

<b>Sheffield Teaching Hospitals</b>  NHS Trust		Trust Guideline developed by the Sheffield Bariatric Surgery Service
<b>Title: A guideline for the nutritional supplementation and blood monitoring of Sheffield bariatric surgery patients</b>		
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<b>Ratified by:</b> Directorate of General Surgery		
<b>Ratification date:</b> December 2019		<b>Review date:</b> December 2021
<b>Applies to:</b> All clinical staff involved in the care of bariatric surgery patients including GPs.		<b>Exclusions:</b> Non-clinical staff and clinical staff <b>not</b> involved in the care of bariatric surgery patients.
<b>Purpose:</b> To standardise nutritional blood monitoring and supplementation guidance for clinical staff and patients who have had bariatric surgery at Sheffield Teaching Hospitals NHS Foundation Trust.		

## Background

This guideline is intended to provide a baseline overview of the key aspects of nutritional monitoring and supplementation as part of the overall nutritional care of pre-surgical and post-surgical bariatric patients.

### Blood monitoring for all pre-surgery and post-surgery patients

The following blood tests should be checked pre-surgery and annually post-surgery lifelong, or as clinically indicated.

- Urea and Electrolytes (U and E's)
- Liver Function Tests (LFT's)
- Full Blood Count (FBC)
- Glucose
- HbA1c pre op and (post-op annually in diabetic patients)
- Lipid profile

- Thyroid Function Test
- Ferritin
- Folate
- Vitamin B12
- Calcium Profile
- 25-Hydroxyvitamin D (Vitamin D)
- Parathyroid hormone (PTH)
- Zinc
- Copper
- Selenium

(NB: BOMSS 2014 guidance recommends checking zinc, copper and selenium in post op gastric bypass patients only. Selenium is advised to be checked only if the patient has unexplained fatigue, anaemia, metabolic bone disease, chronic diarrhoea or heart failure. Sheffield Teaching Hospitals Consultant Clinical Chemist advises that zinc, copper and selenium are checked together for ease of interpretation. As the service has encountered many selenium deficiencies, this is checked routinely regardless of symptoms).

### **Nutritional supplementation prior to bariatric surgery**

Morbidly obese pre-operative bariatric patients have been shown in studies to have a high incidence of nutritional deficiencies (*Nicoletti et al, 2011* and *Moize et al, 2011*). It is therefore important that all pre-surgery bariatric patients have their nutritional status assessed and treated prior to bariatric surgery.

- When patients commence the ten day pre-operative liver shrinkage diet, they are advised to start taking an over the counter complete multi-vitamin and mineral supplement daily such as: Sanatogen A-Z Complete, supermarket brand complete A-Z (such as Tesco, Sainsbury's, Asda) or an equivalent complete A-Z multivitamin and mineral preparation (the multivitamin and mineral tablet should be A-Z complete with 100% Reference Nutrient Intake (RNI) of iron and also contain selenium). Self-care is encouraged: if taking Forceval capsules or Holland and Barrett ABC Plus caplets only one is needed per day.

- If a pre-operative bariatric patient is found to have any nutritional deficiency they are advised to commence appropriate corrective nutritional supplementation, if required (see 'Correcting micronutrient blood levels' section) and start taking a complete A-Z multivitamin and mineral daily.
- Any bariatric patients found to have nutritional deficiencies prior to bariatric surgery will have their blood levels rechecked at their first post-operative appointment, if the recommended supplementation has been taken.

### **Post gastric bypass and sleeve gastrectomy surgery**

Patients who have had gastric bypass or sleeve gastrectomy surgery (but particularly bypass patients where there is an element of malabsorption) are at a greater risk of nutritional deficiencies. Gastric bypass patients may require higher doses of nutritional supplements.

Whilst on the liquid/pureed stages of the post-operative diet, two chewable multivitamin and mineral supplements are advised daily, for example; Nature's Plus Source of Life Adult's Chewable Multivitamin and Mineral, Superdrug chewable multivitamins and minerals, Centrum Fruity Chewable multivitamins and minerals, Wellkid Multi-Vitamin Smart Chewable or a similar equivalent. These chewable nutritional supplements are only recommended whilst on the liquid/pureed stages of the diet as they are nutritionally incomplete.

Once patients can tolerate foods from stage 3 (soft, mushy, crispy) of the diet they should change to 2 complete vitamin and mineral supplements in tablet/capsule form daily. This multi vitamin and mineral supplement should contain 100% of the RNI for at least two thirds of the micronutrients **including iron**, such as Sanatogen A-Z Complete, supermarket brand complete A-Z (such as Tesco, Sainsbury's, Asda) or equivalent complete A-Z multivitamin and mineral preparation. If taking Holland and Barrett ABC Plus only one caplet is needed per day. Self-care is encouraged; however, Forceval is available on prescription, if taking Forceval only one capsule per day is required. They should contain a minimum of 2mg of copper per day and should contain selenium. The ratio of 8-15mg of zinc for each 1mg of copper should be maintained.

