

Transfer of care after bariatric surgery

For the primary care providers

Bariatric surgery department

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Introduction

Bariatric surgeries provide long term benefit in regards to their cardiovascular morbidity and mortality secondary to improvement of hypertension, diabetes mellitus, hyperlipidaemia and obesity. However it needs essential dietary and behavioural modifications by the patients pre and post-surgery, to achieve optimum health benefits of weight loss surgery.

Bariatric surgery patients need lifelong prophylactic or therapeutic doses of vitamin and mineral medications (oral/injectable) depending on their clinical condition. In the absence of a robust supplementation regimen, strict patient adherence and necessary adaptations of recommendations for evolving clinical needs, patients can be predisposed to severe vitamin and mineral deficiencies (and associated complications) due to the malabsorptive nature of some of the bariatric surgeries.

This leaflet will give you information about long term care following bariatric surgery. A person undergoing bariatric surgery at Homerton University Hospital (HUH) will stay under the care of the specialist bariatric surgery service for two years following their operation. After this time they will be transferred back to their GPs for on-going post bariatric surgery care. These recommendations have been drafted in line with BOMSS (British Obesity & Metabolic Surgery Society) guidelines with some additional features based on our extensive experience with bariatric surgery patients at HUH.

Every patient who has undergone bariatric surgery should receive an annual review by their GP for the rest of their lives as stipulated by NICE guidelines on obesity (2014).

Certain patients who have undergone a complex and severe malabsorptive surgical procedure (e.g. duodenal switch/BPD procedure requiring strict monitoring) will remain under the care of the specialist bariatric surgery service at HUH for life. A re-referral can be made back to the bariatric surgery department at any time if there are any concerns regarding bariatric surgery related complications.

Vitamins and minerals

Vitamin and mineral status needs to be monitored lifelong in patients who have undergone bariatric surgery. However it must not be assumed that abnormal bloods results are always directly related to the surgery itself. There could be potential contributions from physiological and pathological changes in the body, including comorbidities worsened by ageing. High risk patients might require more frequent monitoring e.g. pregnancy, lactation, acute illness etc.

Nutrients at risk of malabsorption and associated problems:

- Iron
- Vitamin B12
- Folate
- Calcium
- Vitamin D
- Magnesium
- Albumin

Recommended blood tests:- to check annually as a minimum (more frequently if established depleted stores)

- Full blood count
- Complete iron profile including serum iron, TIBC, Transferrin, Ferritin (Ferritin level can be normal/high due to acute phase response and a normal Ferritin level does not exclude depleted iron store).
- Serum folate (not red cell folate)
- Vitamin B12, Holotranscobalamin (active vitamin B12), Methylmalonic acid (MMA). (A severely deficient patient can have normal B12 level and active B12 and MMA are more sensitive and specific markers for vitamin B12 deficiency. In absence of availability of active vitamin B12 and MMA, please ensure to maintain the serum vitamin B12 in the upper normal reference range. You can ask your clinical biochemistry lab to send the sample to Homerton Hospital lab as a specialist send away test if clinically indicated).

- Bone profile including calcium, phosphate and magnesium. Patients on high doses of vitamin D can have depletion of tissue magnesium stores and therefore magnesium supplementation is recommended if patient clinically symptomatic or serum magnesium levels are low.
- Vitamin D, parathyroid hormone (PTH). Vitamin D and PTH within normal reference range suggest optimum bone metabolism. Elevated PTH suggests secondary hyperparathyroidism due to vitamin D deficiency on cellular level. Please monitor serum calcium levels regularly if patient is on high dose of vitamin D.
- U&Es
- Liver function tests
- HbA1c/and or FBG in patient with preoperative diabetes
- Lipid profiles in patients with dyslipidaemia
- Thyroid function test in patients with known thyroid disorders

Other tests to consider:

- Vitamin A – if concerns regarding steatorrhea/ vision problems/night blindness.
- Zinc and copper – if unexplained anaemia, hair loss or change of taste, neutropenia, pica/neurological sign and symptoms persisting after vitamin B12 level optimization.
- Selenium- if unexplained fatigue, anaemia, metabolic bones disease, chronic diarrhoea or heart failure.

