

PRACTICE



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Primary care management of patients after weight loss surgery

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Bariatric surgery is the most effective treatment for sustained weight loss in people with complex obesity,^{1,2} and reports from large UK and international registries highlight its overall safety.^{3,4} The overall mortality of 0.07% and composite complication rate of less than 4% for gastric bypass are similar to those for laparoscopic cholecystectomy.⁴ After surgery, short hospital stays are the norm (median one day for gastric band and two days for a sleeve gastrectomy or gastric bypass).² General practitioners thus need to recognise early, as well as late, postoperative complications, monitor long term nutrition, and provide support. General practitioners may also need to assess patients who have had bariatric surgery abroad (sometimes with non-standard procedures), without any follow-up planned. Useful resources for patients include BOSPA (<http://www.bospauk.org>) and WLSinfo (<http://www.wlsinfo.org.uk>).

The operations

Box 1 describes the three most common procedures performed in the United Kingdom. More than 95% are done laparoscopically.^{3,5}

What are the postoperative complications?

The infographic summarises the complications that can follow bariatric surgery and describes their causes and assessment.³⁻¹³

How to manage obesity related comorbidities after surgery

Patients are usually followed up every two to three months for the first two years by the bariatric multidisciplinary team, then yearly by general practitioners in a shared care model.¹² Continue monitoring cardiovascular risk and comorbidities associated with obesity, being mindful of possible de-escalation of their treatment¹³:

- **Type 2 diabetes**—No clear consensus exists on long term management of such patients, but Endocrine Society guidelines recommend measuring glycated haemoglobin (HbA_{1c}) at least annually.¹¹ Up to 65% of patients with type 2 diabetes may be in glycaemic remission two years after surgery and may be able to stop their antidiabetes drugs.^{3,14} Longer term follow-up data suggest that up to one third of patients who initially experience glycaemic remission will go on to redevelop diabetes within five years of gastric bypass.¹⁵
- **Hypertension**—At each blood pressure review, evaluate the need for antihypertensive drugs. The effect of weight loss is variable and often transient, although many patients can reduce or stop antihypertensive drugs.¹⁶
- **Dyslipidaemia**—Bariatric surgery is known to reduce total cholesterol, low density lipoprotein cholesterol, and triglycerides while increasing high density lipoprotein cholesterol.¹⁷ In the light of other comorbidities, however, patients may remain at increased cardiovascular risk. Consider statin treatment in line with recent

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Data supplements on [bmj.com](http://www.bmj.com) (see <http://www.bmj.com/content/352/bmj.i945?tab=related#datasupp>)

Infographic

Raw data used to create infographic

What you need to know

- In the first 30 days after bariatric surgery, symptoms such as increasing or severe abdominal pain, unexplained tachycardia, pyrexia, chest pain or breathlessness, or continuous vomiting warrant emergency referral
- Continue long term monitoring of cardiovascular risk and comorbidities associated with obesity, such as type 2 diabetes; reduce treatment for these as appropriate
- All patients need lifelong supplementation with vitamin and mineral supplements to prevent serious nutritional complications

Box 1: Most common bariatric surgery procedures in UK (fig 1)*Laparoscopic adjustable gastric banding*

An adjustable band is placed around the top of the stomach, forming a small gastric pouch above it. The band is adjusted by injecting saline into a port positioned under the skin to achieve the sensation of fullness after a small amount of food.

Roux-en-Y gastric bypass

The most common operation for weight loss in the UK NHS (60%), involving creation of a small gastric pouch by stapling. A classical Roux-en-Y reconstruction is then fashioned with a biliary limb carrying bile, pancreatic, and gastric secretions and an alimentary limb (connected to the new pouch) joined into a common channel for ongoing digestion.

Laparoscopic sleeve gastrectomy

Involves excising most (85%) of the stomach by stapling along a tube placed inside the stomach along the lesser curvature to create a narrow tube of stomach.

recommendations from the National Institute for Health and Care Excellence.¹⁸

What are the postoperative nutritional requirements and how should they be monitored?

High quality evidence to guide clinicians is lacking here, although the British Obesity and Metabolic Surgery Society (BOMSS) has recently published recommendations based on observational data (table 1).^{19, 20} These recommend that all patients who have had bariatric surgery should take a complete multivitamin and mineral supplement, in addition to further supplementation in most cases. Patients who have had bariatric surgery will often need much higher than standard recommended doses of supplementation to become replete. Patients need careful biochemical monitoring, depending on the type of procedure. Table 2 outlines the BOMSS recommendations.²⁰

What about bone health?

Compared with dietary weight loss, bariatric surgery procedures such as Roux-en-Y gastric bypass (which bypasses the main sites of calcium absorption) may lead to calcium deficiency, secondary hyperparathyroidism, increased vitamin D activation, and increased calcium resorption from bone resulting in a disproportionate amount of bone loss.²¹ The clinical significance of this state is unclear, and a retrospective population study of more than 2000 bariatric surgery patients did not find a statistically significantly increased risk of fracture in the two years after surgery.²² Gastric bypass is generally associated with less bone loss than Roux-en-Y gastric bypass.

