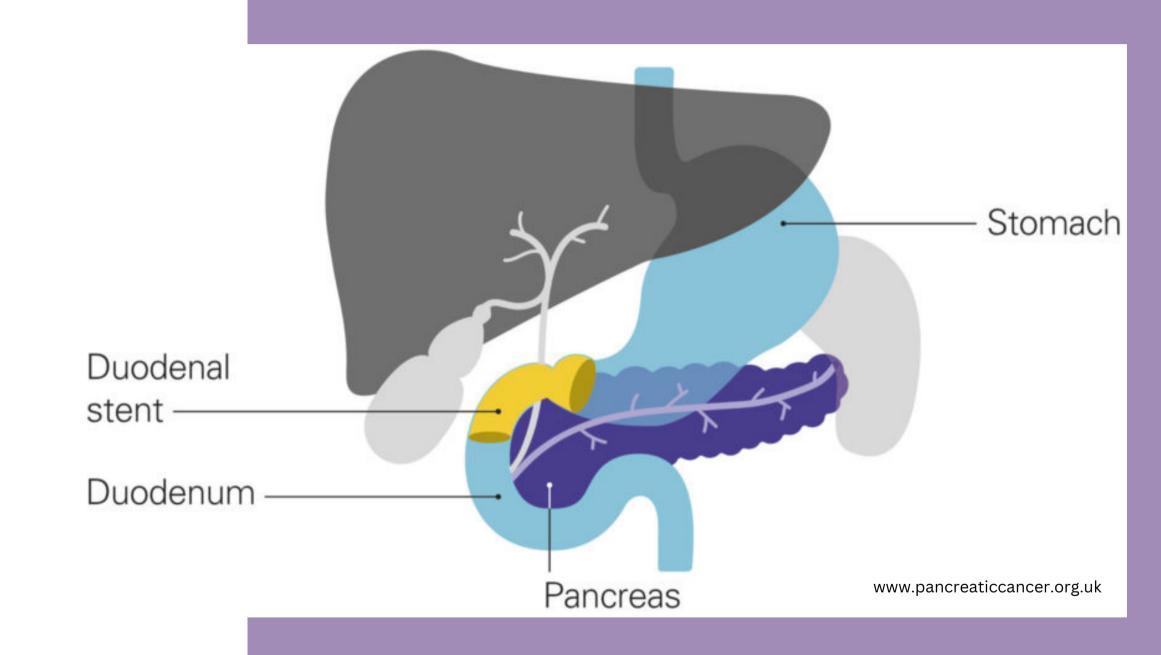
What food is best to avoid for patient's with a stent?

raw vegetables
soup
poached fish
rice pudding

Sometimes pancreatic cancer can block or obstruct the duodenum.

A blocked or obstructed duodenum means food cannot pass through as quickly as normal. This can cause nausea, early satiety and a loss of appetite.

A duodenal stent can be placed to allow food to pass through the obstruction, and the stomach to empty properly.



Most duodenal stents take about 3 days to expand into the correct position

Post Insertion

First 24hrs post insertion, liquid diet recommended (tea, coffee, milk, soup, ice cream, jelly, supplements)

If no nausea and vomiting, can move to soft/moist diet. This needs to continue for a few days to ensure food is flowing freely through the stent.

Soft foods that are easy to chew include:

Porridge or milky cereal Soup Eggs Soft pasta dishes Poached fish, minced meat Well cooked vegetables/stewed fruit Mashed potato Rice pudding Yoghurt Custard Ice cream

Food fortification can be implemented if concerns re: intake/weight

It is also important to avoid foods that might block the stent. These include:

raw vegetables or harder to digest vegetables (e.g. salad, green beans, sweetcorn and celery) nuts and dried fruit citrus fruits with piths (e.g. oranges and grapefruit) tough or gristy meat bread (as it expands in your stomach) wholegrain food (more difficult to digest)

Top Tips

- Eat smaller meals more often
- Take your time eating, chew food well
- 5 Eat a variety of foods
- Sit up when eating and avoid lying down after meals
- Avoid drinking too much fluid before or with meals

Surgery - pre & post

Pancreatic cancer is an aggressive cancer, and the surgery to remove it carries significant risks. If patients undergo successful surgery, then they will require chemotherapy to stop the cancer returning

