

Guidelines for the prescribing of nutritional supplements post bariatric surgery

Prescribing recommendations:

NHS patients should be directed to purchase nutritional supplements over the counter (OTC) post-bariatric surgery if they have had an adjustable gastric band fitted or sleeve gastrectomy (postoperative risk of impaired absorption is low) – **LMMG RAG status 'Black'**

NHS patients should be prescribed nutritional supplements post-surgery if they have received a gastric bypass (Roux-en-Y; postoperative risk of impaired absorption is high) – **LMMG RAG status 'Amber0'**

Please note: Patients that have proceeded with bariatric surgery privately and have subsequently opted to switch their care back to the NHS **should be prescribed supplements equivalent to that offered to NHS patients in accordance with this policy**

1. Introduction

The incidence of obesity and associated comorbidities continues to increase, with around 8,500 bariatric surgeries performed each year [1]. This procedure is now an increasingly routine option for the treatment of obesity in patients with a Body Mass Index of 40 kg/m² or more, or between 35 kg/m² and 40 kg/m² with co-morbidity.

Many patients presenting for surgery may have pre-existing low blood vitamin concentrations. All bariatric surgical procedures compromise nutrition to varying extents, with the potential to cause clinically significant micronutrient deficiencies.

The British Obesity & Metabolic Surgery Society (BOMSS) published its guidelines in 2014, which make recommendations for the peri-operative biochemical monitoring and micronutrient replacement for bariatric surgery patients [2]. Patients who had their procedure carried out under the NHS will be reviewed by specialist services for **two years** post-surgery.

The Royal College of General Practitioners' Nutrition Group have also developed guidelines which are aimed at all non-specialist clinicians, dietitians and nurses, to aid

management of these patients once they are discharged back to primary care for whom follow up guidance by the surgical team was not issued [3].

2. Preoperative Care

All patients should have a comprehensive nutritional assessment prior to bariatric surgery, which includes a detailed dietary assessment by a trained dietitian with specific experience of bariatric nutrition, screening for eating disorders and psychosocial assessment (in accordance with local commissioning arrangements). Nutritional deficiencies identified at this stage should be investigated and corrected as clinically indicated, **by the specialist bariatric service**, prior to surgery (see Table 1).

Full Blood Count	Parathyroid Hormone
Urea and Electrolytes	Calcium
Liver Function Tests	Vitamin D
Ferritin	Fasting Blood Glucose
Folate	HbA1c
Vitamin B12	Lipid Profile

Table 1: Recommended preoperative blood tests before undergoing bariatric surgery [4]

Many centres recommend a low calorie / low carbohydrate diet immediately prior to surgery to shrink the size of the liver. A multivitamin and mineral supplement may also be needed as the prescribed diet may not always be nutritionally complete.

3. Postoperative Care and Biochemical Monitoring

The main bariatric surgeries are: gastric band, gastric bypass (Roux-en-Y) and sleeve gastrectomy, with the duodenal switch being less frequent. Recommendations for postoperative supplementation vary in accordance with the type of procedure:

Nutritional Supplement	Procedure			Product Example	OTC Cost (per month (MIMS Jul 20))	Dosage	Course Length
	Laparoscopic Adjustable Gastric Band (the patient must be advised to purchase Forceval® OTC)	Laparoscopic Sleeve Gastrectomy (the patient must be advised to purchase Forceval®, Iron and Calcichew® D3 Forte OTC. Vitamin B12 will need to be prescribed and administered in primary care)	Roux-en-Y Gastric Bypass (prescribe all preparations)				
Multivitamin and Mineral	Yes	Yes	Yes	Forceval®*	£9.92	One daily	Lifelong
Iron	No	Yes	Yes	Ferrous Sulphate	£1.44	200mg once daily	Lifelong
				Ferrous Fumarate	£3.99 (3-months)	210mg once daily	
				Ferrous Gluconate	£1.21	300mg once daily	
Folate	Separate preparation is not required - Included in Forceval®*	Separate preparation is not required - Included in Forceval®*	Separate preparation is not required - Included in Forceval®*	Forceval®*	£9.92	One daily	
Vitamin B12	No	Yes	Yes	Hydroxocobalamin	-	1mg every 3-months	Lifelong
Calcium and Vitamin D	No	Yes	Yes	Calcichew® D3 Forte	£3.96	Three times daily	Lifelong
Zinc	Separate preparation is not required - Included in Forceval®*	Separate preparation is not required - Included in Forceval®*	Separate preparation is not required - Included in Forceval®*	Forceval®*	£9.92	One daily	
Copper	Separate preparation is not required - Included in Forceval®*	Separate preparation is not required - Included in Forceval®*	Separate preparation is not required - Included in Forceval®*	Forceval®*	£9.92	One daily	
Selenium	Separate preparation is not required - Included in Forceval®*	Separate preparation is not required - Included in Forceval®*	Separate preparation is not required - Included in Forceval®*	Forceval®*	£9.92	One daily	

