Bariatric surgery: Practical aspects of primary care management

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Article points

1. Bariatric surgery is an effective treatment for obesity and type 2 diabetes; however, it requires lifelong monitoring postoperatively.
2. Failure to adhere to dietary advice will result in weight gain and complications such as reactive hypoglycaemia; dietary control is key.
3. Bariatric centres routinely follow patients for 2 years; thereafter, ongoing nutritional monitoring needs to take place in primary care.

Key words

- Bariatric surgery
- Obesity
- Nutritional monitoring
- Nutritional supplementation

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Bariatric surgery is an effective treatment for obesity and can lead to remission of its related complications, including type 2 diabetes. However, recipients need appropriate preoperative advice and management from dietitians and psychologists to ensure suitability for surgery and ability to change behaviour. Certain procedures also require lifelong nutritional supplementation, and all recipients will need long-term monitoring and management, which currently takes place in primary care. This article is a review of bariatric surgery and the role of primary care in supporting people who undergo it.

An extensive body of data supports the use of bariatric surgery in selected patients to alleviate the burden of morbid obesity and its associated complications. In particular, multiple studies have demonstrated remission of type 2 diabetes and improvements in cardiovascular risk factors as a result of surgery (Courcoulas et al, 2014; Schauer et al, 2017). A recent long-term study has shown that these benefits are sustained up to 5 years postoperatively and has identified further benefits, such as improved quality of life and reduced medication use (Schauer et al, 2017). Reductions in all-cause mortality rates at 5 and 10 years are also recognised (Patterson et al, 2003). The precise mechanism behind the remission of type 2 diabetes is unclear; however, factors include changes in glucagon-like peptide-1 (GLP-1) and other gut hormones, bile acids, the gut microbiota and liver metabolism, in addition to weight loss (Rhee et al, 2012; Goldfine and Patti, 2014).

This article reviews the role of primary care in supporting people who undergo bariatric surgery, including preoperative assessment and postoperative monitoring of complications and nutrition.

Types of bariatric surgery

The three types of bariatric surgery commonly employed in the UK, and their advantages and disadvantages, are shown in *Box 1*. Endothelial sleeve procedures, such as the EndoBarrier, are not routinely available on the NHS. They have been used in clinical research studies and, internationally, safety concerns have been reported over an increased frequency of liver abscess, which has led to restriction of its use to clinical trials only in the US. Therefore, they will not be reviewed in this article

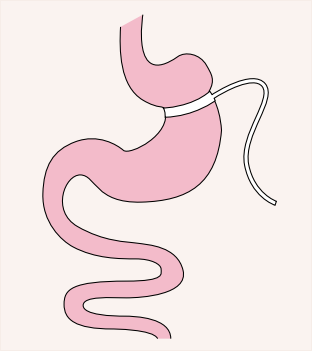
Who to refer for bariatric surgery

Existing evidence and expert multidisciplinary opinion have contributed towards a number of international and national guidelines (NICE, 2014; Rubino et al, 2016). Bariatric surgery can result in significant changes in metabolism beyond those caused by simple weight loss. As such, bariatric surgery is now recommended as the most effective treatment for type 2 diabetes with associated obesity, particularly when other appropriate interventions have failed (Picot et al, 2009; Colquitt et al, 2014).

Type 2 diabetes remission rates are higher in people within 10 years of diagnosis who do not require insulin therapy (Schauer et al, 2016). A diabetes duration of >10 years is often characterised by insufficient insulin production, and resolution of insulin resistance will not be enough to cause remission of type 2 diabetes; at best, such patients may achieve a partial remission.

Box 1. Main bariatric procedures currently employed in the UK.