Recommended daily vitamin and mineral supplements:

Post gastric band:

1. Over the counter multivitamin and mineral preparation e.g. Sanatogen A-Z, Centrum vitamin and mineral once a day. Forceval may be required following NHS prescription in established vitamin and mineral deficiencies as per clinical need.

Post sleeve gastrectomy

1. Over the counter multivitamin and mineral preparations e.g. Forceval, Centrum advance twice a day, to be modified based on blood levels of vitamins and minerals. Forceval may be required

following NHS prescription in established vitamin and mineral deficiencies as per clinical need.

2. Maintenance oral dose of vitamin D 3000 IU per day OR 20,000 IU once per week in presence of normal vitamin D level.
3. Recommend vitamin B12 injections 3 monthly. Frequency of vitamin B12 injections might need to be increased in established severe deficiency. *Important note:* In patients with both vitamin B12 and folate deficiency, folate supplements should not be given alone, as it can precipitate severe neurological complications (sub-acute combined degeneration of spinal cord).

Post gastric bypass:

1. Over the counter multivitamin and mineral preparations e.g. Forceval, Centrum advance twice a day, to be modified based on blood levels of vitamins and minerals. Forceval may be required following NHS prescription in established vitamin and mineral deficiencies as per clinical need.
2. Maintenance oral dose of vitamin D 3000 IU per day OR 20,000 IU once per week in presence of normal vitamin D level.
3. Recommend vitamin B12 injections 3 monthly. Frequency of vitamin B12 injections might need to be increased in established severe deficiency. *Important note:* In patients with both vitamin B12 and folate deficiency, folate supplements should not be given alone, as it can precipitate severe neurological complications (sub-acute combined degeneration of spinal cord).

A note on vitamin D and calcium

In presence of severe vitamin D deficiency (25 hydroxyvitamin <30nmol/L), intramuscular vitamin D injection 300,000 IU followed by oral 20,000 IU colecalciferol two times a week should be given till optimum level reached and then maintenance regimen as above with regular monitoring of serum 25 hydroxyvitamin D3 and serum calcium levels as clinically indicated. *Important note:* Please note before starting high doses of vitamin D, hypercalcaemia due to any other cause should be excluded.

Calcium containing preparations should ALWAYS be taken with food to avoid risk of kidney stone formation in high risk patients. Patient should be drinking 2 to 2.5 L of water to keep themselves hydrated and avoid precipitation of calcium oxalate kidney stones due to enteric hyperoxaluria, known to be associated with bariatric surgeries. A diet high in calcium, low in oxalate and salt is recommended for patients with high risk of calcium oxalate kidney stones.

Calcium citrate 1000mg per day is preferred form of oral calcium supplement for patients with past history of calcium containing kidney stones/other bariatric surgeries. It can be bought from online sources/local health shops as not currently available on NHS pharmacy).

High doses of vitamin D should be used with caution in patients with impairment of renal function and the effect on calcium and phosphate levels should be monitored. The risk of soft tissue calcification should be taken into account. In patients with severe renal insufficiency, vitamin D in the form of colecalciferol is not metabolised normally and other forms of vitamin D should be used.

Caution is required in patients suffering from sarcoidosis or other granulomatous disease because of the risk of increased metabolism of vitamin D to its active form. These patients should be monitored with regard to the calcium levels in serum and urine.

Treatment with vitamin D has the potential to unmask primary hyperparathyroidism. Serum calcium levels should be monitored in susceptible patients. If calcium levels are raised then the potential for vitamin D treatment to have unmasked primary hyperparathyroidism should be considered and a referral should be made to a specialist e.g endocrinologist if required.