* Forceval® is the only complete multivitamin and mineral supplement available both on and off prescription. Forceval® is available in both soluble and capsule form. Other A to Z multivitamins and minerals are also available to buy perhaps at a lower price. However, it cannot be guaranteed that these contain everything that is required.

Table 2: Recommended nutritional supplements after different bariatric procedures [4]

Generally, in the initial stages after surgery, patients are advised to start on a liquid diet, before progressing onto pureed food, soft food and then more normal textured food. At two years, the patient should be able to manage a wide range of textures of foods but may still report difficulties with some. It can be assumed that all are not receiving the benefits of eating a “well-balanced” diet to a greater or lesser extent depending on the type of surgery they have had. Therefore, **life-long supplementation is indicated in all patients.**

Hence, blood monitoring should be performed at intervals that are dependent on the type of bariatric surgery performed (see Table 3) or as directed by the specialist bariatric service.

Blood Test	Procedure		
	Laparoscopic Adjustable Gastric Band	Laparoscopic Sleeve Gastrectomy	Roux-en-Y Gastric Bypass
Calcium	Annually	3, 6, 12 months after surgery, then annually	3, 6, 12 months after surgery, then annually
Ferritin	N/A	3, 6, 12 months after surgery, then annually	3, 6, 12 months after surgery, then annually
Folate	N/A	3, 6, 12 months after surgery, then annually	3, 6, 12 months after surgery, then annually
Full Blood Count	Annually	3, 6, 12 months after surgery, then annually	3, 6, 12 months after surgery, then annually
HbA1c or Fasting Blood Glucose (patients with preoperative diabetes)	Monitor as appropriate	Monitor as appropriate	Monitor as appropriate
Lipid Profile	Monitor in those with dyslipidaemia	Monitor in those with dyslipidaemia	Monitor in those with dyslipidaemia
Liver Function Tests	Annually	3, 6, 12 months after surgery, then annually	3, 6, 12 months after surgery, then annually
Parathyroid Hormone	N/A	3, 6, 12 months after surgery, then annually	3, 6, 12 months after surgery, then annually
Selenium	N/A	If clinically indicated*	If clinically indicated*
Thiamine	N/A	Routine blood monitoring is not required – only in patients with prolonged vomiting	Routine blood monitoring is not required – only in patients with prolonged vomiting
Urea and Electrolytes	Annually	3, 6, 12 months after surgery, then annually	3, 6, 12 months after surgery, then annually
Vitamin A	N/A	Measure if concerns regarding steatorrhea or symptoms of vitamin A deficiency e.g. night blindness	Measure if concerns regarding steatorrhea or symptoms of vitamin A deficiency e.g. night blindness
Vitamin B12	N/A	6, 12 months after surgery, then annually – not required if the patient is receiving B12 injections	6, 12 months after surgery, then annually – not required if the patient is receiving B12 injections
Vitamin D	Manage patients in line with the LMMG vitamin D position statement	3, 6, 12 months after surgery, then annually	3, 6, 12 months after surgery, then annually
Vitamin E and K	N/A	If clinically indicated*	Measure vitamin E if unexplained anaemia, neuropathy. Consider measuring INR if excessive bruising / coagulopathy
Zinc, Copper	N/A	If clinically indicated*	Annually

* GP to be informed by the specialist service if indicated.