- The chewable forms are not nutritionally complete and are not advised for long term nutritional supplementation.
- Patients are advised to take two daily, complete vitamin and mineral supplements lifelong, if taking Forceval capsules or Holland and Barrett ABC Plus caplets only one is needed per day.
- Vitamin B12 - All patients who have had gastric bypass or sleeve gastrectomy surgery will require intramuscular vitamin B12 (hydroxocobalamin), 1mg dose, once every three months. It is advised to start within three months post operatively and then continue once every three months lifelong. A loading dose is not required unless the patient already has a deficiency. See [Vitamin B12 Guidance for Primary Care](#) for guidance. Vitamin B12 tablets are not recommended for patients who have had a gastric bypass or sleeve gastrectomy as the nature of these operations means that very little oral vitamin B12 can be absorbed.
- Thiamine - Additional thiamine and vitamin B may be needed for patients with prolonged vomiting, poor nutritional intake, or weight loss greater than expected (thiamine 100mg tds and vitamin B co- strong 1 or 2 tablets tds should be prescribed for duration of these factors as per [STH re-feeding guidelines](#)). BOMSS guidance recommend that if a deficiency is suspected to prescribe thiamine immediately, therefore, not necessary to check and wait for thiamine blood levels (*O'Kane, 2014*). (See: [STH re-feeding guidelines](#) or PENG sections on 're-feeding' and 'bariatric surgery').

### **Post laparoscopic adjustable gastric band surgery**

- Prior to the first gastric band adjustment - one chewable multivitamin and mineral supplement daily is advised, for example, Nature's Plus Source of Life Adult's Chewable Multivitamin and Mineral, Superdrug chewable multivitamins and minerals, Centrum Fruity Chewable multivitamins and minerals, Wellkid Multi-Vitamin Smart Chewable or a similar equivalent. These chewable nutritional supplements are only recommended whilst on the liquid/pureed stages of the diet (first two weeks post-surgery) as they are nutritionally incomplete.

- Once patients are able to tolerate stage three (soft, mushy, crispy) of the diet, they should change to one, tablet/capsule form of an over the counter, complete multivitamin and mineral supplement, such as Sanatogen A-Z Complete, supermarket brand complete A-Z (such as Tesco, Sainsbury's, Asda, Holland and Barrett ABC Plus) or equivalent complete A-Z multivitamin and mineral preparation (the multivitamin and mineral tablet should be A-Z complete with 100% RNI of iron and also contain selenium). Self-care is encouraged; however, Forceval OD is available on prescription.
- Patients with a gastric band are advised to take one daily, complete A-Z multivitamin and mineral supplement lifelong.

### **Pregnancy following bariatric surgery**

- Pregnancy post bariatric surgery is not recommended until at least 18 months post-operatively, due to the potential increased risk of nutritional deficiencies.
- Bariatric patients who become pregnant should be referred to the bariatric dietitians at the Sheffield Bariatric Surgery Service for closer monitoring (every 4-8 weeks) and dietary/supplementation advice.
- Gastric band patients who become pregnant should have their gastric bands emptied. These patients should contact the specialist nurse/dietitian who will arrange this.
- Patients who are planning to become pregnant or who are pregnant are advised to stop their daily complete A-Z vitamin and mineral supplementation and commence a pregnancy specific supplement such as, Seven Seas Pregnancy Multivitamins and Minerals, Boots Pregnancy or Tesco Pregnancy Support Multivitamins and Minerals Pregnancy, one a day is recommended.
- Health professionals should ensure the supplements contain Vitamin A in the beta carotene not retinol form. They should still continue with any other nutritional supplementation as previously advised, unless contraindicated.
- Women trying to conceive who are obese or who have diabetes are advised to take 5mg folic acid from preconception until the 12<sup>th</sup> week of pregnancy (or longer if advised) (*O'Kane et al, 2014*). This will need to be prescribed.

- Pregnant bariatric patients (except gastric band patients) should be screened for nutritional deficiencies every trimester due to reduced dietary intake and potential malabsorption with a gastric bypass (*O’Kane et al, 2014*).

