



Pancreatic
CANCER UK



**The Clatterbridge
Cancer Centre**
NHS Foundation Trust

Nutritional management of pancreatic cancer

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Overview of session

- Managing appetite loss
- Diet fortification & ONS
- Surgery
- Chemotherapy
- Stent Dietary Advice
- Bile Acid Malabsorption (BAD/BAM)
- Small intestinal bacterial overgrowth (SIBO)
- Dumping Syndrome
- T3C Diabetes

Poll

What is the main symptom/ complaint patients with pancreatic cancer report to you that bother them most?

Low appetite and weight loss

Bowel changes e.g. diarrhoea/steatorrhoea

Nausea/sickness

Pain / abdominal discomfort

All of the above and more

Appetite and weight loss

Common complaint of pancreatic cancer patients

PG SGA tool (CCC data); often scoring for eating less than usual and no appetite/don't feel like eating in >85% patients screened at initial oncology appointment

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

Over a third have lost > 10% of their body weight over 6 months


(Witvliet-van Nierop et al., 2017)

Multifactorial;


- Cancer related anorexia
- Maldigestion symptoms
- Symptoms of disease e.g. pain , fatigue, steatorrhoea, diarrhoea, diabetes
- Treatment side effects e.g. nausea / sickness, taste changes , diarrhoea
- Surgery e.g. early satiety , taste changes, changes to bowels
- Medications e.g. taste changes , constipation

Nutritional aims and goals


- Optimise dietary intake / nutritional status
- Maintain dietary intake and nutritional status through treatment
- Improve fat free mass / muscle mass
- Ensure optimal nutrient absorption and manage GI symptoms via PERT
- Correct micronutrient deficiencies
- Maintain good / Improve glycaemic control



Support with
treatment tolerance /
minimise risk of
toxicities



Maintain / improve
well being and
quality of life



Optimise post-op
recovery

Appetite stimulants

- Steroids e.g. Dexamethasone / Prednisolone
- Progestins e.g. Megestrol acetate (Megace®)
- Anti-depressants e.g. Mirtazapine / Olanzapine?
- Can take no. of weeks before see any effect
- Side effects!

Randomized Double-Blind Placebo-Controlled Study of Olanzapine for Chemotherapy-Related Anorexia in Patients With Locally Advanced or Metastatic Gastric, Hepatopancreaticobiliary, and Lung Cancer

Lakshmi Sandhya¹, Nirmala Devi Sreenivasan¹, Luxitaa Goenka¹, Biswajit Dubashi¹,
Smita Kayal¹, Manikandan Solaiappan², Ramkumar Govindarajalou³, Harichandrakumar Kt⁴,
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Tips for poor appetite

- Fresh air before meals / light exercise if possible
- Little and often approach – eating 6-8x per day
- Eating at set times / day / set routine even if not hungry
- Meal preparation when feeling well / asking family to help
- Snack platters / Snack bowls
- Keeping hydrated / regular fluid intake
- Make meals look attractive - colours , arrangement
- Avoid overwhelming portions
- Mealtime environment
- Manage taste changes
- Timely use of anti-emetics
- Use Oral Nutritional Supplements (ONS) as required



Little and often and Food Fortification

- Crumpet/s with butter and jam/peanut butter/Nutella
- Scotch pancakes with butter/spread
- Sandwiches / Bread thins/Wraps
- Cereals
- Crisps/ Breadsticks and dips e.g. cheese/humous / guacamole
- Nuts / seeds / fruit mix
- Crackers and Cheese
- Yogurts
- Soups
- Tinned fruit with yogurt/ice cream
- Milky puddings e.g. custard, rice pudding , trifle
- Finger foods / platters with cold meats , crackers, dips , cheese , grapes
- Milky drinks e.g. Horlicks, Ovaltine, Hot chocolate , Lattes , Cup of milk
- Keep fluids away from meals times

Little and often and Food Fortification

- Make up fortified milk – 4-5 tablespoons of milk powder mixed into a paste with milk (full fat milk if tolerated) – add extra milk up to ~pint and use through the day in drinks/puddings etc..
- Choose full fat ,sugar versions of foods rather than low fat/low sugar types e.g. full fat yogurts, full fat milk
- Add cream to soups, butter and cream to mashed potatoes, butter / oil to vegetables, cheese to pasta dishes
- 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
- Look at cooking methods that add oil e.g. frying, spray or brush if baking/grilling

Oral nutritional supplements (ONS)



| Type | Comments |
|--|---|
| Milkshake style | Available with fibre / without Large flavour range |
| Juice style | Fat free but still need PERT with them |
| Powdered | Make up with full cream milk |
| Soup / savoury | Powdered and ready made available Powdered make up with water or milk |
| High protein | Vary in presentation; jellies, shots, ready made milk-based preparations |
| Low volume / high concentration | Fat / protein based which are taken in small quantities , frequently over the day e.g. 30-40mls, three-four times/day |
| Dysphagia range | Range of presentations from thickened fluids to smooth pudding style |
| Plant based | Smoothie made with water, ready made milkshake style |
| Peptide based | Milk based ready made , higher MCT content , limited flavours |

Poll

Oral nutritional supplements

What type of oral nutritional supplement do you use first line in your practice for patients with pancreatic cancer?

- Standard Polymeric
- Peptide based

Oral nutritional supplements (ONS) use and PERT shortages

- Peptide based oral nutritional supplements (ONS). i.e., VITAL 1.5 kcal® / Survimed OPD 1.5kcal®/ Peptisip Energy HP®, Peptamen® Vanilla
- ProSource Jelly® / ProSource Plus® / ProSource 20®
- Medium chain triglyceride (MCT) lipid products (Liquigen® / MCT oil®) could be used alongside fat free ONS in patients who need higher energy ONS.
- Emsogen® can also be considered, as this should not require PERT (low in energy and protein).



