Nutritional Management

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What I Will be Covering

- Managing appetite loss
- Diet fortification and oral nutritional supplements
- Enteral feeding
- Stent dietary advice
- Surgery – including pre- and post-surgery
- Chemotherapy
- Small intestinal bacterial overgrowth (SIBO)
- Bile acid malabsorption (BAM) / Bile acid diarrhoea (BAD)
- Dumping syndrome
- Introduction type 3c diabetes and how it impacts on nutrition

Managing Appetite Loss

- Poor appetite can be common in patients with pancreatic cancer
- Can be caused by medications, treatment, surgery and the cancer itself
- Symptoms from treatment can also impact appetite
- A patient may be prescribed steroids to help improve appetite
- Poor nutrition increases the risks of surgery and reduces the number of patients that can have chemotherapy

Managing Appetite Loss

- Eating little and often
- Keeping snacks handy
- Use smaller plates or smaller portions
- Try and eat to the clock if not feeling hungry
- Make the most of the good days
- Light exercise can help promote appetite
- Manage taste changes
- Get support with meal prep
- Nourishing drinks
- Take supplements as prescribed

Food Fortification

- Increasing the calories of food without increasing volume
- Use of high calorie foods to fortify meals or snacks
- Examples include:
  - Adding sugar, jam, honey and cream to cereals, porridge or hot drinks
  - Add cheese, cream or milk powder to soups
  - Add butter, cream or cheese to potatoes and vegetables
  - Enrich milk by adding 2-4 tablespoons of skimmed milk powder to whole milk which can be used for meals and drinks

Food Fortification

- Breakfast- Porridge made with water
- Lunch- ¼ tin of beans on a slice of dry toast
- Dinner- Baked cod, new potatoes and peas
- Snack- Strawberries
- Drinks- Tea and coffee made with semi-skimmed milk
- Calories- 720kcal
- Protein- 50g

- Breakfast- Porridge made with fortified milk
- Lunch- ¼ tin of beans on a slice of toast with butter and grated cheese
- Dinner- Fried cod, mashed potatoes with butter and fortified milk, peas with butter
- Snack- Strawberries and double cream.
- Drinks- Milky tea and coffee using fortified milk
- Calories- 1787kcal
- Protein- 91g
- Consider increased PERT requirement

Oral Nutritional Supplements (ONS)

- To be used in addition to oral intake
- Used in both acute and community settings
- Prescribed products- may be short or long term depending on clinical need
- Variety of flavours and formulations
- Food first advice should be followed in addition to taking ONS.

Nutritional Supplements

Type of ONS	When to use
Powdered ONS	Tend to be first line in community, to be mixed with full fat milk or water if smoothie style, can be compact
Ready Made Milkshakes	Can be either in ~200ml bottles or compact versions ~125ml
Ready Made Juices	Fat free but can still require PERT
Semi-Elemental	Can be taken without PERT
Savoury Soups	Can be available in powder form to mix with water
Dysphagia	Thickened fluids to pudding style supplements
Shot Style	Can either be fat or protein based, do not contain micronutrients, usually 30-40ml per shot