Laparoscopic adjustable gastric band (LAGB)



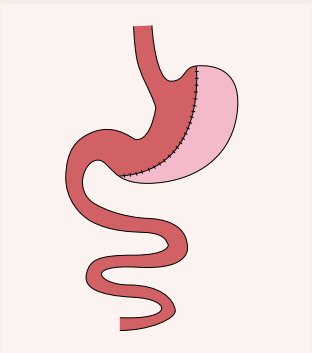
Mechanism: The band creates a sense of fullness after meals and reduces portion size and hunger between meals. The band is first filled with fluid (from an external port) 6 weeks postoperatively and can be periodically tightened thereafter. LAGB has no effect on incretin hormones or calorie absorption; therefore, it is less useful for people with type 2 diabetes and metabolic syndrome.

Efficacy: Average weight loss is about 40–50% of excess body weight in the first 2 years, but there is considerable variation between individuals (10% fail to lose weight). Does not restrict liquid or soft food intake; there are reports of patients liquidising chocolate bars or drinking cream to satisfy their cravings.

Advantages
- Less surgical risk than other procedures
- No changes in intestinal absorption
- Reversible

Disadvantages
- Slower or delayed weight loss
- The band may leak, deflate or slip, requiring replacement
- Possible ⇧gastrointestinal reflux, difficulty swallowing, dehydration, constipation
- ⇧Nausea and vomiting – particularly initially

Laparoscopic sleeve gastrectomy



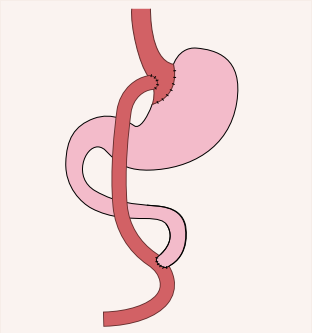
Mechanism: The stomach size is reduced, through a stapling procedure, by about 75% and the redundant stomach removed. This leads to a significant reduction in hunger postoperatively. Affects incretin hormone secretion, with a corresponding reduction in appetite. As the operation maintains the usual pathway for food, most nutrients are absorbed normally, although proteins, vitamins and some minerals may not be.

Efficacy: The majority of people lose 50–60% of their excess body weight. This occurs quickly, over the course of the first year. There is some variation in response in terms of both weight loss and type 2 diabetes remission; 24% achieved a mean HbA_{1c} of ≤42 mmol/mol (6.0%) at 3 years postoperatively (Schauer et al, 2014).

Advantages
- Less surgical risk than with RYGB
- Little change in intestinal absorption
- Suitable for those with central obesity or who have had previous abdominal surgery – technically easier operation than RYGB

Disadvantages
- Need lifelong vitamin and mineral supplementation
- Weight loss may be less than with RYGB
- Greater risk of weight regain than with RYGB
- ⇧Cholelithiasis
- Nausea and vomiting in first few days
- ⇧Gastro-oesophageal reflux
- Permanent procedure

Laparoscopic Roux-en-Y gastric bypass (RYGB)



Mechanism: Initially, a small gastric pouch is created using staples and separated from the main stomach. The main stomach remains *in situ* with a normal blood supply and is repaired at the site of the separation. The small intestine is then divided around 75–150 cm from its origin. The lower end of the divided intestine is attached to the distal end of the newly formed stomach pouch, and the proximal end is re-attached to the small bowel. This enables the digestive enzymes secreted within the stomach and proximal small bowel to pass into distal intestinal tract and mix with ingested food. The procedure restricts the amount of food that can be eaten, and reduces appetite and improves glucose handling through upregulation of incretin hormones.

Efficacy: Most people lose 60–70% of their excess body weight. While there is variability between individuals, it is unusual for the weight loss not to be achieved. The procedure is particularly appropriate for people with high BMIs (>50 kg/m^2). The metabolic effects are seen straight away; normalisation of blood glucose levels occurs immediately after surgery, before weight loss has occurred, largely because of a surge in incretin hormones.

Advantages
- Weight loss starts after surgery and is faster than with LAGB
- Improves glucose control and reduces requirement for glucose-lowering therapies in type 2 diabetes

Disadvantages
- Increased surgical risk vs LAGB
- Possible obstruction due to anastomotic stenoses
- Lifelong vitamin and mineral supplementation required
- ⇧Cholelithiasis and upper gastrointestinal symptoms
- Dumping syndrome and reactive hypoglycaemia if diet not adhered to

Table 1. Who to refer for bariatric surgery.