Position Statement: Pancreatic enzyme replacement therapy (PERT) shortage – advice for clinicians on the management of adults with pancreatic exocrine insufficiency

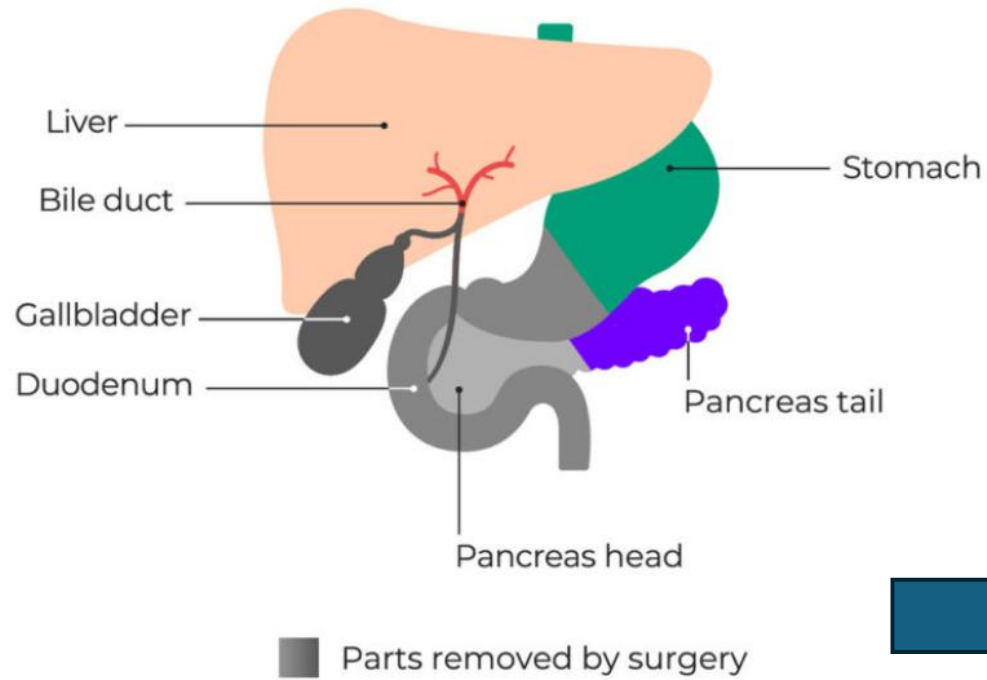
Phillips M.E^{1,3}, McGeeney L.M¹, Watson K-L², Lowdon J².

Position statement and advice for prescribers from the ¹Nutrition Interest Group of the Pancreatic Society of Great Britain and Ireland (NIGPS), ² Cystic Fibrosis Specialist Group and ³ Gastroenterology Specialist Group, British Dietetic Association.

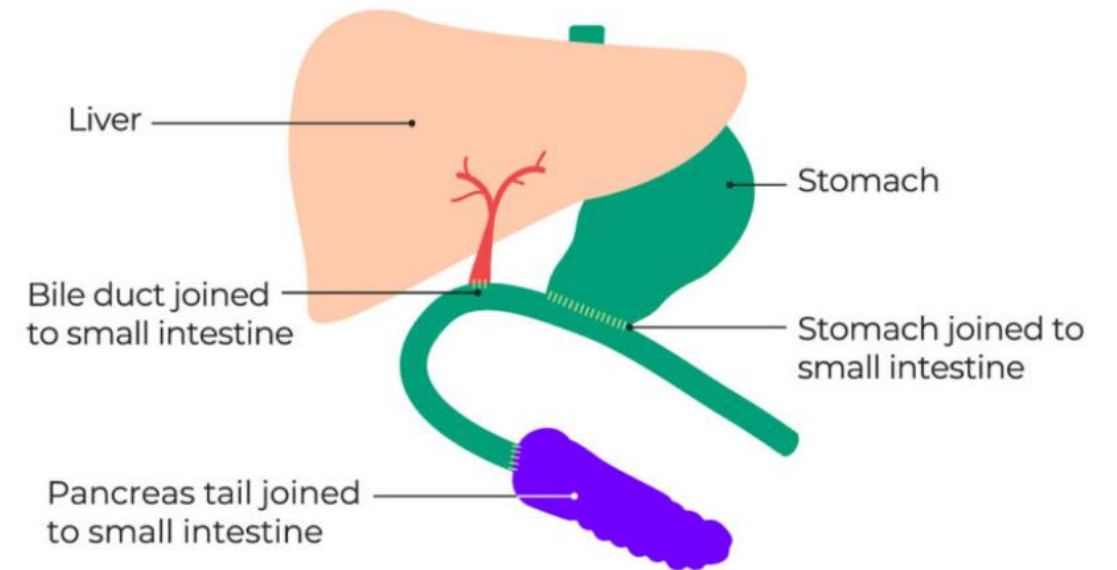
Pancreas surgery

- Surgical resection with adjuvant systemic chemotherapy currently provides the only chance of longer-term survival
- Only 10-20% of patients with pancreatic cancer are deemed suitable for surgery
- Malnutrition is present in approx. a fifth of patients before pancreatoduodenectomy and increases during inpatient stay to 75%. Underlying cause is multifactorial, with PEI playing a large driver.
- Malnutrition and maldigestion contribute to poor outcomes - increased length of stay , poor wound healing and readmissions