Enteral Feeding

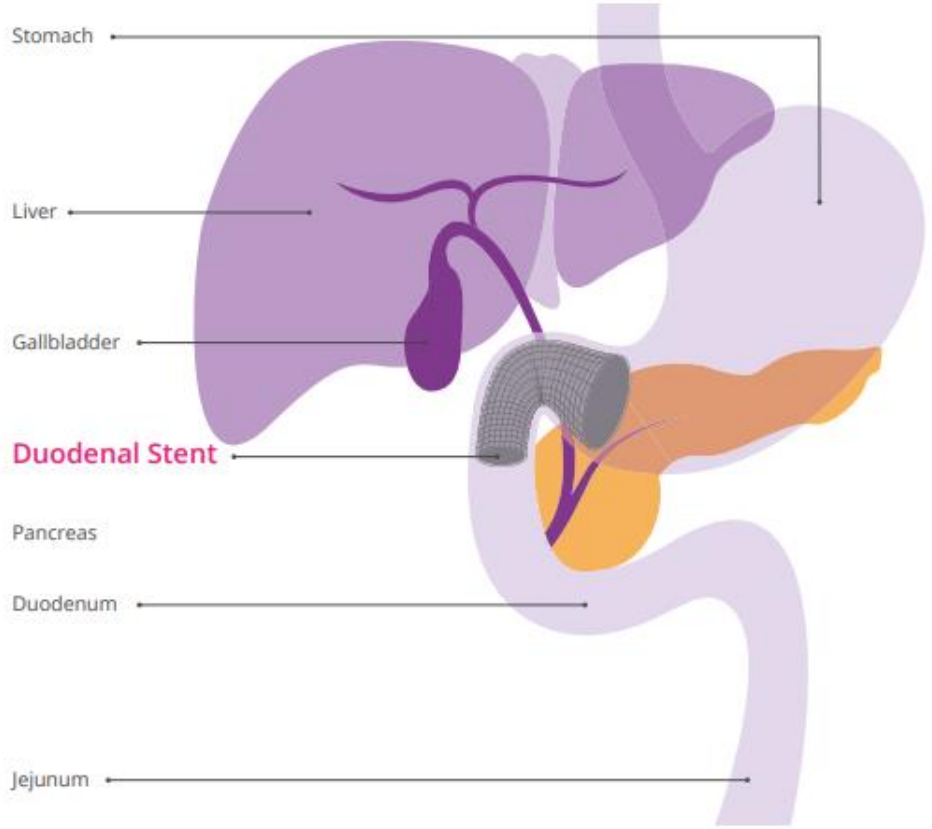
- May be required during all stages of treatment
- Gastric or jejunal route?
- NICE guidance- early enteral nutrition following pancreatoduodenectomy in patients with a functioning gut rather than parenteral nutrition.
- Enteral feeds should be peptide and medium-chain triglyceride-based- many patients do not require PERT with these feeds
- PERT can be given via enteral feeding tubes

Case Study

- Male, 65 years old, diagnosed with pancreatic head tumour, planned for surgery
- Current weight- 60kg, BMI 19.5, 12% weight loss over 6 months
- Poor intake secondary to poor appetite and nausea
- Prescribed PERT and taking appropriately
- Typical day-
  - Breakfast- 1x weetabix
  - Lunch- 1/2 tin of soup
  - Dinner- Small cooked meal e.g. chicken and potatoes or pasta
  - No snacks, prescribed powdered supplements but too fatigued to mix them up
- How would you improve this patients nutritional status?

Duodenal Stents

- Pancreatic cancer can press on the duodenum causing a gastric outlet obstruction
- Symptoms include nausea, early satiety and loss of appetite.
- If the duodenum is completely blocked it can cause vomiting.
- Stents allow and opening in the obstructed section of the duodenum, helping to alleviate symptoms



(Pancreatic Cancer Action, 2023)

Duodenal Stent Diet

- Stents take around 3 days to expand into the right position
- Liquid diet day 1 post stent insertion
- Soft moist diet on day 2 if liquids tolerated
- Foods at risk of blocking a stent:
  - Bread
  - Hard foods such as nuts
  - Stringy vegetables such as celery or green beans
  - Pith or skins of fruit
  - Tough or gristly meat

Duodenal Stent Diet- Typical Day

Meal	Food
Breakfast	Cornflakes/ Rice Krispies/ Porridge with plenty of milk Scrambled egg
Lunch	Jacket potato (no skin) with tuna mayo or cheese Creamy soup
Dinner	Cottage pie/ Shepherd's pie/ Bolognaise Fish in sauce/ Fish pie Pasta in a sauce- cooked in a pan not oven to prevent a hard/crunchy topping
Snacks	Yogurts/ Jelly/ Mousse Jelly babies/ Wine gums/ Chocolate
Puddings	Rice Pudding/ Custard/ Ice cream Blancmange/ Mousse