During long-term treatment, serum calcium levels and renal function (through measurements of serum creatinine) should be monitored. Monitoring is especially important in elderly patients on concomitant treatment with cardiac glycosides or diuretics and in patients with an increased tendency to calculus formation. In the case of hypercalciuria (exceeding 300 mg (7.5 mmol)/24

hours) or signs of impaired renal function, the dose should be reduced or the treatment discontinued

The total dose of vitamin D should be considered and adjusted accordingly with other medicinal products containing vitamin D. The calcium status and dietary intake of individual patients should also be considered at the same time as starting vitamin D3 replacement or treatment.

Some patients might need magnesium supplements if they have symptomatic hypocalcaemia.

A note on iron

Therapeutic iron supplements (oral) may be required separately to usual supplementation plan if established iron deficiency anaemia, or prophylactically in cases of depleted iron stores. Iron supplements should be taken with a small amount of orange juice to increase iron absorption and tea/coffee should be spaced away at least 90 minutes away from food and iron supplements. Vitamin C is known to increase iron absorption but should be used with caution as high doses of vitamin C are known to be associated with increased risk of oxalate containing kidney stones especially in men.

Patients suffering from severe constipation or bloating on oral iron supplements should be tried on other formulations including liquid formulations e.g Ferroglobin, Spatone however it is important to ensure that they get appropriate dosage of iron (variable with different formulations) as per their clinical need. Sometimes a combination of liquid and tablet formulation might be better tolerated than high daily doses of iron tablets.

Some patients might require higher than regular therapeutic dose of iron for a short period to treat IDA and replenish iron stores, due to surgery associated malabsorption and should be closely monitored to prevent any iron toxicity. Consider referral to your local hospital for an iron infusion if clinically indicated and oral iron supplements are not sufficient to treat the condition.

Potential long term surgical and medical complications

Surgical:

Anastomotic and stomach ulcers

Ulcers can occur at the gastrojejunal anastomosis (marginal ulcers) and occur in up to 16% of patients following a Roux-en-Y gastric bypass. Marginal ulcers have been strongly associated with smoking, chronic use of non-steroidal anti-inflammatory medication and *Helicobacter pylori* infection.

Symptoms: upper abdominal pain, vomiting, hematemesis and acute abdomen secondary to perforation.

Confirming diagnosis: upper GI endoscopy in chronic presentation. Chest X-ray and CT abdomen in acute setting.

Treatment options: high dose of proton pump inhibitors and surgery in acute presentation and as the last option for ulcers refractory to medical treatment.

Reflux/heartburn

This may occur post-surgery and be treated with simple medications (PPIs). If patient complains of coughing at night or reflux on bending over these also signify this problem. Patient to be referred to the bariatric service at Homerton University Hospital to be investigated if persists.

Strictures/stenosis

Anastomotic strictures can occur post bariatric surgery. These can be the result from scarring at the anastomosis.

Symptoms: nausea and vomiting, dysphagia, and regurgitation.

Confirming diagnosis: radiological investigations such as barium studies and upper GI endoscopy.

Treatment: most strictures can be managed safely and effectively by endoscopic dilatations.

Internal hernias (gastric bypass)

Internal hernias can occur months or years after gastric bypass surgery.

Symptoms: cramping or intermittent abdominal pain, nausea with or without vomiting.

Confirming diagnosis: based on clinical suspicion as it can be missed on CT abdomen.

Treatment: diagnostic laparoscopy and repair of hernia defects.

Gallstones

There is a potential risk of gallstones formation due to the rapid weight loss after bariatric surgery. This is a result of reduced gallbladder contractility, cholesterol super-saturation of bile and cholesterol nucleation. Only symptomatic gallstones require laparoscopic cholecystectomy.

Gastric band slippage/erosion

Band slippage is the most common complication of a gastric band.

Symptoms: abdominal pain and vomiting.