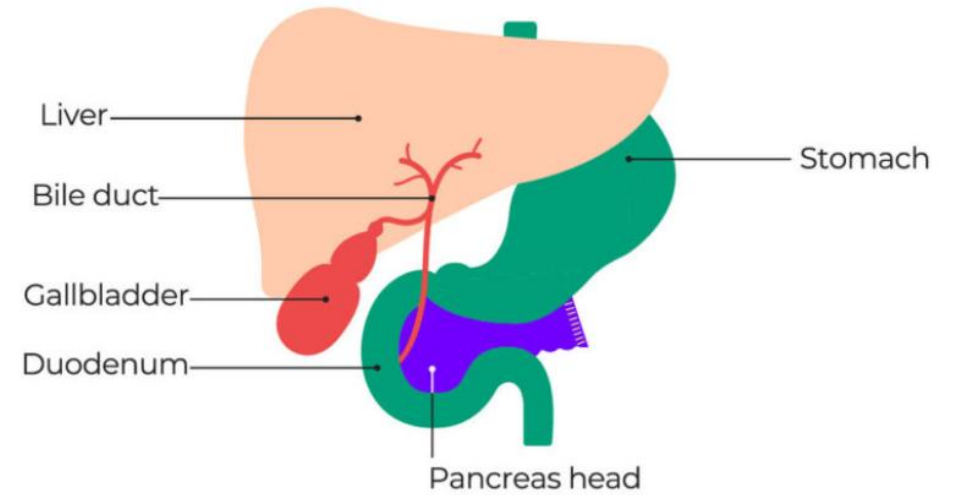
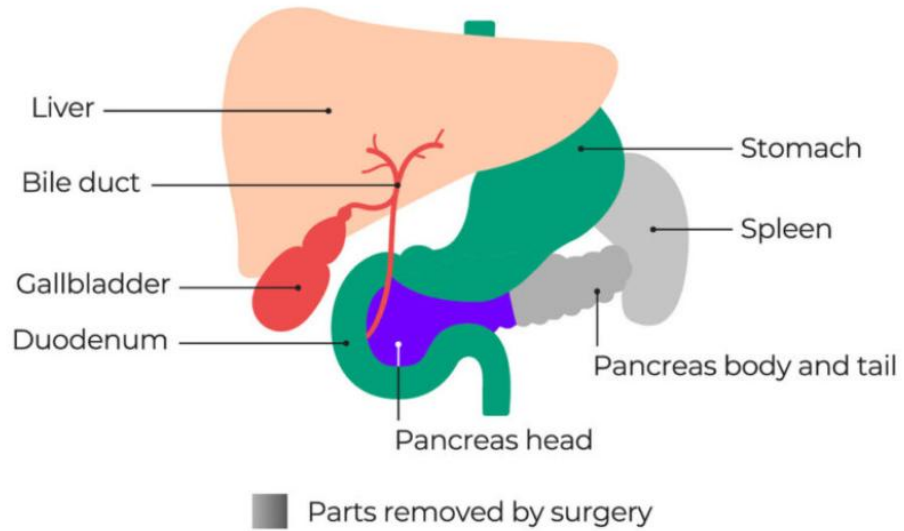
Kang, J et al., (2016); Morita, Y et al., (2019); Menozzi, R et al., (2023) ;Peng , Y-C et al., (2021)



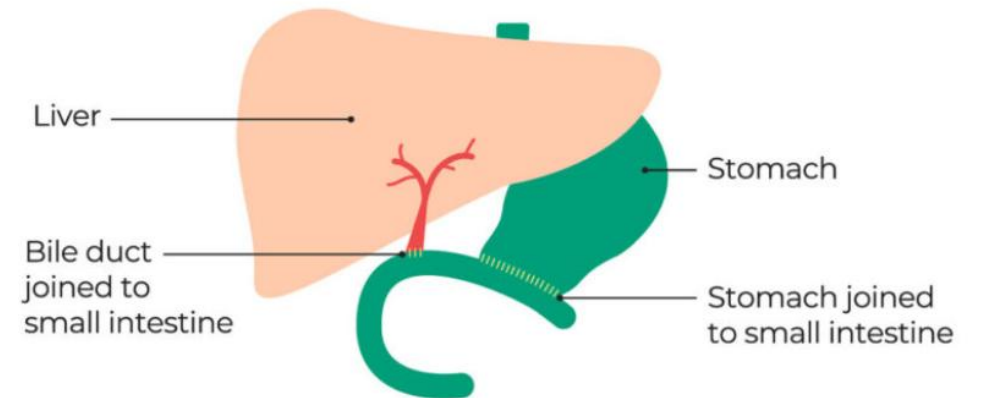
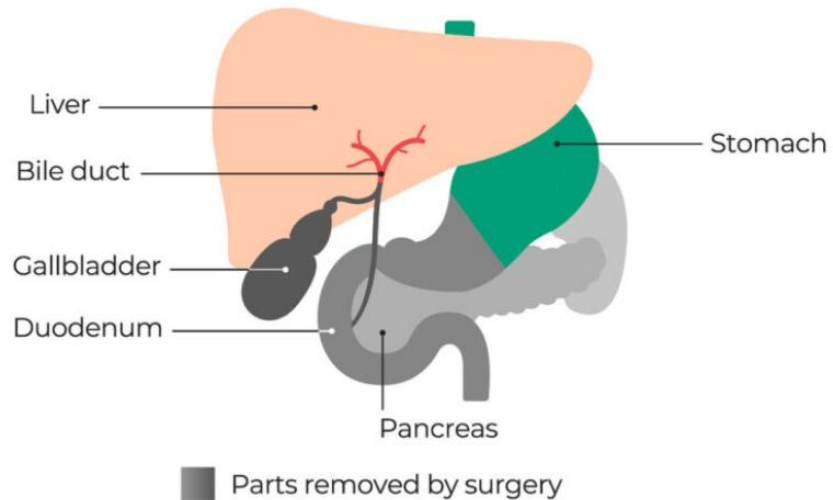
Pancreatoduodenectomy (PD)/ Whipple's



