Bariatrics – Nutrition After the Knife

Part 2 – Post-operative

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Obesity rates are increasing and bariatric surgery is an effective treatment option for morbid obesity and its associated metabolic complications. Although, surgery isn't suitable for everyone and doesn't come without risk, this article will specifically look at the post-operative nutritional considerations.

Given the anatomical and physiological changes following surgery, nutritional challenges coexist with the surgery and may manifest as protein-calorie malnutrition and vitamin and mineral deficiencies, particularly thiamine (B1), vitamin B12, vitamin D, and iron. Such deficiencies can lead to the more serious conditions of anaemia, metabolic bone disease and neuropathies. Other post-operative challenges with bariatric surgery include nausea, vomiting, diarrhoea, constipation and bacterial overgrowth.[1] It is therefore essential that patients are monitored to ensure that they are meeting their nutritional requirements and to mitigate risks of developing nutritional deficiencies.

Bariatric procedures with a malabsorptive component generally have a greater impact on long term nutritional outcomes than restrictive procedures, and the risks tend to increase proportionally with the amount of small bowel being bypassed.[2] The duodenal switch comes with the highest risk although this surgery is not currently offered at University Hospitals of North Midlands NHS Trust (UHNM) and not discussed here.

Mechanisms of weight loss

Although the full range of mechanisms is incompletely understood, the following processes are involved in eliciting weight loss, post-operatively:[3]

- Dietary restriction due to creation of small gastric pouch (<30 ml).
- Reduced appetite, mediated by gastric and hormonal changes – including ↑GLP-1, ↓ghrelin grehlin, ↑leptin, ↑PYY, ↑CKK, altered bile acid levels and composition etc.
- Dietary modifications as a result of taste and olfactory changes, fear of dumping syndrome, GI symptoms.
- Malabsorption: micronutrients including iron, calcium, zinc, selenium, folic acid are absorbed in the duodenum and upper jejunum. The Roux-en-Y gastric bypass (RYGB) bypasses this length of intestine which may lead to deficiencies. Vitamin B12 deficiency can occur as it requires an acidic environment and intrinsic factor produced by gastric parietal cells.[4]
- Alterations in gut microbiome.
- Epigenetic changes modifying gene expression.

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The role of the dietitian

Post-operatively the registered dietitian (RD) plays an important role in supporting the patient through their journey, promoting an adequate provision of nutrients as well as identifying, preventing and managing nutritional deficiencies.[2] We reinforce nutritional education and behaviour modification in order to maximise weight loss outcomes. A comprehensive nutritional assessment at regular appointments is important in order to achieve this as well as identifying any difficulties the patient may be experiencing.

A nutritional assessment will cover the following areas:

- diet history, food frequency,
- presence of GI symptoms affecting food intake e.g., reflux, vomiting, dumping syndrome,
- behavioural/psychological: body image, relationship with food, food aversions,
- assess compliance with routine micronutrient supplementation,
- anthropometrics, including amount of excess bodyweight loss,
- bowel habits,
- food intolerances,
- bloods, (vitamin B12, Calcium, vitamin D, Folate, Copper, Zinc, Selenium and Iron as well as FBC and U+E's FBC),
- physical activity levels.

Post-operative dietary progression

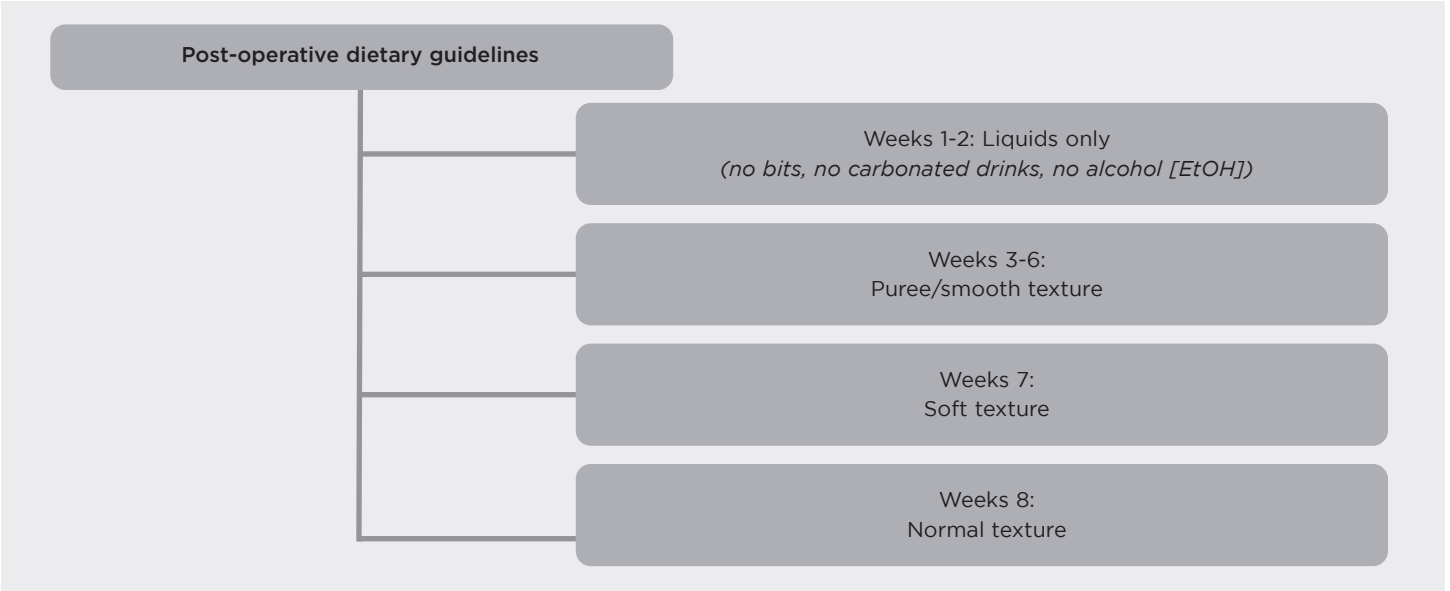
In the early post-operative period, patients are required to follow a diet progression which enables them to adjust to the reduced stomach capacity, minimise potential nausea and vomiting, keep hydrated and obtain adequate nutrients for healing (**Figure 1**). As the patient progresses onto more solid foods and the more difficult to digest protein sources advice around behaviour changes becomes particularly relevant.[1]