Patient characteristics	Pathway
BMI >50 kg/m^2	Proceed straight to surgery with preoperative preparation
BMI >40 kg/m^2	12-month Tier 3 weight management service*
BMI >35 kg/m^2 in addition to: • Type 2 diabetes (ideally within 10 years of diagnosis) • Obstructive sleep apnoea	12-month Tier 3 weight management service*
Consider surgery in people of Asian origin with BMI <35 kg/m^2 plus type 2 diabetes within 15 years of onset	

*Tier 3 weight management services comprise a 12-month programme of specialist input from a dietitian, psychologist and physiotherapist, with input from an obesity physician.

Bariatric surgery can also resolve obstructive sleep apnoea, optimise blood pressure (particularly in those refractory to medical treatment), improve liver function scores in people with non-alcoholic fatty liver disease (Mathurin et al, 2009) and improve insulin resistance in, for example, polycystic ovary syndrome (PCOS), which can be beneficial for optimisation of fertility.

Commissioning guidelines for bariatric surgery are shown in *Table 1* (NICE, 2014; NHS England, 2016). Since April 2017, funding reverted to Clinical Commissioning Group (CCG)-led decisions, and so there is some variability in commissioning nationwide, with some CCGs restricting bariatric surgery to people with a BMI >45 kg/m^2 who have type 2 diabetes, and discordance from NICE (2014) guidelines, which state that bariatric surgery may be considered in people of Asian origin who have a BMI <35 kg/m^2 in conjunction with type 2 diabetes (Royal College of Surgeons and British Obesity and Metabolic Surgery Society [BOMSS], 2017).

The severity of obesity as an illness can be demonstrated clearly using the King's Obesity Staging System (Aasheim et al, 2011), which can be helpful in determining those who are most likely to benefit from bariatric surgery (*Table 2*). Stages 2 and 3 represent the people in whom maximum clinical benefit can be attained, as there is a reversible element to their disease burden.

Preoperative assessment and management

The preoperative pathway necessitates input from bariatric dietitians, psychologists, specialist nurses, bariatric physicians and surgeons to identify and manage obesity-inducing behaviours, and to prepare patients for the diet and lifestyle changes required for bariatric surgery. Red-flag issues include a history of alcoholism, eating disorders or major psychosis, as these increase the risk of further problems postoperatively (Mechanick et al, 2013; Ostlund et al, 2013).

Smoking cessation is also necessary, particularly in people undergoing Roux-en-Y gastric bypass (RYGB), because of the significant risk of anastomotic ulcers and poor wound healing (Mechanick et al, 2013).

Weight loss

Patients are required to show evidence of adherence to the bariatric diet, which involves a high protein and carefully controlled carbohydrate intake, with avoidance of sugar and high-glycaemic-index carbohydrates. A degree of weight loss preoperatively is required by most bariatric centres. Dietary adherence is important not only to achieve the desired weight loss but also to avoid predictable postoperative problems such as dumping syndrome (covered later in this article).

Glycaemic control

Optimisation of diabetes control prior to surgery is necessary to reduce the perioperative risk of wound infection but can also be hugely beneficial to optimise weight. GLP-1 receptor agonists, such as liraglutide, can induce 5–10% weight loss in addition to optimising diabetes control (Mehta et al, 2017). This is mediated through their effects on insulin sensitivity and their direct effect on the hypothalamus to improve satiety.

Sodium–glucose cotransporter 2 (SGLT2) inhibitors, such as dapagliflozin, can also induce weight loss as a result of increased urinary glucose excretion. A recent patient seen at Chelsea and Westminster Hospital lost 5 kg in 3 months as "every time she ate cake she needed to urinate and so it stopped her from eating cake", which suggests that there may also be a behavioural

Table 2. The modified King's Obesity Staging System (Aasheim et al, 2011).