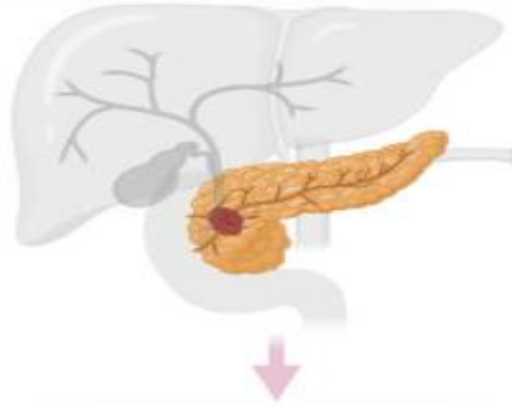
Distal pancreatectomy



Total pancreatectomy



Potential contributors to maldigestion and malnutrition in resectable pancreatic cancer patients



Pre-Operative

PEI: reduced secretory capacity and reduced enzyme/bicarbonate delivery from duct obstruction

Compression: leading to jaundice (with associated fatigue/nausea) and gastric outlet obstruction

Cancer Cachexia: metabolic demands of the tumour and chronic subclinical inflammation

Tumour derived islet amyloid polypeptide: contributes to weight loss, specific to pancreatic cancer

Operative

PEI: pancreatic resection reduces enzyme and bicarbonate secretory capacity

Hormonal: duodenectomy reduces CCK and VIP, down-regulating pancreatic secretions

Enzyme Cleavage: duodenectomy reduces enterokinase activity available for enzyme secretion

Anatomical: creation of a blind loop of small bowel disrupts normal enzyme passage and activity

Post-Operative

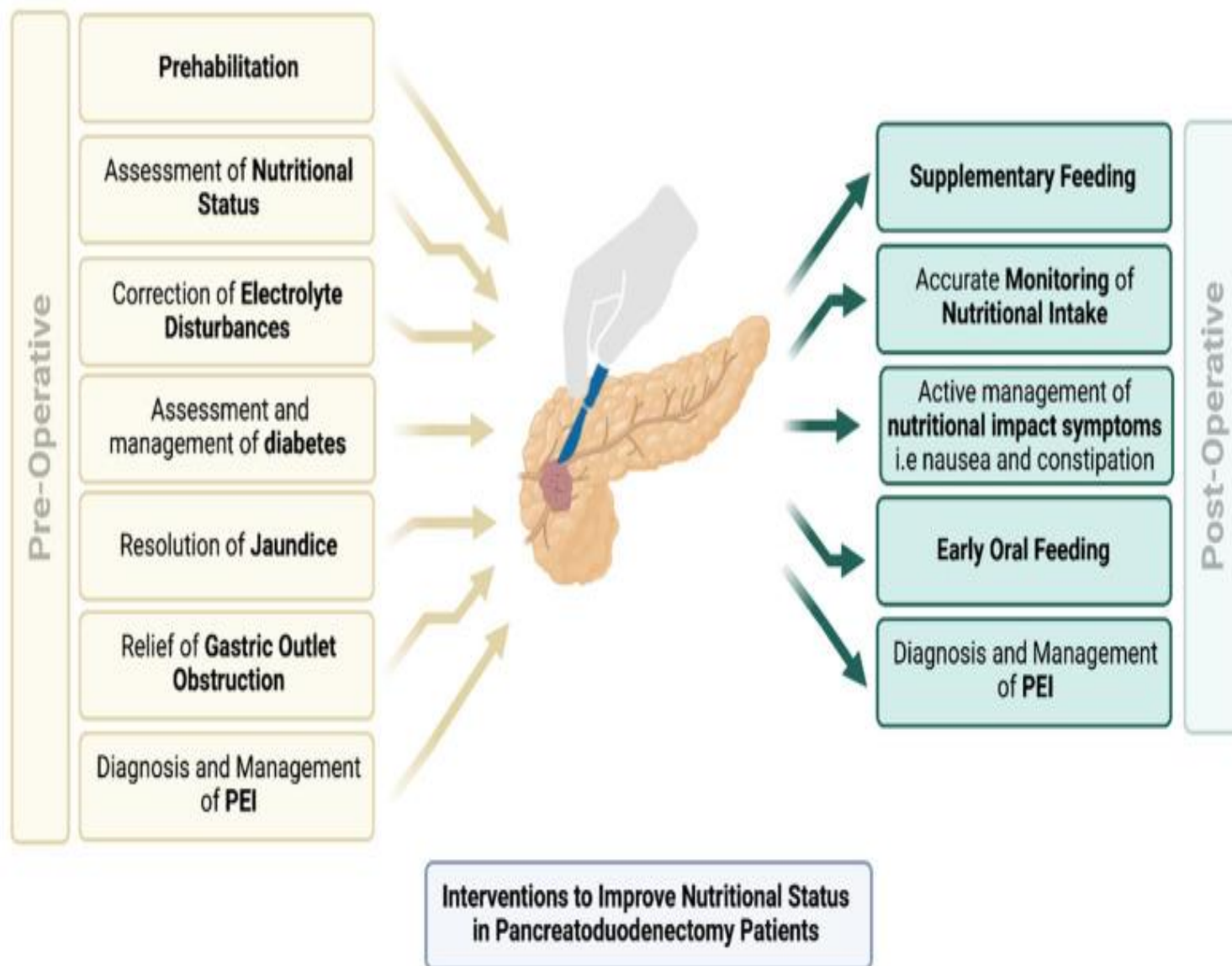
Pancreatic Failure: delayed detection and treatment of PEI and/or diabetes