Supplementation—Patients should take calcium and vitamin D supplementation according to their preoperative status (table 1), although some may need a higher maintenance dose of vitamin D, occasionally up to 4000 IU daily.¹¹

Monitoring—Table 2 outlines blood monitoring requirements for calcium and vitamin D. Little evidence is available, and thus no firm consensus exists, on the role of dual energy x ray absorptiometry (DEXA) for routine monitoring. Some guidelines suggest considering DEXA scans at baseline and two years after surgery in patients who have had Roux-en-Y gastric bypass,¹⁶

whereas others advise yearly DEXA until bone density is stable.¹¹

Osteoporosis treatment—If DEXA scanning identifies osteoporosis, evaluate calcium and vitamin D status and treat any abnormalities before considering bisphosphonate treatment. Offer intravenous bisphosphonates such as zoledronic acid, owing to concerns about oral absorption and the potential for anastomotic ulceration.

Are there precautions regarding pregnancy?

Pregnancy is considered safe after bariatric surgery, as most maternal (pre-eclampsia, gestational diabetes) and fetal complications (macrosomia) of obesity are reduced after weight loss surgery.²³ However, most guidelines advise avoiding pregnancy preoperatively and for 18 months after surgery, on the basis of low quality evidence suggesting a risk of fetal growth retardation from nutritional deficiencies in rapid weight loss. Offer non-oral contraception for sleeve and bypass patients¹⁶; any methods of contraception are suitable for band patients. Pregnancy should trigger a review by the bariatric multidisciplinary team, as routine band deflation or additional nutritional supplementation may be needed.

What if the patient regains weight?

Patients often regain 20-25% of their lost weight over a 10 year period after surgery.²⁴ Greater regain may cause obesity related comorbidities to re-emerge.

Figure 2 outlines possible reasons for weight regain based on a systematic review,²⁵ with our suggested questions to open up discussion of these reasons with the patient. Patient related factors are more common; however, as with any prosthetic or anatomical modification, the procedure can fatigue.

The most important aspect in managing weight regain after bariatric surgery is continued engagement with healthcare services. Early assessment by a bariatric dietitian may also identify surgical complications (commonly suggested by new or increased heartburn or reflux) requiring re-referral to the surgical team.

Search strategy

We based this predominantly on current guidelines and systematic reviews
Additional references were drawn from our personal datasets

How patients were involved

We discussed the article with a patient representative from two bariatric patient groups, BOSPA and WLSinfo, who reviewed the article as it was being written. We incorporated their suggestions on the commonly unclear nature of symptoms that patients experience in the section on complications. The contribution of one author (JH) was also informed by a survey of more than 100 patients on aspects important to them, conducted by Karen Coulman (University of Bristol for an NIHR funded doctoral research fellowship), in which he collaborated as part of the ByBand Trial.²⁶

James Byrne and Sean Woodcock, consultant bariatric surgeons and members of the BOMSS Council, reviewed this paper, as did Ken Clare, chairman of WLSinfo (a patient led charity providing web based support and information) and retired bariatric specialist nurse. We are grateful for advice and comments from Christopher Byrne, professor of diabetes, University of Southampton.

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Tables

Table 1 | Recommended vitamin and mineral supplements after bariatric surgery¹⁶¹⁹²⁰

Supplement	Laparoscopic adjustable gastric banding	Roux-en-Y gastric bypass/laparoscopic sleeve gastrectomy
Multivitamin/mineral*	Forceval one capsule daily OR one over the counter complete multivitamin and mineral supplement daily	Forceval one capsule daily OR two over the counter complete multivitamin and mineral supplements daily
Iron	No supplement given routinely	200 mg ferrous sulphate daily
Folic acid	No supplement given routinely	No supplement needed unless deficient
Vitamin B ₁₂ †	No supplement given routinely	Three monthly intramuscular injection of 1 mg hydroxocobalamin
Calcium + vitamin D	No supplement given routinely	Continue with maintenance dose identified preoperatively. Likely to be at least 800 mg calcium + 20 µg vitamin D (eg, Adcal D3)

This will be sufficient for most patients, but some will need individualised regimens.

*For bypass and sleeve gastrectomy, supplements should contain a minimum of 2 mg copper/day. Forceval contains 2 mg; however, most over the counter products such as Sanatogen A-Z contain only 1 mg of copper, so two tablets/day will be needed.

†Three monthly intramuscular vitamin B₁₂ injections are recommended for all patients who have bypass or sleeve gastrectomy owing to frequency with which vitamin B₁₂ deficiency occurs.