	Stage 0: Normal health	Stage 1: At risk of disease	Stage 2: Established disease	Stage 3: Advanced disease*
Airway status	Normal	Snoring	CPAP required	Cor pulmonale
BMI (kg/m²)	<35	35–40	40–60	>60
Cardiovascular disease	<10% risk	10–20% risk	Heart disease	Heart failure
Diabetes	Normal	Impaired fasting glucose	Type 2 diabetes	Uncontrolled type 2 diabetes
Economic	Normal	Increased expenses: clothes and travel	Workplace discrimination	Unemployment due to obesity
Functional status	Can walk three flights of stairs	Can walk 1–2 flights of stairs	Requires mobility aid	Housebound
Gonadal status	Normal	PCOS or erectile dysfunction	Subfertility	Severe sexual dysfunction
Health status (perceived)	Normal	Low mood or QOL	Depression or poor QOL	Severe depression
Body image	Normal	Dislikes body	Body image dysphoria	Eating disorder

*Stage 3 obesity represents patients who may have irreversible disease that can limit the safety and effectiveness of bariatric surgery.
CPAP=continuous positive airway pressure; PCOS=polycystic ovary syndrome; QOL=quality of life.

aspect to the weight loss.

Insulin and insulin secretagogues, such as gliclazide, increase weight and, if possible, should be avoided. However, the priority at the time of surgery is good glycaemic control to minimise perioperative risk.

There are increasing numbers of people with type 1 diabetes and obesity. Bariatric surgery can improve glycaemic control in these people, owing to improvements in insulin resistance and insulin requirements (Ashrafian et al, 2016). However, these individuals remain insulin-deficient and must not discontinue their insulin peri/postoperatively, as this will induce diabetic ketoacidosis.

Supplementation

Preoperatively, it is important to correct vitamin deficiencies, especially in people undergoing RYGB. Vitamin D deficiency is particularly common and, as people with obesity have poor gut absorption compared to those with a normal BMI, high-dose vitamin D is required to replace deficient levels. For surgery recipients with a deficiency, BOMSS (2014) recommends a loading regimen up to a total of approximately 300 000 IU, given as either weekly or daily split doses. Preparations may be given as one of the following options:

- 50 000 IU capsules, one given weekly for 6 weeks (300 000 IU in total).
- 20 000 IU capsules, two given weekly for 7 weeks (280 000 IU in total).
- 800 IU capsules, five per day given for 10 weeks (280 000 IU in total).

Postoperative nutritional monitoring

Through a combination of changes in nutritional intake and absorption, bariatric procedures may contribute towards further nutritional deficiencies. Ongoing supplementation and monitoring is, therefore, essential and must occur for the rest of the patients' lives. As such, GPs play a vital role, and it is important that bariatric centres communicate clearly with primary care. Most bariatric centres are able to routinely follow

Preoperative assessment and management – summary

1. Input from a multidisciplinary team is required to manage obesity-inducing behaviours and to prepare patients for the diet and lifestyle changes required before and after bariatric surgery.
2. Smoking cessation is also necessary, particularly for people undergoing gastric bypass.
3. Evidence of weight loss preoperatively is required by most bariatric centres, as dietary adherence is important to achieve weight loss and avoid predictable postoperative problems.
4. Glycaemic control should be optimised to reduce perioperative risk of wound infection; it may also aid weight loss.
5. Vitamin deficiencies (most commonly vitamin D) need to be corrected through supplementation.

Table 3. Lifelong vitamin, mineral and blood monitoring requirements post-RYGB and post-sleeve gastrectomy.