Feeding: delayed enteral feeding, or inappropriate dietary restriction

Complications: DGE, POPF, chyle leak, constipation, oral thrush, neurogenic diarrhoea

Adjuvant Therapy: side effects of chemotherapy and radiotherapy e.g radiation enteritis

PEI, SIBO, Type 3c Diabetes, Bile Salt Malabsorption, Weight Loss, Sarcopenia and Micronutrient Deficiencies



ERAS guidelines for PD surgery advise additional routes to deliver nutrition if patients are not meeting 60% of their nutritional requirements for seven days post surgery (Melloul et al., 2020)

Observational study (n-35)

- 66% needed a nutritional intervention pre-operatively
- Only 1 patient met >60% nutritional requirements by day of discharge
- 29% did not achieve >60% despite intervention
- 71% discharged on oral nutritional supplements, 13% on NJ feeding
- Physical activity levels were poor
- Poor intake one month post surgery was significantly associated with dose reduction in chemo for energy & protein (Philips, M et al., 2024)

Surgery

Nutritional considerations

Pre-op considerations

- Prehab
- Low threshold for ONS
- Consider enteral feeding for patients identified as having significant preoperative malnutrition to optimise before surgery (NJT)
- Encourage physical activity and physio involvement
- Ensure timely PERT prescriptions
- MDT involvement

Post-op considerations

- Little and often approach with diet
- Use ONS as appropriate and consider timings of these
- Ensure taking PERT and taking correctly!
- Manage post op taste changes
- Gentle physical activity can support recovery
- Early post op feeding if indicated (ESPEN)

Chemotherapy

~80-90% present with metastatic disease and are therefore incurable.

Treatment options include palliative chemotherapy **if deemed fit enough to withstand oncological treatment.**

Chemo regimens; Triplet chemo e.g. FOLFIRINOX , doublet e.g. Gemcitabine/Capecitabine - cause multiple side effects, cumulative effect.

The development of malnutrition during chemotherapy is as high as 70.3% (Attar, A et al., 2012).

Weight loss associated with **failure to complete adjuvant chemotherapy**, potentially **impacting on longer term survival.**

Weight loss of greater than 10% postoperatively is associated with reduced uptake and completion of adjuvant chemotherapy after pancreatectomy (Morita, Y et al., 2019).

Chemotherapy side effects

- Fatigue
- Changes to bowels - Diarrhoea /Constipation
- Taste changes
- Oral thrush
- Nausea and/or vomiting
- Dry or sore mouth
- Weight loss
- Lack of appetite



Taste changes

- Check for oral thrush
- Good oral hygiene - regular tooth brushing
- Go with foods that fancy
- Keep trying foods previously gone off a few weeks later
- Suck on extra strong mint/ boiled sweets/ chewing gum pre meals to eliminate / minimise any unpleasant tastes in mouth and stimulate saliva
- Season foods with strong flavours (herbs / spices/ pepper/salt/lemon juice/chilli /strong cheeses)
- Marinate meat in fruit juice / alcohol to flavour (especially if bitter tasting)
- Sharp tasting foods e.g. pineapple/ lemon/ grapefruit
- Fruit teas / milky / chocolate drinks / fruit juices/fizzy flavoured waters may be preferable to plain water/tea/coffee
- Use plastic or wooden utensils and cutlery if metallic taste

Diarrhoea

- Assess for steatorrhoea - Ensure taking PERT and taking correctly and doses are reviewed
- Rule out infections e.g. C. Difficile
- Ensure using anti-diarrhoeal medications e.g. Loperamide /Codeine phosphate
- Little and often eating pattern
- Chew food well and eat slowly
- Drink plenty fluids , little and often
- Avoid spicy and greasy foods
- Avoid alcohol, fruit juices and caffeine
- May need to rule out other conditions e.g. Bile acid malabsorption, SIBO