Table 3: Recommended schedules of blood monitoring after different bariatric procedures [5] [2].

4. Nutritional Deficiencies – What to Look For

Clinicians should also be aware of the signs and symptoms of potential nutritional deficiencies especially anaemia, vitamin D deficiency, protein malnutrition, as well as other vitamin and micronutrient deficiencies (see Table 4).

4.1 Protein Malnutrition – can occur for a number of reasons including poor dietary choice, an overtight gastric band, anastomotic or protein malabsorption. It may present several years following surgery. Protein energy malnutrition is accompanied by oedema. In all cases of suspected protein malnutrition, the patient must be fast-tracked back to the bariatric centre.

Nutritional Deficiency	Notes
Protein malnutrition	May present as oedema several years post-surgery Requires urgent referral back to the bariatric team
Anaemia	Iron deficiency (rule out and investigate other potential causes, such as blood loss) Folate deficiency Vitamin B12 deficiency Less common deficiencies such as zinc, copper, and selenium are a potential cause of unexplained anaemia Some patients may need parenteral iron or blood transfusions if oral iron does not correct the deficiency
Calcium and vitamin D deficiency	May result in secondary hyperparathyroidism (it is recommended that vitamin D should be replaced as per LMMG guidance)
Vitamin A deficiency	Suspect in patients with changes in night vision Patients with steatorrhea or those who have had a duodenal switch are at high risk
Zinc, copper and selenium deficiency	Unexplained anaemia, poor wound healing, hair loss, neutropenia, peripheral neuropathy and cardiomyopathy are potential symptoms Ask about over-the-counter supplements and liaise with bariatric unit, as zinc supplements can induce copper deficiency and vice versa
Thiamine deficiency	Suspect in patients with poor intake, persistent regurgitation or vomiting This may be caused by anastomotic stricture in the early postoperative phase, food intolerances or an over tight band Start thiamine supplementation immediately and refer urgently to the local bariatric unit due to risk of Wernicke's encephalopathy Do not give sugary drinks as they may precipitate Wernicke's encephalopathy

Table 4: Potential nutritional deficiencies post-bariatric surgery [5]

4.2 Iron Deficiency Anaemia – This is common following gastric bypass surgery. However, other causes should also be considered and investigated. If additional oral iron does not correct the iron deficiency anaemia, parenteral iron or blood transfusions may be necessary. Oral iron supplements can be taken with meals or drinks containing vitamin C to aid absorption and at a different time to calcium supplements. If the anaemia is not due to iron deficiency or blood loss, other nutritional causes should be considered, including folate, vitamin B12, zinc, copper and selenium.

4.3 Folate and Vitamin B12 – low folate levels may be an indication of non-compliance with multivitamin and mineral supplements. However, it could also be an indication of severe malabsorption, especially if there are other nutritional deficiencies. Vitamin B12 deficiency should be considered before recommending additional folic acid.

4.4 Calcium, Vitamin D and Parathyroid Hormone – vitamin D deficiency may result in secondary hyperparathyroidism. Clear recommendations for the management of vitamin D deficiency are given in the National Osteoporosis Guidelines: Vitamin D and Bone Health: A Practical Clinical Guideline for Patient Management and LMMG guidance [6].

4.5 Vitamin A – patients who have steatorrhea or who have had a duodenal switch may be at risk of vitamin A deficiency. Duodenal switch patients should receive additional fat soluble vitamins. Although, vitamin A levels may still drop over time. Changes in vision may be an indication of vitamin A deficiency. If the patient has vitamin A deficiency, oral supplementation should be considered.