Poor nutrition increases the risks of surgery and reduces the number of patients that can have chemotherapy

Malnutrition and maldigestion are highly prevalent in this patient population and contribute to poor outcome

Malnutrition is present in a fifth of patients before pancreatoduodenectomy and increases during inpatient stay, to greater than 75%. The underlying cause is multifactorial, with PEI playing a major role

For those identified as having significant preoperative malnutrition, individualised preoperative optimisation should be considered, with MDT input that could involve the use of preoperative nasojejunal (NJ) feeding if required

Pelore Surgery

- 1 Try to eat as well as possible
- Being active can be useful to maintain strength, reduce fatigue and support appetite
- If weight loss, may need to increase weight/build up diet
- Ensure commenced on PERT if not already

Roughly 15% of patients have preoperative symptoms of GOO

After Surgery

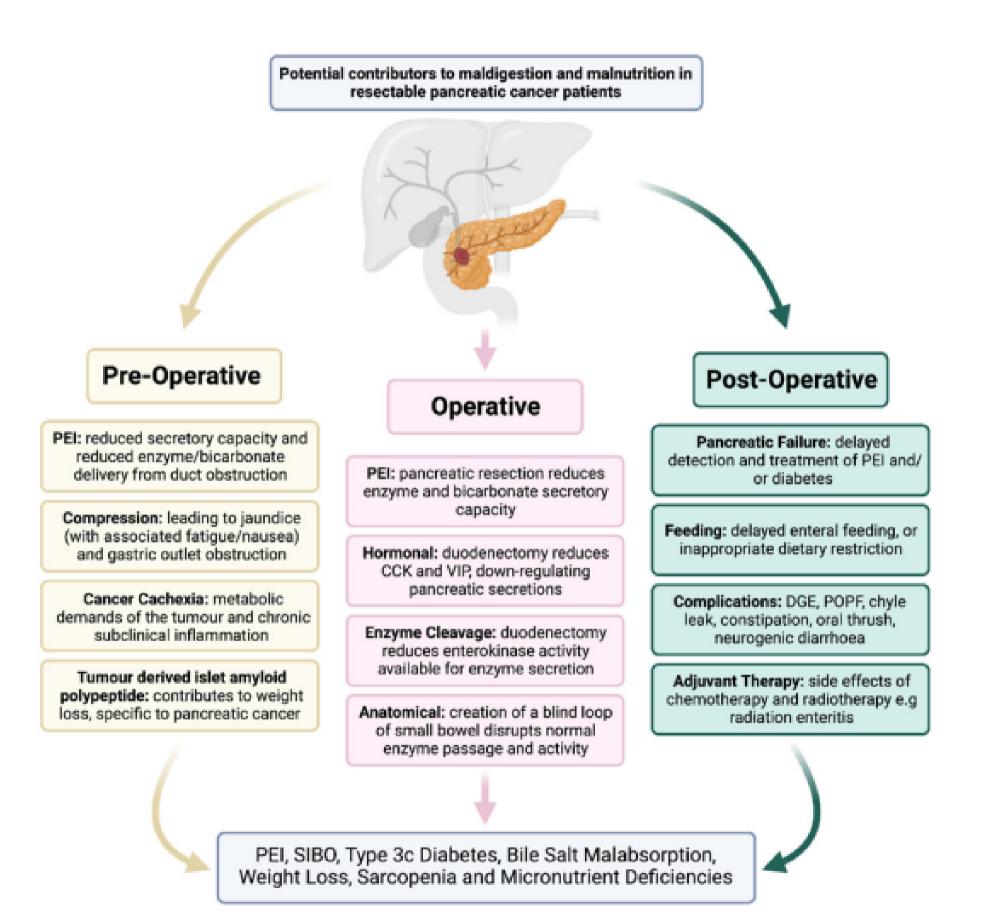
- Little and often
- Taste changes can occur, as can a loss of appetite
- Oral thrush is common post op, which can reduce appetite and cause a sore mouth
- Gentle physical activity can support recovery
- 5 Ensure taking PERT

The ESPEN consensus guidelines for nutritional management after surgery recommend nutritional intervention if patients are not meeting 50% of their nutritional requirements post-surgery, which they estimate at 1.5 g/kg/day of protein and 25–30 kcal/kg/day.

Recent publications reporting a typical intake of between 27–32 g of protein and 588–745 kcal per day post op.