Vitamin supplements	Dose	Blood tests annually*	Deficiency (symptoms and signs)
Multivitamin (e.g. Forceval®, Centrum®)	1 per day	**RYGB:** U+E, LFT, copper, folate, zinc, possibly vitamin A **Sleeve gastrectomy:** U+E, LFT, folate	Copper (neuropathy, anaemia, neutropenia) Folate (neuropathy, macrocytic anaemia) Selenium (hypothyroidism, fatigue) Thiamine* (Wernicke's encephalopathy and Korsakoff syndrome) Vitamin A (night blindness) Zinc (mood disturbance, skin problems, immune problems)
Combined calcium and vitamin D	2 per day	**Both procedures:** Calcium, PTH, vitamin D	Calcium/vitamin D (hypocalcaemia [paraesthesia, tetany], osteopenia, tiredness)
Colecalciferol (vitamin D_3; needed in addition to combined calcium/vitamin D)	20 000 IU once per week or 3000 IU once per day	**Both procedures:** Calcium, PTH, vitamin D	Calcium/vitamin D (hypocalcaemia [paraesthesia, tetany], osteopenia, tiredness)
Ferrous fumarate (for pre-menopausal women)	1 per day	**Both procedures:** Ferritin, FBC	Iron (anaemia)
Vitamin B12	1 mg intramuscular injection every 3 months	**Both procedures:** Vitamin B12	Vitamin B12 (subacute combined degeneration of the cord, macrocytic anaemia)

*Note: thiamine cannot be measured reliably and should be given empirically to anyone who is vomiting or who has poor oral intake.
FBC=full blood count; LFT=liver function tests; PTH=parathyroid hormone; RYGB=Roux-en-Y gastric bypass; U+E=urea and electrolytes.

patients for 2 years postoperatively; thereafter, nutritional monitoring is managed in primary care. *Table 3* outlines the vitamin requirements, the type and frequency of blood test monitoring, and the common deficiencies seen. Blood test monitoring following a gastric band procedure is only recommended if the patient is suspected to be not adhering to a nutritionally balanced diet (BOMSS, 2014).

Thiamine is a vitamin of particular importance to bariatric surgery recipients; it has a short half-life within the body and so it is easy to become deficient, particularly in patients experiencing vomiting and poor oral intake post-surgery. When deficient, patients develop Wernicke's encephalopathy: a triad of ophthalmoplegia/nystagmus, ataxia and confusion that can lead to irreversible Korsakoff syndrome if not treated promptly. Thiamine is not reliably measurable in the blood; however, if there is any clinical suspicion, patients must receive parenteral thiamine urgently.

Further information on recommended nutritional supplements and features of nutritional deficiencies are available in the BOMSS (2014) guidelines. These guidelines also highlight the importance of considering diagnoses other than bariatric surgery as a cause for micronutrient deficiency and indicate situations where ongoing referral may be advisable, such as pregnancy in women post-bariatric surgery.

Postoperative complications

A number of complications can occur following bariatric surgery. If a post-bariatric patient develops any new abdominal or systemic symptoms or has persistent vomiting, clinicians are advised to contact the bariatric department for advice.

Metabolic complications

Following bariatric surgery, hormonal and anatomical adjustments affecting carbohydrate metabolism are thought to impair glucose homeostasis and contribute to the syndromes of reactive hypoglycaemia (RH) and dumping syndrome. Both complications are precipitated

by the ingestion of high-glycaemic-index (GI) carbohydrates. Dumping syndrome occurs within 30 minutes and is due to the osmotic changes within the gut, whereas RH occurs after approximately 2 hours and is due to a surge in insulin that causes hypoglycaemia. Where hypoglycaemia occurs, it is recommended that the possibility of fasting hypoglycaemia and the risk of endogenous hyperinsulinism due to insulinoma or islet cell hyperplasia are excluded (Service et al, 2005). Other causes of hypoglycaemia, such as adrenal insufficiency, should also be considered.

The mainstay of treatment for these complications is optimisation of diet and avoidance of high-GI carbohydrates. Patients are encouraged to keep diaries of symptoms, food intake and blood glucose readings (from a standard glucometer). Continuous glucose monitoring, where available, can be very helpful to demonstrate blood glucose trends in conjunction with a diary of food and symptoms. More detailed dietary protocols using a high-GI diet on one day followed by a low-GI diet on the next can be useful to prove the importance of dietary intake in inducing the hypoglycaemia.