Band erosion is another potentially serious complication

Symptoms: pain, vomiting, bleeding, intra-abdominal abscess or fistula formation. It can also present with weight gain and loss of restriction.

Confirming diagnosis: plain X-ray, barium studies, CT abdomen and upper GI endoscopy.

Treatment: often removal of gastric band is required.

1 in 5 patients with gastric band will need revisional surgery at some point following their original operation.

Medical (metabolic and nutritional) complications:

Hypoglycaemia after gastric bypass

Following the gastric bypass and less commonly after the sleeve gastrectomy or duodenal switch, some patients may experience early or late dumping syndrome.

Symptoms: dizziness, shaking, sweating, palpitations, light headedness, nausea, diarrhoea and in some cases severe hypoglycaemia.

Treatment: Dietary modification such as avoiding high sugar foods and drinks, separating eating and drinking, avoiding long gaps between meals and opting for low glycaemic index (GI) foods can reduce occurrence of dumping syndrome. For severe hypoglycaemia a referral back to Homerton University Hospital is recommended.

Protein malnutrition/protein-energy malnutrition/hypoalbuminaemia

This can present several years following bariatric surgery. Causes include poor dietary protein intake as well as malabsorption. Oedema is an important indicator of protein energy malnutrition, and may mask weight loss and muscle wasting. Patients should be encouraged to increase their protein intake to more than 80 grams a day unless contraindicated. Whilst it is necessary to exclude the many other causes of oedema, the patient should also be referred back to the bariatric centre for further investigation if hypoalbuminaemia is not resolved by increased protein intake.

Increased protein intake is generally recommended in Gastric bypass patients and other patients with hypoalbuminaemia. However please rule out gout and uric acid kidney stones in relevant patients where clinically indicated, as higher levels of meat and seafood consumption are associated with an increased risk of gout, whereas a higher level of consumption of dairy products (especially low fat products), is associated with a decreased risk. Moderate intake of purine-rich vegetables or protein is not associated with an increased risk of gout.

Severe iron deficiency anaemia- bariatric surgery induced iron deficiency anaemia can be further compounded by menorrhagia in females and if long

standing, it can become refractory to oral therapy requiring injectable iron preparations. Patients on proton pump inhibitors are at increased risk of iron deficiency anaemia.

Severe prolonged undiagnosed vitamin B12 deficiency can lead to sub-acute combined degeneration of the spinal cord. Inappropriate folate supplementation in a vitamin B12 deficient patient can aggravate vitamin B12 deficiency related neurological complications. Patients on proton pump inhibitors, metformin are at increased risk of vitamin B12 deficiency.

Severe folic acid deficiency- bariatric surgery patients on anti-folate drugs, with psoriasis, or any condition with high cell turnover including pregnancy and during lactation, are predisposed to severe deficiency unless supplemented. Higher doses might be required to take into account the malabsorption created by bariatric surgery.

Vitamin A deficiency- more pronounced in duodenal switch surgery but can manifest in other bariatric surgeries if patient has prolonged history of diarrhoea and vomiting. Patient can have problems with vision and can lead to irreversible damage, if not supplemented with high doses of vitamin A.

Kidney stones- Post bariatric surgery (especially gastric bypass and duodenal switch), patients can have an increased risk of kidney stone formation due to enteric hyperoxaluria (increased oxalate absorption) from the gut due to altered gut structure post-surgery. Patients need to keep their water intake to 1.5 to 2 litres of water and adhere to low oxalate diet to minimize risk of calcium oxalate kidney stone formation. Additionally any calcium supplements should be taken with food to help binding of oxalate and prevent its absorption. A 24 urine collection to assess risk of urinary stone formation by measuring stone promoters (calcium, oxalate, sodium) and inhibitors (citrate and magnesium) will be helpful post-surgery in high risk patients e.g. patient with reduced eGFR, past history of kidney stones, single kidney etc.