Nausea and vomiting

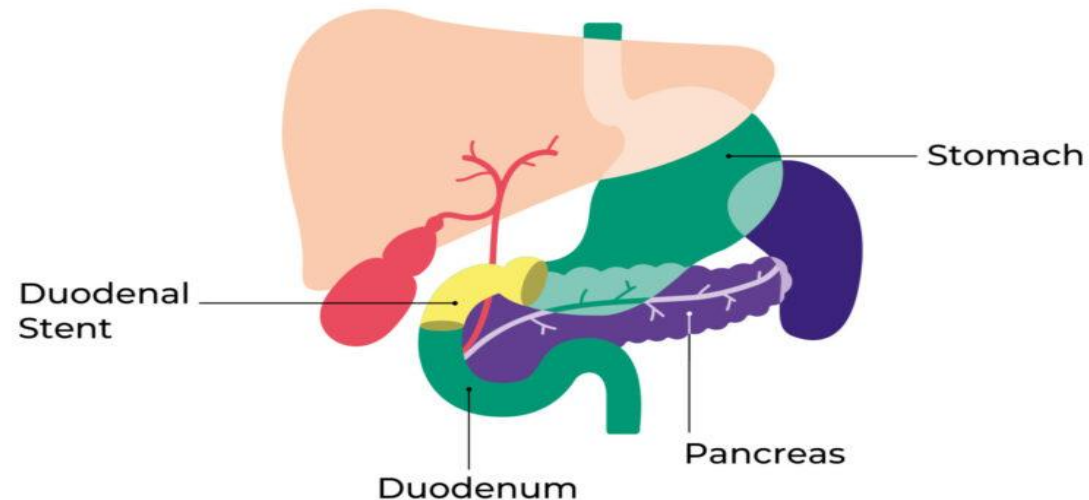
- Ensure taking an anti-emetic regularly and change if not effective
- Review the need for PPI ? acid stomach
- Pace self at mealtimes – eat slowly and ensure upright
- Plain foods may be better tolerated - e.g. toast, bread, biscuits, cold pasta , rice , cereals
- Cold foods may be better tolerated
- Avoid smells in the kitchen
- Ask family/friends to cook
- Salty foods such as crisps and salted nuts
- Foods/drinks containing ginger e.g. ginger biscuits / ginger drinks
- Stay hydrated - small amounts of fluid throughout the day
- Avoid alcohol and caffeine
- Fresh air before eating / during may help
- Sometimes having a distraction when eating can help e.g. watching TV / reading / listening to music

Duodenal stents

Duodenum can become blocked, either by a tumour within it or by tumour progression outside of it causing external pressure. As a result, food cannot pass through as quickly, if at all.

Symptoms include, vomiting (complete obstruction) , nausea , early satiety , loss of appetite , belching

Duodenal stent may be placed to create a lumen for food to pass through, allowing the stomach to empty



Diet advice post duodenal stent

Stents can take up to 3 days to expand fully -some patients may experience nausea, discomfort or pain for the first few days

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 for next few days before progressing to a more normal diet

May be prescribed prokinetic medications e.g. Domperidone , Metoclopramide to support food to move through the gut efficiently

Ensure food chewed well & check have well fitting dentures

Ensure upright when eating and avoid lying down immediately after eating

Sips of fluids before/with/after fluids but avoid overfilling on fluids

Little and often approach

Diet advice post duodenal stent

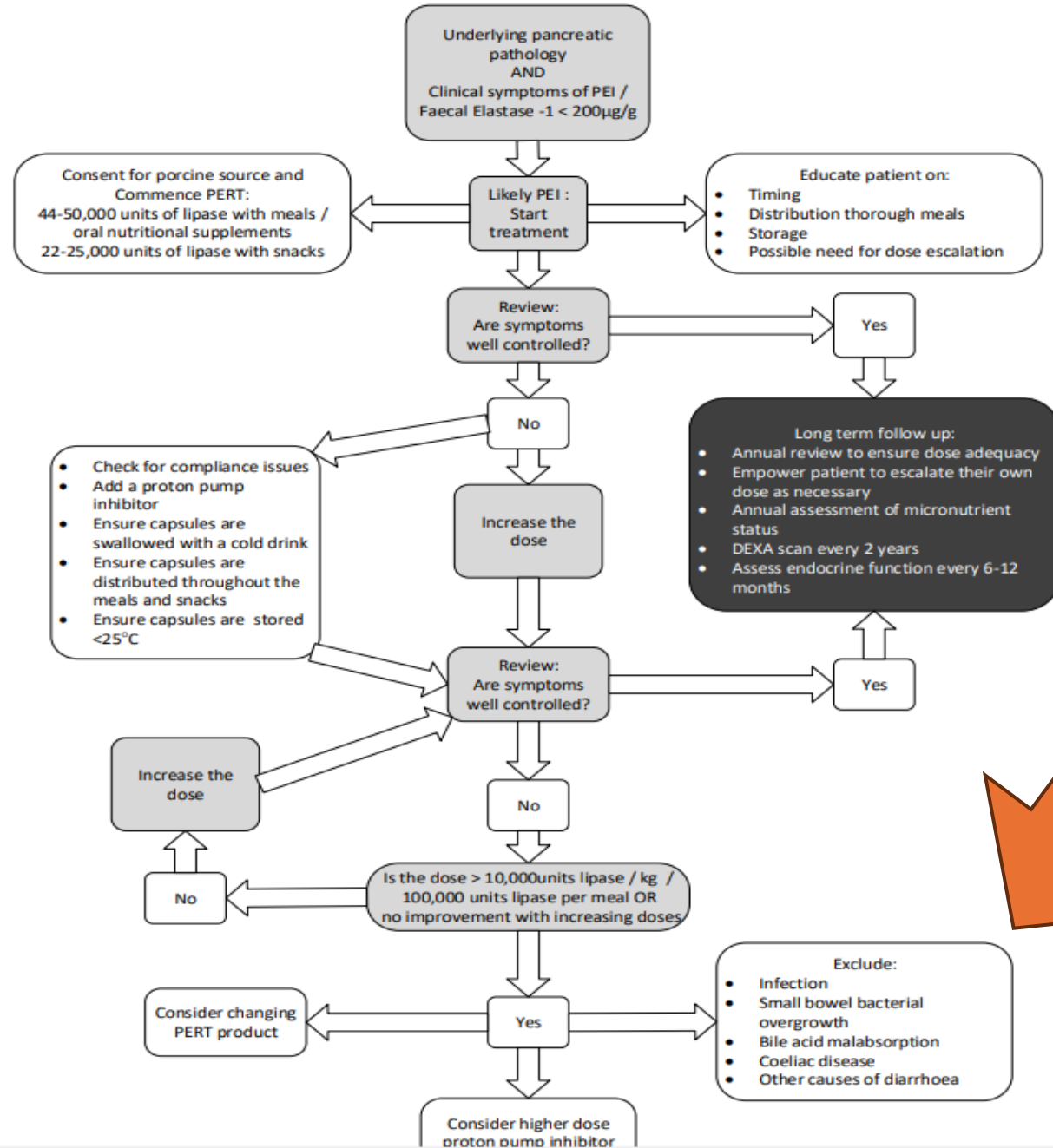
| Meal | Examples |
|--------------------------|---|
| Breakfast | Porridge/instant oat cereal made with milk or cream Wheat biscuits or breakfast cereals (avoid any with nuts/dried fruit) soaked in milk Skinless sausages with poached eggs Omelette, scrambled, fried or poached eggs |
| Lunch | Soup: homemade, tinned or packet Macaroni cheese or ravioli Tinned spaghetti Jacket potato (with skin removed) with soft filling e.g. cream/cottage/grated cheese, tuna mayonnaise, bolognese |
| Evening meal | Cottage/shepherd's pie Fisherman's pie / Fish in a sauce Chicken/beef stew slow cooked) Pasta e.g. Spaghetti bolognese Corned beef hash Tofu, Quorn or soya mince in gravy/sauce Cauliflower cheese Well cooked vegetables Vegetable curry or other soft rice dishes |
| Snacks / Puddings | Fruit such as banana, stewed apple or pear Yogurt or fromage frais Stewed fruit with custard, cream, condensed/evaporated milk Egg custard/crème caramel Ice-cream/sorbet Sponge and custard Mousse/blancmange/instant whip/milk or fruit jelly |