4.6 Zinc, Copper and Selenium – unexplained anaemia, poor wound healing, hair loss, neutropenia, peripheral neuropathy or cardiomyopathy may be symptoms of zinc, copper or selenium deficiency. Zinc and copper share a common metabolic pathway, so supplementation with zinc can induce copper deficiency and vice versa. Information about any additional over-the-counter supplements the patient may be taking is essential. If additional zinc supplementation is required, a ratio of 1mg copper for every 8mg – 15mg zinc must be maintained. [2]

5. When to Request Specialist Biochemical / Nutritional Advice or Refer

Diagnosis and management of micronutrient deficiency syndrome can be complex and so when in doubt, it is recommended that specialist advice is sought, especially in the following cases:

- Newly identified biochemical deficiency, where there is differential diagnosis or its appropriate investigation and treatment are uncertain
- Unexplained symptoms that may be indicative of underlying micronutrient / trace element deficiencies

- Women who have undergone previous gastric bypass, sleeve gastrectomy or duodenal switch surgery and who are planning to become pregnant or who are pregnant
- The patient is regaining weight

6. Ten Top Tips for the Management of Patients' Post-Bariatric Surgery

The Royal College of General Practitioners' Nutrition Group has also published an article in the British Journal of Obesity, which suggests 'Ten Top Tips for the management of patients' post-bariatric surgery in primary care, as listed below [3]:

1. Keep a register of bariatric surgery patients
2. Encourage patients to check their own weight regularly and to attend an annual BMI and diet review with a healthcare professional
3. Symptoms of continuous vomiting, dysphagia, intestinal obstruction (gastric bypass) or severe abdominal pain require emergency admission under the local surgical team
4. Continue to review comorbidities post-surgery, including diabetes, hypertension, hypercholesterolaemia and obstructive sleep apnoea, as well as mental health
5. Review the patient's regular medications
6. Bariatric surgery patients require lifelong annual blood tests, including micronutrient monitoring
7. Be aware of potential nutritional deficiencies that may occur and their signs and symptoms
8. Ensure the patient is taking the appropriate lifelong nutritional supplements
9. Discuss contraception – ideally pregnancy should be avoided for at least 12-18 months post-surgery
10. If a patient should plan or wish to become pregnant after bariatric surgery the patient should alter their nutritional supplements to one suitable during pregnancy

7. References

1. Health and Social Care Information Centre, Lifestyles Statistics. Statistics on obesity, physical activity and diet: England, 2014, [Internet], London, The Health and Social Care Information Centre.

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2. British Obesity & Metabolic Surgery Society. Guidelines on peri-operative and postoperative biochemical monitoring and micronutrient replacement for patients undergoing bariatric surgery.

Available from: <http://www.bomss.org.uk/wp-content/uploads/2014/09/BOMSS-guidelines-Final-version1Oct14.pdf> [Accessed 07 December 2016]

3. Royal College of General Practitioners Nutrition Group. Ten top tips for the management of patients post bariatric surgery in primary care.

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4. Al-Momani H, Williamson J, Greenslade B, Krawec V, Mahon D (2015). Biochemical monitoring and micronutrient replacement for patients undergoing bariatric surgery: A review of British Obesity and Metabolic Surgery Society guidelines. *British Journal of Obesity* 1: 61–67.

5. Parretti HM, Hughes CA, O’Kane M, Woodcock S, Pryke RG (2015). Ten Top Tips for the management of patients’ post-bariatric surgery in primary care. *British Journal of Obesity* 1: 68–73.

6. Francis R, Aspray T, Fraser W, Gittoes N, Javaid K, MacDonald H, Patel S, Selby P, Tanna N, Bowring C (2013). A practical clinical guideline for patient management. National Osteoporosis Society [Internet].

Available from: <http://www.nos.org.uk/document.doc?id=1352> [Accessed 07 December 2016]

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Version Control

Version Number	Date	Amendments Made	Author
Version 1.0	March 2017	Approved	AG
Version 1.1	June 2019	Reference to commissioning responsibilities removed. Logo updated.	AG
Version 1.2	December 2019	Prescribing for private patients' recommendation changed.	AG
Version 1.3	July 2020	References checked and prices updated.	AG

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