Eating behaviours

Education around appropriate eating behaviours is a key component of dietetic input. In the short term, it is important to help to manage poorly tolerated foods and reduce side effects such as nausea or discomfort, and the longer term, in helping to maintain weight loss. Taking small bites, chewing thoroughly and eating slowly are key. Additionally, drinking while eating can interfere with solid food intake, as well as increasing the possibility of rapid food emptying and possible dumping syndrome. In the longer term it could flush food through the system thereby decreasing satiety. Patients are therefore instructed to avoid drinking fluids 30 min before, during a meal and to wait 30 min after the meal.[1] Even after considering eating techniques some foods are still poorly tolerated, such as tough or dry meats or poultry, breads or other doughy products, pasta and rice and some raw fruits or vegetables.

Some patients, post-operatively, can fall into the trap of grazing. This is discouraged and we reinforce balanced meals with an adequate protein content to reach the recommended daily protein intake. Solid foods should be preferred as this helps provide greater satiety.[2]

Figure 1: UHNM post-operative dietary guidelines



Protein malnutrition

Protein malnutrition is a rare but serious potential complication of bariatric surgery, it can present several years after bariatric surgery and the causes are usually multifactorial. They can include malabsorption and poor dietary intake which may be a result of prolonged vomiting, food intolerances, mental health or fear of weight regain.[5] An important part of dietetic follow-up is to ensure patients are getting adequate dietary protein, the minimum requirement after surgery being 60 g a day. In the short term a high protein diet is encouraged in order to minimise the loss of muscle mass during the rapid weight loss phase. Due to the combination of restriction and/or intolerances some patients can find this difficult to achieve. Providing tailored advice is therefore important to promote protein intake. In the longer term, protein will enhance satiety and prevent protein malnutrition.

Dumping syndrome

Dumping syndrome is a potential complication of surgery and patients are counselled on the nature of dumping syndrome and how to avoid it – it is more common with the RYGB, due to lack of pyloric sphincter.

Early dumping syndrome

This may occur after consumption of refined carbohydrates. The current theory is that early dumping is caused by rapid delivery of food to the small intestine, resulting in osmotic fluid shifts from the intravascular compartment to the intestine, producing unpleasant gastrointestinal and vasomotor symptoms.[6] The avoidance of simple sugars and separation between liquids and solids for ≥30 min should minimise risk. Patients can view dumping syndrome as a tool to deter them from eating sweet foods which in turn often helps facilitate weight loss. The frequency of dumping syndrome diminishes over time.

Late dumping/reactive hypoglycaemia

Typically, this doesn't present until at least two years post-surgery and can significantly impact on a patient's quality of life. It occurs one to three hours after a meal and the aetiology seems to be excessive insulin secretion leading to a hypoglycaemic event.[6] The first line of treatment is dietary measures; smaller and more frequent meals, choosing low-glycaemic index carbohydrates and limiting sugary drinks and foods.[1]

Supplementation

Lifetime supplementation is vital as all procedures can potentially cause clinically significant micronutrient deficiencies:[4]

- Forceval one capsule daily,
- Ferrous sulphate 200 mg once daily,
- Fultium D3 2000 iu once daily,
- B12 injections 1 mg, every three months.

It is necessary to check adherence to supplementation at every review as requirements and adherence can vary over time. Monitoring patient's bloods at regular intervals is an important part of the management process.

Initially most patients will experience a lack of hunger and early satiety however as their weight stabilises both of these will increase. Patients are often highly motivated while achieving weight loss results and reducing, or eliminating, medications etc. However, the weight-loss maintenance-phase is often more challenging.[7] Obesity is a complex and chronic condition, and just as causes of obesity vary between individuals, so will their treatment outcomes. Maintaining a healthier weight for some, even after weight loss surgery, may mean a lifetime of intermittent behavioural, medical, psychological or nutritional therapy.

Conclusion

Patients should have access to lifelong monitoring following bariatric surgery to ensure that nutritional requirements are met and the risks of developing post-bariatric surgery related nutritional deficiencies are reduced.[4] At UHNM currently we discharge patients back to the GP at two years post-op, with advice on which bloods to screen for annually.

The RD has an important role in optimising outcomes for the patients, and research shows patients consider access and interaction with an RD as a vital role in their success.[2]

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