Foods to avoid post stent

Important to avoid foods that may block the stent

- Raw vegetables or harder to digest vegetables (e.g. salad, green beans, sweetcorn and celery)
- Nuts and dried fruit
- Cereals with nuts/fruit or those that don't soak well in fluid e.g. granola
- Citrus fruits with piths/skin (e.g. oranges and grapefruit)
- Tough or gristly meat
- Poultry skins e.g. chicken
- Fish with bones
- Jacket potato skins
- Bread

Other considerations



Bile acid malabsorption (BAM/ BAD)

Symptoms;

Diarrhoea (explosive, watery , smelly)

Urgency

Bloating

Cramping

Abdominal pain

Excessive wind

Similar symptoms to PEI

Symptoms can have a physical , psychological and social impact on quality of life (Ludlow et al., 2020)



Bile acid malabsorption (BAM / BAD)

Bile is involved in the breakdown of fat and vitamin and removal of waste products

Bile acids are made in the liver, stored in the gallbladder and released into the small intestine when food is consumed.

97% of bile acids are re-absorbed in ileum and returned to the liver. When this cycle is disturbed, bile acid malabsorption or bile acid diarrhoea occurs.

Diagnosed using a **SeCHaT scan**

Retention values;

15-20% Borderline BAM

10% -15% Mild BAM

5% to 10% Moderate BAM

0% to 5% Severe BAM

Bile acid malabsorption (BAM/BAD)

Establish on medications before considering dietary changes!

Bile acid sequestrants;

- **Cholestyramine** - 4 g daily, increased in steps of 4 g every week (12-24g) in 1-4 divided doses
- **Colestipol**
- **Colesevelam** - 1.25–3.75 g daily in 2–3 divided doses

Inhibit the absorption of other drugs so must be taken four hours before or after other medications

BAM

Nutritional considerations

- Patients report multiple dietary exclusions / intolerances
(McKenize et al., 2024)
- At risk of soluble vitamin deficiencies (A, D, E, K) and trace element deficiencies can occur with longer term use of bile acid sequestrants
- Low fat diet (~ 20% total energy intake, minimum) e.g. 2000kcal/day = 45g fat per day
- **Use with caution in pancreatic cancer!!**
- Asymptomatic
- Losing weight / underweight/ malnourished
- History of disordered eating

BAM

Nutritional considerations

- Systematic review – no conclusions on effectiveness of diet , exercise and psychology
- Low fat diet > possibly beneficial for diarrhoea, flatulence and abdominal pain (McKenzie et al., 2022)
- More research needed into other diet therapies e.g. FODMAPS
- MDT approach

On assessment;

- Optimise bile acid sequestrant / Minimise dietary restrictions
- Ensure meeting nutritional requirements – protein / energy
- Consider low fat snacks and oral nutritional supplements if needed e.g. Fortijuce , Vital 1.5kcal , Prosource

Small intestinal bacterial overgrowth (SIBO)

Symptoms;

Weight loss

Bloating

Flatulence

Chronic diarrhoea

Abdominal pain and distention

Nutritional deficiencies (Iron , B12, Calcium)

Link between PEI and SIBO

Small intestinal bacterial overgrowth (SIBO)

TREATMENT OF SIBO

Antibiotics

Recommendations

6. We suggest the use of antibiotics in symptomatic patients with SIBO to eradicate overgrowth and resolve symptoms (conditional recommendation, low level of evidence).