Prolonged glucose tolerance tests used to be considered first-line investigations; however, to ingest a large quantity of glucose is not representative of a usual diet and is likely to induce hypoglycaemia in up to 50% of post-RYGB patients (Ukleja, 2005). As such, a mixed-meal test using a defined intake of carbohydrate, protein and fat is generally preferred.

Following appropriate investigation and diagnosis, the cornerstone of prevention and management for RH and dumping syndrome is dietary modification. Specialist dietetic input should be sought, as advice may vary according to the specific postoperative stage and diet. General advice on avoiding these conditions is provided in *Box 2* (overleaf).

Where dietary modification is not successful, other treatment options are available. Acarbose is used first-line to slow gastric emptying but has only limited success. Somatostatin analogues, such as octreotide, are effective but require regular injections (also available as a monthly depot) and are expensive; thus, they are reserved for people with severe RH. There is anecdotal evidence to support the use of dipeptidyl peptidase-4 (DPP-4) inhibitors, such as sitagliptin. These are believed to reduce the surge in gastric inhibitory polypeptide that is thought to be a major factor in RH; however, there is no published evidence for this. One centre has successfully used the GLP-1 analogue liraglutide in cases of severe RH; however, the mechanism leading to the clinical response is unclear (Abrahamsson et al, 2013).

Rarely, people are so debilitated by their symptoms of refractory RH that the only option is reversal of the bypass. However, this has obvious weight repercussions.

Driving

Another important aspect of care is the acute management of hypoglycaemia and driving safety. For this, advice is modified from that provided to the general population with diabetes. Bariatric surgery recipients are recommended to avoid high-GI carbohydrate intake prior to driving, in order to avoid the insulin spikes and subsequent hypoglycaemia.

Management of diabetes and complications

Owing to its effectiveness in treating type 2 diabetes, bariatric surgery is increasingly being referred to as "metabolic surgery". Glycaemic improvement may be evident within days of an RYGB (Rubino, 2008), possibly through GLP-1-related mechanisms. Remission typically takes longer following a laparoscopic adjustable gastric band (LAGB), and the time course is variable after a sleeve gastrectomy.

In a study with 100 participating centres and 28 616 people with obesity and type 2 diabetes, diabetes remission rates were 83% for RYGB, 55% for sleeve gastrectomy and 44% for LAGB (Hutter et al, 2011). Similar rates have been reported in other studies. However, it is important to note there is no international consensus on the definition of type 2 diabetes remission, and different HbA_{1c} and fasting plasma glucose levels have been used over the years.

To help predict remission and support shared decision-making, various scores have

Postoperative management – summary

1. Bariatric centres routinely follow up patients for 2 years; thereafter, monitoring takes place in primary care.
2. Sleeve gastrectomy and gastric bypass require lifelong nutritional monitoring and supplementation.
3. Clinicians should contact the bariatric department for advice if a surgery recipient develops any new abdominal or systemic symptoms or has persistent vomiting.
4. Reactive hypoglycaemia and dumping syndrome are common metabolic complications, and dietary modification is required to avoid them.
5. Type 2 diabetes often resolves following surgery; however, it may recur over time. Patients should remain on practice registers and continue to be screened for type 2 diabetes.

Box 2. Dietary modification required to avoid dumping syndrome and reactive hypoglycaemia.

- Increase protein: three meals plus 2–3 protein-rich snacks per day.
- Avoid gaps of >3 hours between meals.
- Limit carbohydrate intake to 10–30 g at any one time.
- Eat and drink separately; do not drink within 1 hour of eating.
- Increase fibre intake to slow absorption of carbohydrates.
- Avoid alcohol.
- Avoid sugary drinks, fruit juices, smoothies, fizzy drinks and milkshakes. Sugar-free squash may be used as an alternative.
- Control intake of caffeine; severity of symptoms may be reduced.

been developed and validated, including the DiaRem score (Still et al, 2014). Longer duration of type 2 diabetes and preoperative insulin requirements are the most consistent factors reported to play a role in remission (Schauer et al, 2016). However, even when remission is achieved, patients are advised to continue standard screening for diabetes complications (e.g. retinal screening), as the long-term outcomes are not yet known in bariatric surgery recipients. Biochemical monitoring of HbA_{1c} and lipid profiles is also recommended on a routine basis.