Osteomalacia & fracture- prolonged vitamin D deficiency can lead to secondary hyperparathyroidism thereby increasing loss of bone mass predisposing patients to severe bone pains, long bone and vertebral fracture. Regular monitoring with vitamin D and PTH levels will help in assessing bone metabolism along with DEXA scan in patients' especially postmenopausal, on steroids or high dose of thyroxine.

Wernicke's encephalopathy- Patients with prolonged vomiting/diminished food intake can develop severe thiamine deficiency as body thiamine stores lasts for only couple of weeks. If patient experiences prolonged vomiting always prescribe additional thiamine (thiamine 200–300 mg daily, vitamin B co strong 1 or 2 tablets, three times a day) and urgent referral to bariatric centre. Those patients who are symptomatic or where there is clinical suspicion of acute deficiency should be admitted immediately for administration of IV thiamine/referred to specialist bariatric unit at HUH.

Neurological complications- Severe neurological deficits including loss of sense of vibration and touch, sub-acute combined degeneration of spinal cord, loss of deep tendon reflexes, severe depression etc. can occur due to concomitant multiple nutritional deficiencies e.g. copper, vitamin B12, thiamine. Urgent referral to specialist bariatric unit at HUH recommended.

Please refer back to the bariatric surgery service at the Homerton University Hospital, if support and guidance is required regarding complications.

Excess skin

Referrals for plastic surgery for excess skin removal have to be made through the GP and not the bariatric surgery service. Funding for plastic surgery for excess skin removal after weight loss is limited within the NHS and patients do need to meet certain BMI and weight stabilisation targets as set out by individual CCG's.

Changes in regular medications

Improvement in conditions such as type 2 diabetes, hypertension, hyperlipidaemia and obstructive sleep apnoea are often seen following weight loss from bariatric surgery. People with these conditions should therefore have regular monitoring and adjustments of medications after bariatric surgery. For people who have type 2 diabetes and no longer require medication, it is still recommended that they have other checks including eye tests and foot health checks on a long term basis especially if they have had diabetes for a long time. Studies have shown an excellent remission rate of Type 2 diabetes post bariatric surgery but a percentage of patients do relapse so it is important to continue with health checks.

Patients on thyroxine might require dose reduction following bariatric surgery & weight loss and hence should be monitored regularly in first year for dose optimization.

Pregnancy after bariatric surgery

It is recommended that women wait 18 months post bariatric surgery before considering a pregnancy. Risk of oral contraceptive failure is increased after bariatric surgery, so non-oral administration should be considered especially considering that pregnancy rates are twice those in general adolescent population after bariatric surgery.

Particular attention should be paid to vitamin and mineral status in women post bariatric surgery that fall pregnant. A complete pregnancy multivitamin and mineral tablet would be recommended for all pregnant women post bariatric surgery and care should be taken that vitamin A should be in Beta-carotene form and not retinol. Forceval is safe during pregnancy as it has vitamin A in the form of Beta-carotene.

For patients who have undergone a gastric bypass, a glucose tolerance test (GTT) for confirming the presence of gestational diabetes should not be performed. This test will induce dumping syndrome in someone after a gastric bypass and will not confirm or exclude the presence of diabetes.

A referral to an obstetrician with a specialist interest in bariatric surgery should be considered. A referral back to the specialist bariatric surgery service at the Homerton University hospital as soon as pregnancy is confirmed must be considered for specialist dietetic and medical advice.

Expected weight loss after bariatric surgery

Weight loss following bariatric surgery varies greatly. A weight loss of 50-70% excess weight can be expected 18 months after surgery.

The term excess weight refers to how much extra a person is over a BMI of 25 kg/m². Achieving a BMI of 25kg/m² and below is not a realistic goal for the majority of people who undergo bariatric surgery.