Table 5. Suggested antibiotics for treatment of small intestinal bacterial overgrowth

| Antibiotic | Recommended dose | Efficacy |
|-------------------------------|-----------------------|--------------|
| Nonabsorbable antibiotic | | |
| Rifaximin | 550 mg t.i.d. | 61%–78% |
| Systemic antibiotic | | |
| Amoxicillin-clavulanic acid | 875 mg b.i.d. | 50% |
| Ciprofloxacin | 500 mg b.i.d. | 43%–100% |
| Doxycycline | 100 mg q.d. to b.i.d. | ^a |
| Metronidazole | 250 mg t.i.d. | 43%–87% |
| Neomycin | 500 mg b.i.d. | 33%–55% |
| Norfloxacin | 400 mg q.d. | 30%–100% |
| Tetracycline | 250 mg q.i.d. | 87.5% |
| Trimethoprim-sulfamethoxazole | 160 mg/800 mg b.i.d. | 95% |

^aIn the study, no testing performed to reassess small intestinal bacterial overgrowth, although all participants had other objective measures of improvement.

Rifaxamin is often used
first line

SIBO may return as
underlying cause can often
remain > may need cyclical
antibiotic regimen

Dumping syndrome

Symptoms

Early Dumping Syndrome

Usually occurs within 30 minutes of eating

Nausea, Diarrhoea, Feeling weak, , Faint or dizzy, High heart rate, Sweating, Abdominal cramps

Late Dumping Syndrome

Occurs a few hours after eating or after missing a meal

Dizziness, Cold sweats, Faintness, Low blood sugars Low blood pressure
Chewing glucose tablets or eating a sugary snack can help symptoms

Dumping syndrome

Diet advice

- Little and often approach
- Avoid large meals
- Eat at a slow pace
- Keep large quantities of fluids away from meals
- Alteration in amount of readily absorbed carbohydrate foods
- Include meals high in protein and fat

Medication

Acarbose

Delays the digestion and absorption of starch and sucrose; it has a small but significant effect in lowering blood glucose.

*Pancreatin is predicted to decrease the effects of Acarbose and manufacturer advises to avoid (BNF)

Type 3c diabetes

Diabetes of the exocrine pancreas / Pancreatogenic Diabetes

- Chronic pancreatitis
- Acute pancreatitis
- Pancreatic cancer
- Pancreas surgery e.g. Pancreatectomy
- Cystic Fibrosis
- Others - Haemochromatosis, Fibrocalculous, Pancreatopathy,

NICE guidelines recommend testing patients who are over 60 with weight loss, other GI symptoms and new onset diabetes for pancreatic cancer

Type 3c diabetes

Endocrine function:

- Production of hormones Islets of Langerhans
- 1-2% cells of pancreas

Destruction of all islet cells (not just beta cells like in type 1 diabetes)

- Alpha cells
- Beta cells
- Delta
- Pancreatic Polypeptide cells

Loss of all pancreatic hormones (insulin , glucagon, somatostatin , pancreatic polypeptide.

T3c diabetes Diagnosis

| HbA1c test | |
|--------------|--------------------|
| Normal | 42mmol/mol |
| Pre-Diabetes | 42-47mmol/mol |
| Diabetes | 48mmol/mol or over |

Serum blood glucose test:

- Random >11.1mmol/l
- Fasting >7.0mmol/l
- 2-hour Oral glucose Tolerance Test (OGTT) 75g.
>11.1mmol/l.

T3c Diabetes Pharmacological management

- Drugs typically used are the same as for T2 Diabetes

Metformin / other OHA agents

- May reduce requirement for insulin
- GI side effects

Insulin

- Required for hyperglycaemia
- Anabolic effects may be beneficial

Self monitoring is important - Finger prick testing / Libre

T3c Diabetes Dietary management

Principles of Management

Prevent:

- Hypoglycemia
- Hyperglycemia
- Exacerbation of malnutrition
- Co-morbidities associated with diabetes (e.g. retinopathy, renal disease)

Management Strategies

- Do not skip meals
- Take small, frequent meals
- Measure glucose levels frequently, particularly after physical activity, and if diet is poor
- Avoid alcohol
- Ensure adequacy of enzyme therapy
- Minimize high-sugar/ high-glycemic index food or fluids
- Consider a diary to record diet, glucose levels, enzymes, exercise, at least until acceptable glucose control is maintained
- Dietitian assessment/ monitoring

Hypoglycaemia dietary management

Symptoms;

- Sweating
- Feeling shaky
- Pale complexion,
- Blurred vision,
- Headache
- Lack of concentration



- Fast acting carbohydrate to treat e.g. Glucose tablets, 200ml fruit juice, 150ml non-diet sugary drink, 5 jelly babies
- Follow on with slower acting carbohydrate snack or meal if due
- Ensure PERT is taken with hypo treatments!

T3c Diabetes

Nutritional considerations

- Impaired and irregular nutrient absorption due to PEI. PERT initiation/increases > better absorption of starches unmasking diabetes
- Hypoglycaemia is common (impaired glucagon secretion) > hard to treat (Brittle DM)
- Glycaemic control aggravated by oncology treatment; chemo/steroids/treatment related infections
- Sudden deterioration in glycaemic control > think about malabsorption > consider disease progression
- PEI can be more pronounced in T3c diabetes , often accompanied by other nutritional derangements e.g. fat-soluble vitamins & mins (PEI , poor diet , alcohol history)
- Misdiagnosis and lack of knowledge surrounding type 3c diabetes makes management difficult

PCUK
Diabetes
event

**Diabetes and pancreatic
cancer, 14th January 2026,
9.30 - 12.00pm, via Zoom
Webinar**

Take home messages

- Malnutrition is common in pancreatic cancer and can have negative impact on clinical outcomes
- Early and aggressive nutrition support is required
- MDT management of nutrition impact symptoms is important
- Consider alternative causes of GI symptoms if treatments and PEI have been explored
- Type 3c diabetes is under-recognised and should be considered and monitored in all pancreatic cancer patients

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