The most recent ERAS guidelines for PD advise additional routes to deliver nutrition if patients are not meeting 60% of their nutritional requirements for seven days post surgery.

Even when the need for extra nutritional intervention is identified, the ERAS after PD guidelines acknowledge that the best route to deliver this nutrition is not yet known.

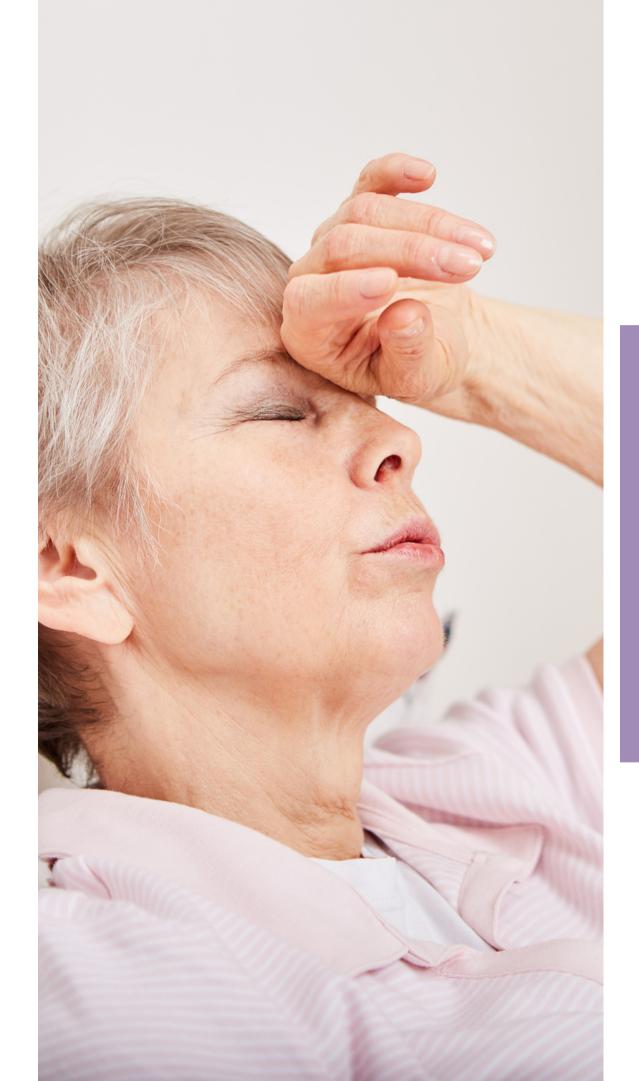


Interventions to Improve Nutritional Status in Pancreatoduodenectomy Patients Chemotherapy



Chemotherapy treatment for pancreatic cancer can cause the following side effects which impact patient nutrition

- / Nausea and vomiting
- 2 Taste changes
- 5 Dry or sore mouth
- 4 Diarrhoea
- 5 Weight loss