Duodenal Stent General Tips

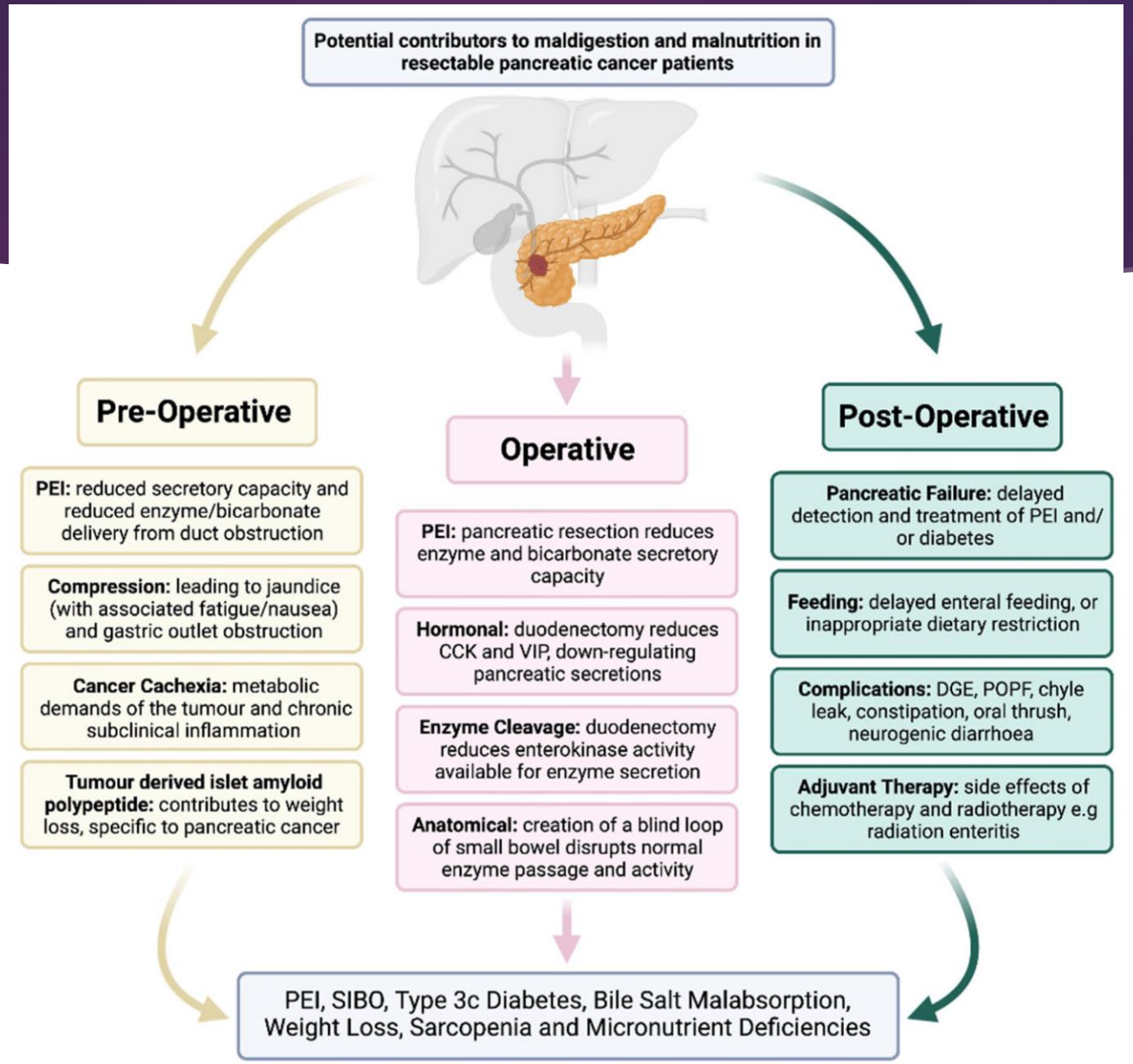
- Sit upright when eating
- Eat slowly and chew food well
- Eat little and often
- Avoid drinking too much before meals
- Avoid lying down for 30-60 minutes after eating