Maintenance of weight loss and remission of type 2 diabetes is one of the main challenges in bariatric care; studies have shown a recurrence of diabetes in 30% of RYGB recipients 5 years post-surgery (Arterburn et al, 2013). Remission of type 2 diabetes is believed to be largely due to the surge in incretin hormones such as GLP-1; however, by 5 years post-surgery, these hormone levels tend to stabilise and the body adjusts to the new gut anatomy.

Continuation of dietary modification, with careful control of carbohydrates, avoidance of sugar and increased protein intake, are beneficial to maintain glycaemic and weight control. There is also variability in different individuals' incretin hormone production and response, which impacts on weight loss post-surgery. This is a particular focus of obesity research, as it might become possible to define an individual's long-term response to treatment in advance.

Recurrence of type 2 diabetes needs to be managed on an individual basis depending on glycaemic levels and with specialist diabetic input. Where possible, medications that are weight-neutral or encourage weight loss (e.g. metformin, SGLT2 inhibitors and DPP-4 inhibitors) are preferred first-line, and consideration of GLP-1 analogues is warranted once the peak post-surgical incretin effect has worn off.

Further considerations

A number of further considerations are briefly highlighted below. Full discussion is outside the scope of this article, but references are provided for further reading.

- **Weight gain:** Often multifactorial in aetiology (Moore et al, 2016). Patient factors include inappropriate food choices and binge eating. Surgical factors include pouch distension and gastro-gastric fistula (in RYGB).
- **Bone health:** An area of active research. Preoperatively, people with obesity are thought to be at increased risk of metabolic bone disease owing to factors such as vitamin D deficiency and a sedentary lifestyle. Fracture risk has been reported to further increase postoperatively due to malabsorption and rapid weight loss (Williams, 2011).
- **Pregnancy:** Patients are advised to avoid pregnancy for 12–18 months following bariatric surgery. Precautions should be taken as fertility is likely to improve, particularly in women with PCOS. Ongoing referral is advised, particularly in the context of nutritional deficiencies.
- **Bacterial overgrowth:** May be indicated by symptoms of bloating, abdominal discomfort or diarrhoea, or vitamin deficiencies. Diagnostic tools include the glucose breath test, but it can be challenging to make an accurate diagnosis. Prolonged or repeated antibiotic therapy may be needed to alleviate symptoms.
- **Persistent vomiting:** Thiamine deficiency is a major complication post-bariatric surgery and cannot be measured reliably. All patients who have vomiting post-procedure should receive additional oral thiamine. In cases of persistent vomiting, parenteral thiamine (e.g. Pabrinex®) should be administered to avoid Wernicke's encephalopathy and the risk of irreversible neurological damage.

Summary and key points

- Bariatric surgery is an effective treatment for obesity and can lead to remission of obesity-related problems, such as type 2 diabetes (particularly of recent onset) and obstructive sleep apnoea.
- Preoperatively, individuals need appropriate advice and management from dietitians and psychologists to ensure suitability for surgery and ability to change behaviour.
- Failure to adhere to dietary advice will result in weight gain and complications such as reactive hypoglycaemia; dietary control is key.
- Bariatric centres routinely follow patients for 2 years; thereafter, ongoing nutritional monitoring needs to take place in primary care.
- Remission of type 2 diabetes is a well-recognised outcome, although not guaranteed or necessarily sustained. Patients should remain on practice registers to enable ongoing type 2 diabetes screening and monitoring for the redevelopment of type 2 diabetes in those who achieve remission.
- There should be a low threshold for seeking further advice in postoperative bariatric surgery recipients, especially those with special circumstances, such as pregnancy. ■

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"There should be a low threshold for seeking further advice in postoperative bariatric surgery recipients, especially those with special circumstances, such as pregnancy."