Top tips

Nausea and Vorniting

Nausea is often worse on an empty stomach

Try plain foods - e.g. toast, bread, biscuits

Cold foods smell less that hot food

Ask someone else to cook for you

Flat fizzy drinks between meals

Salty foods such as crisps and salted nuts

Foods/drinks containing ginger

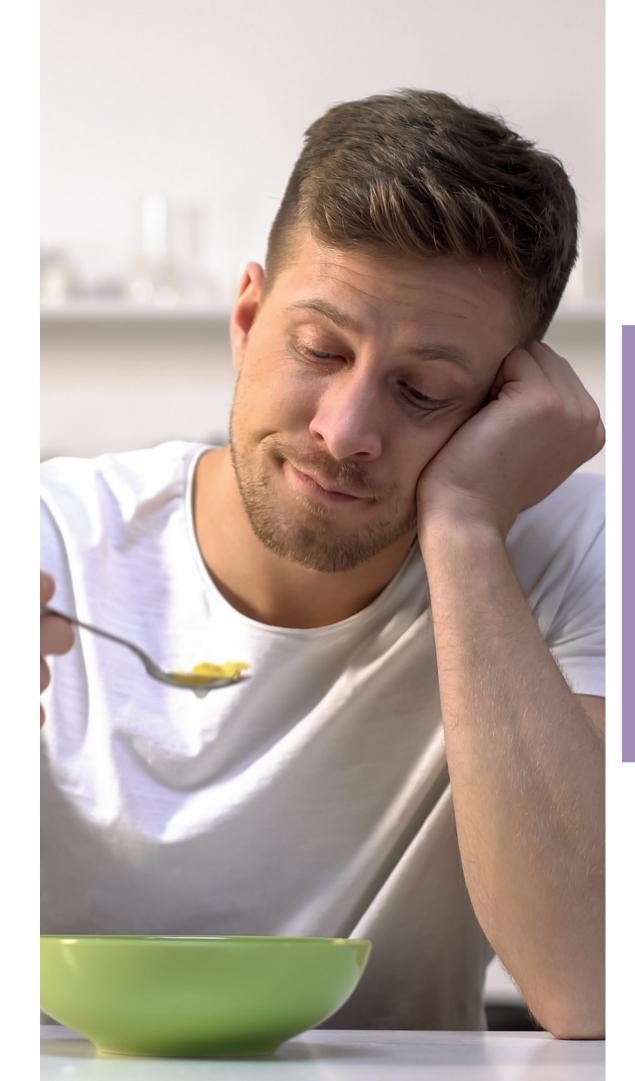
Stay hydrated - small amounts of fluid throughout the

day

Avoid alcohol and caffeine

Eat slowly, and sit up for an hour after eating

Try get some fresh air



Taste Changes

Eat what you enjoy and avoid what you don't

Try foods that you have gone off a few weeks later as taste may have returned

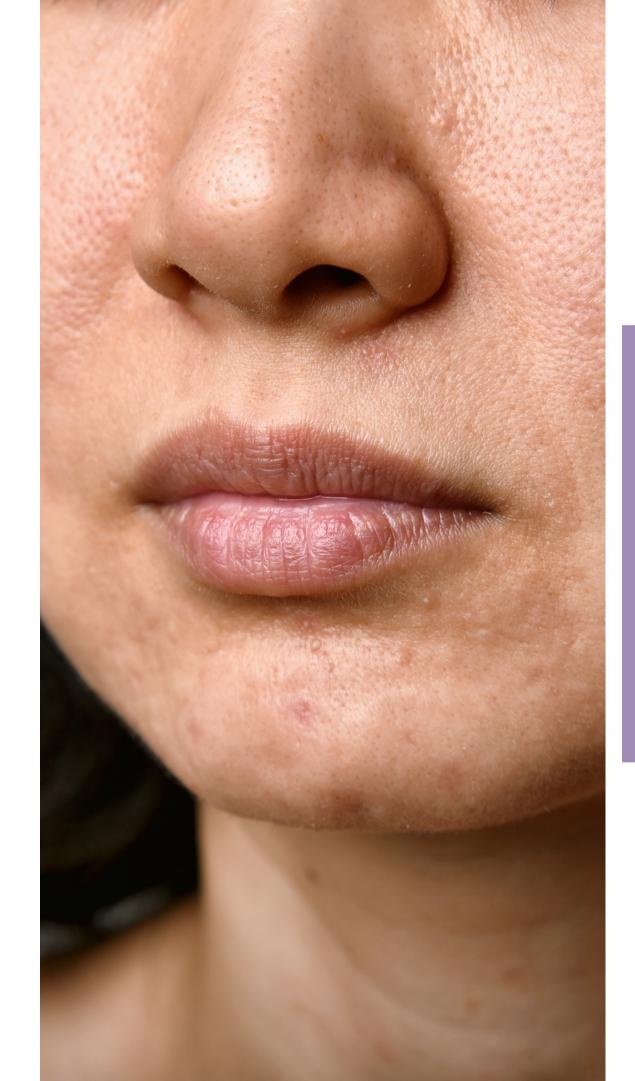
Trial alternative drinks (e.g. herbal teas, milky drinks, fruit juices, fizzy drinks) & using a straw can help

If meat/protein tastes bitter or metallic, try marinating it before cooking

Season food with strong flavourings (herbs, spices, lemon juice, pepper, strong cheese) but not strong smells

Try sharp tasting food/drinks (grapefruit, lemon, pineapple etc)

Keep your mouth and tongue clean - regular tooth brushing
Use plastic or wooden utensils and cutlery
Good oral hygiene - check for oral thrush