Pre-Surgery

- Malnutrition is present in a fifth of patients before pancreatoduodenectomy and increases during inpatient stay, to greater than 75%
- 5% weight loss has been demonstrated to be a significant predictor of complications
- Majority of pancreatic patients have significant weight loss prior to surgery
- NG or NJ feeding preferable over TPN in patients requiring artificial nutrition
  - Recommended in low BMI (<18.5kg/m2) or >15% weight loss
- Surgery may be delayed to ensure adequate nutritional status prior to surgery
- Preoperative carbohydrates intake aims to improve metabolic conditioning to saturate liver glycogen stores immediately before surgery

Post Surgery

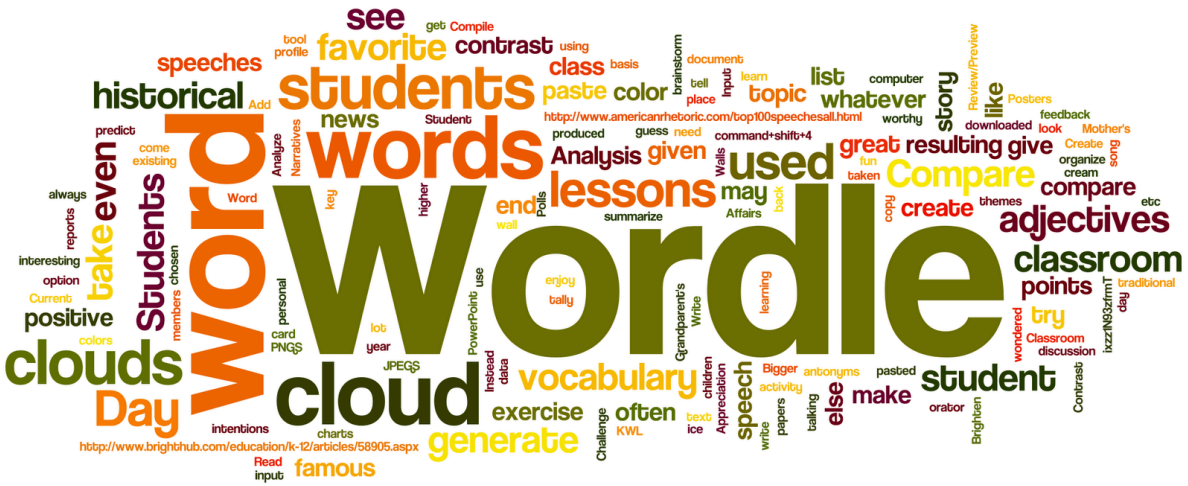
- Lack of consensus as to the best way to provide nutritional support to PD patients postoperatively
- ESPEN recommend nutritional intervention if 50% of nutritional requirements are not met post op
- Many struggle to meet these requirements due to delayed gastric emptying, PEI, loss of appetite, and post op pain
- NJ feeding frequently preferred route of supplementary nutrition
- PEI post op- duodenum also resected



(Halle-Smith et al, 2023)

Word Cloud

What are some common side effects of chemotherapy that could impact on nutritional intake?



Chemotherapy

- Chemotherapy may be used before and/or after surgery, combined with radiotherapy or used to control tumour growth in palliative patients
- Side effects of chemotherapy that can impact nutrition include:
  - Nausea and vomiting
  - Taste changes
  - Diarrhoea
  - Dry and sore mouth
  - Loss of appetite

Nausea and Vomiting

- Eat small meals and snacks rather than trying to have 3 large meals
- Avoid foods with strong tastes or smells
- Regular mouth care
- Cold foods can be better tolerated
- Dry, plain foods
- Nausea can be worse on an empty stomach
- Ask someone else to cook for you
- Ginger tea or ginger biscuits can help with nausea
- Fresh air
- Stay hydrated- avoid fizzy drinks and sip fluids

Taste Changes

- Foods may taste bland, metallic or different to how they used to
- Eat foods you enjoy and avoid foods you don't
- Revisit foods previously not tolerated as tastes change over time
- Season foods with herbs, spices or lemon and marinade meats
- Sharp tasting foods- lemon, pineapple, sweets, chutneys
- Plastic cutlery if foods taste metallic
- Good oral hygiene