Table 2| Recommended micronutrient investigation schedule¹⁶¹⁹

Analyte	Laparoscopic adjustable gastric banding	Roux-en-Y gastric bypass/laparoscopic sleeve gastrectomy
Urea and electrolytes	Annually	3, 6, and 12 months in first year; annually thereafter
Full blood count	Annually	3, 6, and 12 months in first year; annually thereafter
Liver function tests	Annually	3, 6, and 12 months in first year; annually thereafter
Ferritin	Not routinely indicated	3, 6, and 12 months in first year; annually thereafter
Folic acid	Not routinely indicated	3, 6, and 12 months in first year; annually thereafter
Vitamin B ₁₂	Not routinely indicated	6 and 12 months in first year; not needed if receiving B ₁₂ injections
Calcium	Not routinely indicated	3, 6, and 12 months in first year; annually thereafter
Vitamin D	Not routinely indicated	3, 6, and 12 months in first year; annually thereafter
Parathyroid hormone	Not routinely indicated	3, 6, and 12 months in first year; annually thereafter
Zinc	Not routinely indicated	Annually
Copper	Not routinely indicated	Annually

This is a guide, and specific investigations may be needed at other times, depending on clinical presentation.

Figures

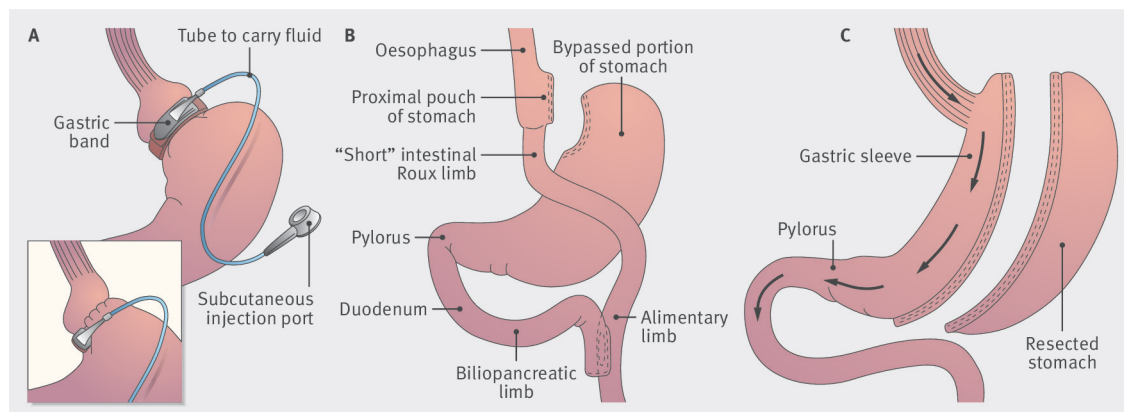


Fig 1 A: Gastric band surgery showing small “virtual” pouch of stomach below gastro-oesophageal junction and (inset) gastro-gastro tunnelling sutures. B: Gastric bypass showing short vertical lesser curve based gastric pouch with Roux-en-Y jejunio-jejunostomy reconstruction. C: Sleeve gastrectomy. (Images reproduced from Griffin SM, Raimes SA, Shenfine J. *Oesophagogastric surgery*. 5th ed. Saunders Elsevier, 2013)

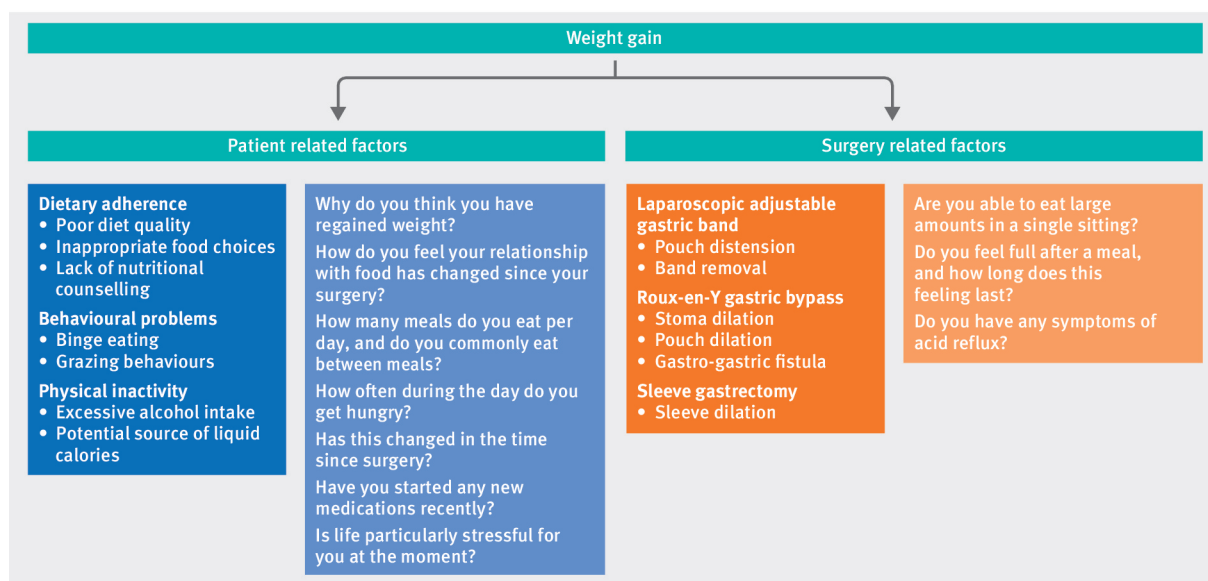


Fig 2 Patient related and surgical factors in weight regain,²⁵ and questions that may help the practitioner to recognise the underlying cause