Lop tips

Dry Mouth

Sip fluids frequently

Suck ice cubes or ice lollies

Sucking boiled sweets, mints or chewing sugar free chewing gum can stimulate saliva

Keep your mouth clean - regular tooth brushing, and using mouthwash regularly

Make foods moist with sauces, gravy, custard, cream

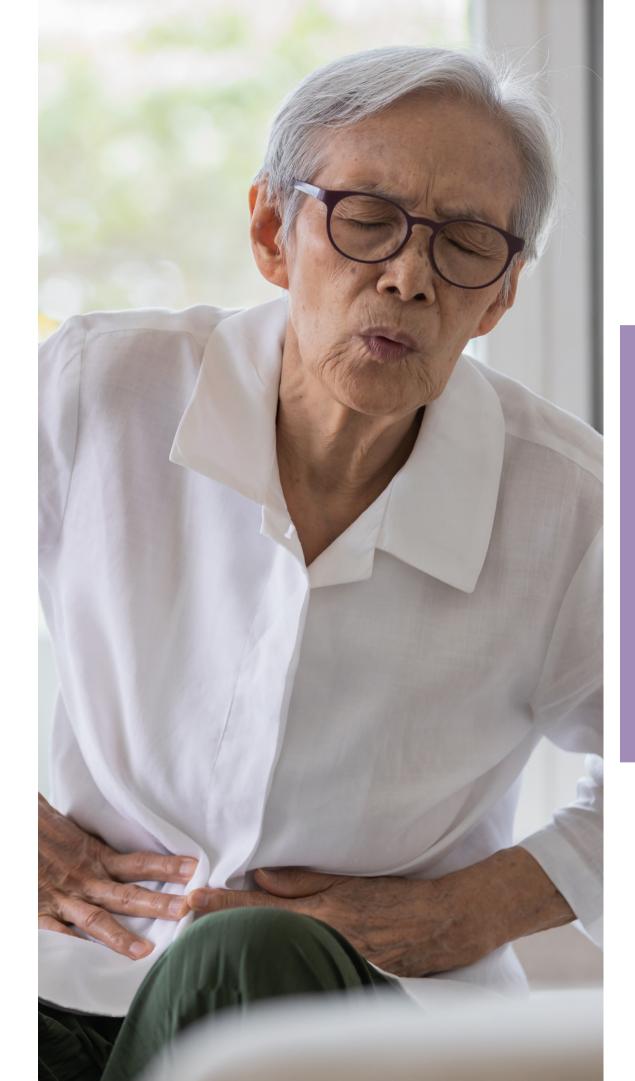
Avoid alcohol, caffeine and smoking

Use lip balm for dry lips

Good oral hygiene - check for oral thrush

Artifical saliva products

Use humidifier



Diamhoea

Check for any signs of infection - high temp Ensure taking PERT

Little and often eating pattern

Chew food well and eat slowly

Drink plenty fluids to replace fluid lost

Avoid spicy foods, alcohol, fruit juice and caffeine

Ensure still getting fruit and vegetables in diet for fibre

If significant diarrhoea, may need to replace lost electrolytes

Lop tips

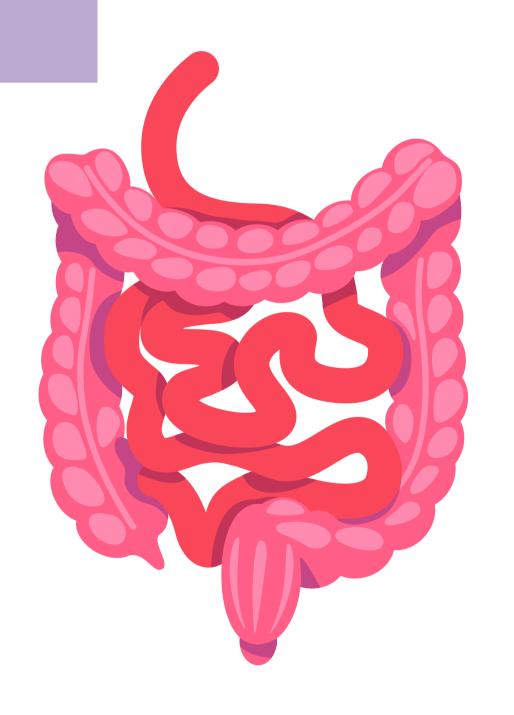
Small intestinal bacterial overgrowth (STBO)

Pancreatic exocrine insufficiency in pancreatic cancer can lead to intestinal bacterial overgrowth.