Diarrhoea

- Ensure PERT is being taken appropriately
- Check for signs of infection
- Avoid alcohol and coffee
- Ensure to stay well hydrated to replace lost fluids
- Eat meals slowly
- Small frequent meals
- Reduce fibre
- Avoid greasy, fatty foods

Dry or Sore Mouth

- Sip fluids throughout the day
- Sucking on ice cubes or ice lollies
- Use sauces, gravy or condiments to keep food moist
- Sugar free gum can help produce more saliva
- Avoid alcohol and smoking as this can irritate the mouth
- Artificial saliva
- Good oral hygiene

Small Intestinal Bacterial Overgrowth (SIBO)

- Link between PEI and SIBO
- Symptoms include diarrhoea, flatulence, bloating and abdominal pain
- Causes- previous GI surgery, abnormal peristalsis from pelvic radiotherapy, impaired immune system, long term PPI use.
- SIBO can cause weight loss and nutritional deficiencies (iron, b12, calcium)
- Treated with antibiotics, first line Rifaximin
- SIBO may return as underlying cause has often persisted

Bile Acid Malabsorption (BAM)/ Bile Acid Diarrhoea (BAD)

- Bile acids are made in the liver, stored in the gall bladder and released into the small intestine
- 97% of bile acids are reabsorbed by the ileum and returned to the liver- BAM/BAD occurs when this process is disturbed
- BAM affects around 1 in 100 people in the UK

Type	Cause
Type I	Problem with reabsorption e.g cancer treatment or Crohn's disease
Type II	No definitive cause can be found
Type III	Results from cholecystectomy, radiotherapy, SIBO, coeliac disease or chronic pancreatitis

BAM Symptoms

- Diarrhoea caused by irritation of the lining of the colon and stimulating salt and water secretion
  - Pale, greasy and hard to flush away or may be unusually coloured stools.
  - Diarrhoea is usually frequent and can occur overnight
- Bloating
- Cramping and abdominal pain
- Excessive wind
- Symptoms similar to symptoms of PEI

BAM Diagnosis and Treatment

- Diagnosed via SeHCAT scan
- Dietary changes- low fat diet
- Medications- Bile Acid Sequestrants
  - Bind with bile acid in the small intestine to prevent irritation
  - Powders- Colestyramine and colestipol
  - Tablet- Colesevelam
  - Affect the absorption of other drugs so must be taken four hours before or after other medications
  - Patients can develop fat soluble vitamin deficiencies (A, D, E, K) or trace element deficiencies with long term use

Dumping Syndrome

- Unlikely to occur following pancreatic surgery unless patient has had a previous GI resection e.g. oesophagectomy or gastrectomy
- Large amounts of food released too quickly into the intestine
- Can be managed by diet
  - Small frequent meals
  - Eating slowly
  - Avoid drinking with meals and sip fluids slowly between meals
  - Avoid food or drinks high in added sugar
  - Meals high in protein and fat
- Acarbose first line medical treatment for dumping syndrome but interacts with Pancreatin so should not be used with PERT

Dumping Syndrome

Early Dumping Syndrome

- Usually occurs within 30 minutes of eating
- Symptoms include nausea, feeling weak, faint or dizzy, high heart rate, sweating, and abdominal cramps
- Symptoms usually settle after lying down for 15-30 minutes

Late Dumping Syndrome

- Occurs a few hours after eating or after missing a meal
- Symptoms include dizziness, cold sweats, faintness, low blood sugar, and low blood pressure
- Chewing glucose tablets or eating a sugary snack can help symptoms

Type 3c Diabetes

- Current guidelines are to treat with metformin and insulin
- Treatment can vary depending on the damage to the pancreas
- Patients with type 3c diabetes often start on insulin quicker than those with type 2 diabetes
- Goal of treatment is to prevent very high and very low blood glucose levels, stop further weight loss and avoid longer-term complications of diabetes
- NICE guidelines recommend testing patients who are over 60 with weight loss and new onset diabetes for pancreatic cancer