An example of excess weight and weight loss is shown below:

Weight: 127kg, height: 1.66m, BMI 46kg/m²

Weight at BMI 25 kg/m²: 69kg

Excess weight: 127-69= 58kg

50% excess weight loss: 29kg

70% excess weight loss: 40.6kg

Weight after surgery: 86.4-98kg (BMI: 31-36kg/m²)

Weight re-gain after bariatric surgery

Weight regain does occur after bariatric surgery. There is a tendency to regain weight from 2 years post-surgery. For some this will be a regain of around 6-12kg and then the weight will plateau, for others a gradual increase may continue.

A referral to a local dietitian or weight management service may need to be considered if weight regain continues.

Eating advice after bariatric surgery

To continue to maintain weight loss and avoid weight regain following bariatric surgery, certain eating behaviours should be followed lifelong.

These include:

- Eating small portions by using small plates or bowls for meals to avoid over-eating
- Chewing food well and eating slowly (20-30 minutes for a meal) to minimise symptoms of nausea or pain on eating and to increase fullness
- Leaving a 30 minute gap between eating and drinking to increase fullness
- Avoidance of fizzy drinks
- Limiting alcohol

For more information on eating after bariatric surgery please see our advice following surgery leaflets and protein after bariatric surgery on our website.

Physical activity following bariatric surgery

It is essential that patients continue with regular physical activity for life to help maintain weight loss and reduce the risk of developing comorbidities associated with weight gain along with post op risks such as osteoporosis and muscle loss.

Recommended physical activity guidelines for adults, Department of Health:

- Adults should be active daily.
- Over a week this should consist of 150 minutes of moderate intensity activity.
- Physical activity must include muscle strengthening exercise on at least two days per week.

Psychology following bariatric surgery

Weight loss tends to significantly slow down around 12-18 months post-surgery, and for some, this is when it becomes clearer that surgery is only a tool and that keeping weight off in the long term will require lifelong changes in diet and physical activity.

Common difficulties include:

- Slower weight loss than anticipated, weight plateau or weight regain, ability to manage more food over time, stressful life events and disappointment that surgery does not solve particular life difficulties. These may result in a feeling of loss of control over eating, difficulties with motivation and mood, or getting back on track after lapses.
- Challenges in dealing with changes in relationships or unwanted sexual attention.
- Intense fear of weight regain, which may lead to unhelpful rules about food and eating which are difficult to follow, or coping with changes in body image from the point of view of weight and/or excess skin.
- Worry about surgical complications. For example, difficulty swallowing due to strictures post-op can lead to a fear of swallowing foods of certain type or texture even when the stricture has been dilated and there is no physical blockage remaining. Others may experience worries about what has happened to the pouch, or in rare cases, develop signs of trauma following surgery.

While some worry and fears are a normal part of adjusting to the surgery, it is important to discuss any concerns if they persist or if they are impacting negatively on weight loss or quality of life. Consider whether a referral to a local psychological service may be helpful, or whether it would be useful to refer back to the bariatric service.

Where to refer for further support

Local community dietitians

Weight management programmes

Specialist tier 3 weight management services

Exercise on referral

Homerton Bariatric Service

Where can I get more information?

Homerton University Hospital website:

www.homerton.nhs.uk/our-services/obesity-surgery/

British Obesity and Metabolic Surgery Society

www.bomss.org.uk

BOMSS Guidelines on perioperative and postoperative
biochemical monitoring and micronutrient replacement for
patients undergoing bariatric surgery September 2014

NICE Guidance

www.nice.org.uk

Patient Advice and Liaison Service (PALS)

PALS can provide information and support to patients and carers and will listen to your concerns, suggestion or queries. The service is available between 9am and 5pm

Tel: 0208 510 7315

Email: huh-tr.PALS.service@homerton.nhs.uk

For information on the references used to produce this leaflet or if you require this information in other languages, large print, audio or Braille please telephone the Patient Information Team on 0208 510 5302/5144 or email huh-tr.patientinformation@homerton.nhs.uk

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