## Abnormal Blood Results

- If any nutritional blood results are abnormal, patients are likely to require a dietary assessment together with advice regarding additional/alternative nutritional supplementation.
- **As a first line, patients who have had a gastric bypass or sleeve gastrectomy need to be taking two complete A-Z multivitamin and mineral supplements daily** (unless taking Forceval or Holland and Barrett ABC Plus where one a day is recommended). **Patients who have a gastric band need to take one complete A-Z multivitamin and mineral daily.** The nutritional information of the supplement should be checked to ensure that it is complete.
- If advice is required about how to interpret a particular blood result or treat a particular micronutrient deficiency, please contact:

STH Clinical Chemistry Consultant via switchboard: 0114 243 4343.

Bariatric surgery dietitians/nurse specialist: 0114 2269083.

## Correcting micronutrient blood levels

- Abnormal U and E's, LFT's, FBC, glucose and HbA1c, lipid profile or thyroid function test – GP to investigate.
- Ferritin – ensure that the patient is taking Forceval one capsule or Holland and Barrett ABC Plus OD or is taking two complete A-Z multivitamin and minerals with 100% RNI for iron (or one complete A-Z multivitamin and mineral for patients with a gastric band). If this is currently being taken, possible sources of blood loss, both related and unrelated to bariatric surgery should also be considered, investigated and excluded. If supplements are required, see [Sheffield formulary](#). Iron-rich foods should also be advised, such as red meats, fortified breakfast cereals, green leafy vegetables, beans, nuts and dried fruit, which should be eaten alongside foods high in vitamin C, such as oranges, strawberries, kiwi fruit, potatoes, red and green peppers and broccoli (see NHS Choices website [‘Vitamins and minerals – iron’](#) for more information).
- Folate – a complete A-Z multivitamin and mineral provides adequate folic acid (one if Forceval or Holland and Barrett ABC Plus or two complete A-Z

Multivitamin and minerals daily for gastric bypass and sleeve gastrectomy patients, or one daily for gastric band patients), check compliance with this. Encourage folate rich foods, such as broccoli, spinach, liver, chick peas, brown rice and fortified cereals (see NHS Choices website '[Vitamins and minerals – B vitamins and folic acid](#)' for more information). Folic acid 400mcg OD can be bought over the counter (or 5mg during preconception or pregnancy – prescription only medicine).

- Vitamin B12 – patients post gastric bypass or sleeve gastrectomy should have three-monthly injections lifelong, if a deficiency is found then [Vitamin B12 Guidance for Primary Care](#) should be followed. Patients who have received routine vitamin B12 injections are unlikely to develop a deficiency; however, some patients may need injections more frequently, such as one every 8-10 weeks due to symptoms of fatigue.
- Calcium and PTH - Encourage dietary sources of calcium, such as dairy, green leafy vegetables, soya and tofu (see NHS Choices – 'Vitamins and minerals – calcium'). If a patient is found to have a low calcium or high PTH blood result, calcium is recommended as 800-1200mg/d with added vitamin D (20mcg/800IU-25mcg/1000IU/day) (*O'Kane et al, 2014*). See [Sheffield guidelines](#) for formulary choice of preparation.
- Vitamin D – patients with low vitamin D should be managed as per [Sheffield guidelines](#).
- Selenium - Additional selenium may be required by patients following gastric bypass and sleeve gastrectomy if their blood levels show a deficiency. Advise 2-3 Brazil nuts per day or over the counter supplement, such as Selenium ACE, Holland and Barrett Selenium, Boot's Selenium with Vitamins A, C and E or Selenase 50mcg/ml (prescribable) (*O'Kane, 2014*).
- Copper – Clinical Chemistry Consultant at STH is willing to advise on the course of action in each individual case for bariatric patients, directly to GPs if needed.
- Zinc – Clinical Chemistry Consultant at STH is willing to advise on the course of action in each individual case for bariatric patients, directly to GPs if needed.
- Patients with neurological symptoms should be referred to a neurologist.

## Follow up care

- Patients who have had a gastric bypass or sleeve gastrectomy should ensure that two complete multivitamin and mineral A-Z tablets are taken every day lifelong (if taking Forceval or Holland and Barrett ABC Plus one a day is recommended). Gastric band patients should take one complete A-Z multivitamin and mineral daily.
- Patients who have had gastric bypass or sleeve gastrectomy surgery should have three monthly vitamin B12 injections (or sooner if needed) lifelong.
- If a nutritional deficiency is detected, blood levels should be rechecked again after three months (or after four months if vitamin D < 25nmol/L), of commencing appropriate nutritional supplementation. If blood levels continue to be lower than the normal reference range, despite compliance with additional recommended supplementation, it is advised that they will require a referral to the bariatric surgery dietitians for further dietary assessment and advice.
- Patients with micronutrient deficiencies following a gastric bypass or sleeve gastrectomy are likely to require supplementation lifelong. If supplementation is stopped once corrected the deficiency is likely to return.

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