Parameter	T1DM	T2DM	T3cDM
Ketoacidosis	Common	Rare	Rare
Hypoglycaemia	Common	Rare	Common
Peripheral Insulin Sensitivity	Normal or Decreased	Decreased	Normal or Increased
Hepatic Insulin Sensitivity	Normal or Decreased	Decreased	Normal or Decreased
Insulin Levels	Low or absent	High or Normal	Normal or low
Glucagon Levels	Normal or high	Normal or High	Normal or low
PP Levels	Normal or low	Normal or High	Low or absent
GIP Levels	Normal or low	Variable	Low
GLP-1 Levels	Normal	Variable	Variable
Typical Age of Onset	Childhood or adolescence	Adulthood	Any
Typical Etiology	Autoimmune	Adulthood	CP, cystic fibrosis, post op

(Andersen et al, 2017)

Type 3c Diabetes- Nutritional Management

- Eat meals little and often and include starchy carbohydrates
- Try not to skip meals
- Monitor blood glucose levels particularly if on insulin, after exercise, if intake poor and having symptoms of hypoglycaemia
- Ensure PERT is taken appropriately
- Limit high GI or high sugar foods and fluids
  - Consider nutritional supplements and their carbohydrate content
- Avoid alcohol

Type 3c Diabetes Challenges

- May be referred to as brittle diabetes
- Impaired glucagon secretion, hypo more likely and harder to treat
- Impaired and irregular nutrient absorption due to PEI
- If post surgery- will need insulin and glucose or risk diabetic ketoacidosis
- Often misdiagnosed and lack of knowledge surrounding type 3c diabetes

Hypoglycaemia

- Common symptoms include feeling shaky, sweating, pale complexion, blurred sight, headache, lack of concentration
- Requires fast acting carbohydrate to treat
  - Glucose tablets
  - 200ml fruit juice
  - 150ml non-diet sugary drink
  - 5 jelly babies
- This should be followed by a slower acting carbohydrate snack
- Ensure PERT is taken with hypo treatment

References

- Afaneh, C (2015) Pancreatic cancer surgery and nutrition management: a review of the current literature
- Andersen, D.K. et al, (2017). Diabetes, Pancreatogenic Diabetes, and Pancreatic Cancer
- Duggan et al (2017). The nutritional management of type 3c (pancreatogenic) diabetes in chronic pancreatitis
- Guts UK, (2018) Bile Acid Malabsorption. https://gutscharity.org.uk/advice-and-information/conditions/bile-acid-malabsorption/
- Halle-Smith, J.M et al, (2023) Recent Advances in Pancreatic Ductal Adenocarcinoma: Strategies to Optimise the Perioperative Nutritional Status in Pancreatoduodenectomy Patients
- Melloul, E. et al, (2019) Guidelines for Perioperative Care for Pancreatoduodenectomy: Enhanced Recovery After Surgery (ERAS) Recommendations.
- NICE (2018). Pancreatic cancer in adults: diagnosis and management. https://www.nice.org.uk/guidance/ng85
- Pancreatic Cancer Action (2023) Eating After a Duodenal Stent. https://pancreaticcanceraction.org/wp-content/uploads/2023/09/Eating-After-a-Duodenal-Stent.pdf
- Pancreatic Cancer UK (2024) Chemotherapy for Pancreatic Cancer. https://shop.pancreaticcancer.org.uk/cdn/shop/files/Chemotherapy_for_pancreatic_cancer_2024_web.pdf?v=1577971540782738961 2&_gl=1*162gj5y*_gcl_au*NDkyNzMxNzExLjE3Mjk2MDczOTU.*_ga*ODI1MzIwMDAwLjE3Mjk2MDczOTI.*_ga_E5BXK8E7L5*MTczMDM4MzcwOS4yMC4xLjE3MzAzOTEwMzAuNTguMC4w
- Phillips, M.E. et al (2021) Consensus for the management of pancreatic exocrine insufficiency: UK practical guidelines