



NET Nutrition

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What's on the menu today?

- Malnutrition
- Loose stools
- Vitamins
- Plans

Problems for NET Patients

- Weight loss (or weight gain in insulinomas)
- Loose stools (diarrhoea, steatorrhoea)
- Vitamin and mineral deficiencies
- Oesophageal and intestinal obstructions
- Post op-complications (rare)

Lead to:

- Malnutrition
- Lack of treatment options
- Poor quality of life
- Poorer survival

2 Main Causes

- A. Direct effects of NETs
- B. Side effects of treatments

- **Some patients get both at some point**

Malnutrition

Why is it important?



Malnutrition

- UK study of 161 GEP NET patients screened with MUST tool, not led by a Dietitian.
 - MUST score was positive (≥ 1) in 14% of outpatients with GEP-NET.
 - MUST-positive patients had lower faecal elastase concentrations compared to MUST-negative patients
 - Also were more likely to be on treatment with long-acting somatostatin analogues

Malnutrition

Danish study of 186 patients (51% women) using NRS tool, led by a Dietitian.

- BMI, Hand grip strength (HGS), NRS measures.
- Low BMI (<20.5 kg/m²) in 12%
- Low HGS in 25%
- Impaired level of function in 43% of the patients.
- Weight loss more likely in patients with an intestinal or pancreatic NET
- 38% were at nutritional risk, more frequent in patients with residual disease
- Both low HGS, impaired level of function and being at nutritional risk were associated with symptoms: nausea, vomiting, stomach ache and dry mouth
- Poor appetite and early satiety were only associated with being at nutritional risk and having impaired level of function

Loose Stools- Diarrhoea

- Hormone related
- SIBO
- Intestinal adaptation after surgery

Small intestinal Bacterial Overgrowth (SIBO)

- Common
- Hydrogen producing bacteria type most common (leads to diarrhoea)
- Methane producing bacteria type less common (causes constipation)
- Hydrogen and methane breath testing

- Probably best treated with rifaxamin (+ possibly with low FODMAP diet and 4 hour meal gaps)
- Herbal alternative therapies
- Other studies have used Lactol probiotic

Food Triggers and Carcinoid syndrome

- Large fatty meals (? saturated fat)
- Spice
- Alcohol
- Foods high in amines: aged cheese, alcohol, smoked/salted fish and meat, yeast, fermented-tofu, miso, sauerkraut
- Foods moderate in amines: large dose of caffeine, chocolate, peanuts, brazil nuts, coconut, avocado, banana, raspberries, most soybean products and broad beans

Loose Stools- Steatorrhoea and PEI

- Pale, yellow/greasy/oily/floating stools that wont flush
- 1 cause is exocrine pancreatic insufficiency (EPI)
- Caused by obstructed/dilated pancreatic duct/pancreatic calcification/atrophy or tumour replacing pancreatic tissue on CT/ after surgery (and CF)
- And also some patients on somatostatin analogues
- Treating EPI should ideally be under care of Dietitian
- Pancreatic enzyme replacement therapy (PERT)
- 22,000-25,000 units lipase per snack, 44,000-50,000 units lipase per meal
- Once settled on this, increase the dose: usually 22,000-50,000 units lipase per snack/nutritious drink or 44,000-75,000 units lipase per main meal
- Rules for taking

Somatostatin Analogues (SSA's)

Many patients experience a change in stool after commencing on SSA's

- SSA's interfere with the absorption of nutrients through direct effects on pancreatic enzyme secretion
- SSA's also significantly decrease the duodenal absorption of carbohydrates and triglycerides directly
- Does it make SIBO more common?

Loose stools - Steatorrhoea

Also caused by

- Small intestinal bacterial overgrowth (SIBO)
- Bile acid malabsorption after surgery and treatment

Bile acid malabsorption (BAM)

- UK study of 114 patients suffering with BAM after cancer treatment.
- 44% already taking colesevelam
- Personalised dietary intervention by Dietitian
- Reduction of fat in diet to 20% of daily energy requirement
- After dietary intervention, improvement in abdominal pain and nocturnal defecation
- Improvement in bowel frequency, urgency, flatulence, belching and stool consistency

Vitamins



Fat soluble Vitamins

Netherlands study of 54 patients, mostly with serotonin producing tumours and on somatostatin analogues for at least 18 months.

- Only one fifth of patients had steatorrhoea, but
- 6% deficient in vitamin A
- 28% deficient in vitamin D
- 15% deficient in vitamin E
- 63% deficient in vitamin K1
- 58% deficient in erythrocyte vitamin E

Vitamin Deficiencies- B12

Swedish study of 50 patients with SI NETs, half were supplemented with vit B12, calcium, vit D

- 32% deficient in B12
- Therefore requires monitoring and supplementation

1980's Norwegian study found low vitamin B12 levels in some patients receiving octreotide therapy.

Vitamin Deficiencies -Vitamin D

- Same Swedish study in small intestinal NETS:
 - 46% deficient in Vit D3
 - All patients with small intestinal NETs should have Vitamin D3
- Polish study: vitamin D deficiency is not worsened by tumour location or somatostatin analogues.
- UK study of Vitamin D supplementation. 66% patients with GEP NETs were insufficient.
 - 45% deficient at 12 months, 46% at 24 months. Risk factor- abdominal surgery.
 - Always get your Vit D checked!

Carcinoid syndrome and Niacin deficiency

- When the body makes large amounts of serotonin, tryptophan levels drop
- When tryptophan stores are low it cannot be converted into niacin
- 28 -45% of patients with serotonin producing tumours and carcinoid syndrome found to be niacin deficient
- Results in Pellagra (DEMENTIA-DIARRHOEA-DERMATITIS)
 - Test urinary N1-MN- ideal, (or tryptophan first and urine second) although not available
 - Study showed average of 144mg nicotinamide /d required for upper normal level
 - As no way of reliable testing in UK, use a nicotinamide containing supplement to prevent niacin deficiency, B strong compound may be best.

Other Intervention studies

- Use of the low FODMAP diet to reduce diarrhoea, reduce weight loss and improve quality of life.
 - Useful where issues are thought to be linked to IBS, gut dysbiosis.
- GEP NETs. Enterade drinks BD for 1 week.
 - 10/13 (59%) reported more than a 50% reduction in diarrhoea frequency

Plans

- Dietitians interested in NETs Group (DING) ... joining Europe!!! perhaps.
- Anthropometry and treatment outcomes
- Vitamin studies
- Diet and exercise program
- Genetic syndromes and dietary exclusions
- Pre-surgical Nutrition



Any Questions?