Symptoms can include weight loss, bloating, flatulence, chronic diarrhoea, abdominal pain and distention (similar to other GI conditions).

This can contribute to ongoing malabsorption, though improves when patients receive antiobiotic therapy.

A low FODMAP diet may be beneficial as this improves bloating and gas in patients with irritable bowel syndrome so may also help in symptomatic SIBO patients, however may not appropriate for this patient group.

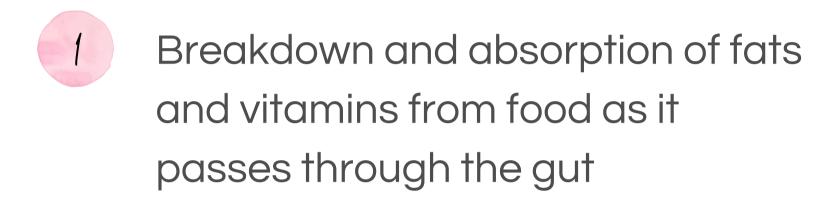


A 2019 study showed that patients with pancreatic cancer are more prone to SIBO than healthy individuals (63.3% vs 13.3%). SIBO can aggravate the symptoms of digestive system through multiple factors that affect the small intestine.

Research has shown that the bacteria overgrowth can compete Vitamin B12, interfere with the metabolism of bile salt, and influence the absorption of amino acids, through which it may cause a Vitamin B12 deficiency, diarrhoea, and low-protein blood syndrome.

Bile Acid Malabsorption Some people have ongoing diarrhoea that isn't helped by PERT. If a patient has diarrhoea that isn't getting better, they may have bile acid diarrhoea – which can happen if there is too much bile in the intestine.

Bile contains bile acids which are used for two main purposes:



To aid with the removal of waste products

Bile acids are made in the liver, stored in the gallbladder and released into the small intestine when food is eaten. Virtually all (97%) of the bile acids are then re-absorbed in ileum and returned to the liver. When this cycle is disturbed, this is termed bile acid malabsorption or bile acid diarrhoea.

There are three different causes of bile acid malabsorption and these are categorised into types:

Type I: when there is a problem in the part of the small intestine (ileum) where reabsorption takes place.

Type II: when no definitive cause found (primary bile acid malabsorption).

Type III: as a result from other diseases or conditions within the abdomen such as gallbladder removal, coeliac disease, chronic pancreatitis, radiotherapy or small bowel bacteria overgrowth

Diagnosed via SeCHAT scan

Symptoms include diarrhoea bloating, cramping abdominal pain and excessive wind (symptoms which can minic PEI)

Treatment is via medication - 'bile acid sequestrants' and can help symptoms and QOL.. They will affect the absorption of other drugs so must be taken four hours before or after other medications

Dietary advice includes keeping to a strict low-fat diet (40g of fat per day) however this is not something I would routinely recommend for pancreatic cancer patients Dumping Syndrome



Which of the following medication has a drug interaction with PERT as per BNF?

Ocreotide

Loperamide

Acarbose

Rifaxamin

Patients who have had a pancreatoduodenectomy are unlikely to incur any symptoms of dumping syndrome, unless they have had previous surgery including bariatric, gastric or oesophgaeal surgery.

Symptoms include: diarrheoa, nausea, and feeling lightheaded or tired after a meal, that are caused by rapid gastric emptying.

Rebound hypoglycaemia can also occur 1-3 hours after eating or exercise.

Dietary advice is crucial to the management of dumping syndrome and patients may find relief of some symptoms by altering the quantity of food eaten, timings of meals and the amount of readily absorbed carbohydrate foods.

SIBO may increase the risk of dumping.

If dietary treatments have no effect, medication can be used.
Acarbose is used first line, and if this doesn't work, then Ocreotide is prescribed.

Pancreatin only has one drug interaction documented in the BNF which is Acarbose.

Pancreatin is predicted to decrease the effects of Acarbose and manufacturer advises to avoid.

Conclusion

Pancreatic Cancer can cause an array of nutritional issues for patients which at times can be complex to manage.

Nutritional support and advice for patients to best manage their symptoms is crucial to quality of life and outcomes



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