

Table 5 Abnormal test results, clinical problems, pregnancy and adolescents

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Recommendations	Grade, Evidence level, Range of evidence
<p>Protein malnutrition / protein energy malnutrition / oedema</p> <ul style="list-style-type: none"> If people present with signs/symptoms of protein malnutrition/protein energy malnutrition/ oedema, investigate potential causes and refer back to bariatric centre 	GPP
<p>Anaemia</p> <p>Iron deficiency anaemia</p> <ul style="list-style-type: none"> Sources of blood loss should be considered, investigated and excluded in individuals who present with iron deficiency anaemia For people over 12 years old and pregnant women diagnosed with iron deficiency anaemia, treat iron deficiency following NICE CKS Anaemia - iron deficiency <p>Vitamin B12 deficiency</p> <ul style="list-style-type: none"> Treat vitamin B12 deficiency immediately using NICE CKS: Anaemia - B12 and folate deficiency. Do not give folic acid first as it may mask underlying vitamin B12 deficiency and precipitate Subacute Combined Degeneration of the spinal cord For people with neurological involvement, NICE recommend administering hydroxocobalamin 1 mg intramuscularly on alternate days until there is no further improvement, then administer hydroxocobalamin 1 mg intramuscularly every 2 months For people with no neurological involvement, NICE recommend administering hydroxocobalamin 1 mg intramuscularly three times a week for 2 weeks After treatment of vitamin B12 deficiency, provide maintenance treatment with 1 mg intramuscularly every 2 to 3 months lifelong Seek urgent specialist advice from neurologist and haematologist, if there is possible neurological involvement, such as unexplained sensory and/or motor and gait symptoms <p>Folic acid deficiency</p> <ul style="list-style-type: none"> Check and treat for vitamin B12 deficiency, before initiating folic acid treatment to avoid precipitation of Subacute Combined Degeneration of the spinal cord Treat folic acid deficiency using NICE CKS: Anaemia - B12 and folate deficiency. Folic acid 5 mg orally daily for a minimum of 4 months is recommended and further investigations if there is suspicion of malabsorption 	<p>Grade D EL4</p> <p>Grade D EL 4</p> <p>Grade D EL 4</p> <p>Grade D EL 4</p> <p>Grade D EL 4</p> <p>Grade D EL 4</p> <p>GPP</p> <p>Grade D EL 4</p> <p>Grade D EL 4</p>
Unexplained anaemia / fatigue	

<ul style="list-style-type: none"> For unexplained causes of anaemia or fatigue, investigate for other nutritional deficiencies including protein, zinc, copper and selenium 	GPP
<p>Low vitamin D levels</p> <ul style="list-style-type: none"> In absence of local adult guidelines for vitamin D replacement, refer to National Osteoporosis Society guidance: Vitamin D and Bone Health: A Practical Clinical Guideline for Patient Management In absence of local children and young people guidelines for vitamin D replacement, refer to National Osteoporosis Society guidance: A Practical Clinical Guideline for Patient Management in Children and Young People or a paediatrician If the person remains vitamin D deficient despite treatment, refer to a secondary care specialist In people with severe vitamin D deficiency, high dose vitamin D injections might be required which should be given following specialist consultation, in people with known history/high risk of hypercalcaemia e.g. people with kidney stones, sarcoidosis, renal impairment, atrial fibrillation 	<p>Grade D EL 4</p> <p>Grade D EL 4</p> <p>GPP</p> <p>GPP</p>
<p>Vitamin A deficiency / disturbances in night vision / xerophthalmia</p> <ul style="list-style-type: none"> In adults, treat vitamin A deficiency, with 10000 to 25000 IU oral vitamin A daily for one to two weeks for clinical improvement. Recheck vitamin A levels at three months For vitamin A deficiency that does not respond to treatment, refer to specialist for assessment and consideration of intramuscular vitamin A injections In adolescents, with vitamin A deficiency, refer for specialist support 	<p>Grade D EL 4</p> <p>GPP</p> <p>GPP</p>
<p>Vitamin E and vitamin K deficiency</p> <ul style="list-style-type: none"> Treat vitamin E deficiency with oral vitamin E 100 to 400 IU/day. Recheck levels after three months For vitamin E deficiency that does not respond to treatment, refer to specialist for assessment and consideration of intramuscular injections When considering vitamin E nutritional status, adjustment should be made for serum lipids For vitamin K deficiency, treat with 1-2 mg oral vitamin K daily (Ketovite tablets, menadiol sodium phosphate or phytomenadione). Recheck levels after three months. For those on anti-coagulants such as warfarin, or for vitamin K deficiency that does not respond to treatment, refer to specialist for assessment 	<p>Grade D EL 4</p> <p>GPP</p> <p>Grade D EL 4</p> <p>GPP</p>
<p>Neurological symptoms / Wernicke's encephalopathy</p> <p>In patients, who present with neurological symptoms:</p> <ul style="list-style-type: none"> Treat for thiamine deficiency (see section Prolonged vomiting/dysphagia/poor oral intake/risk of thiamine deficiency) Check for vitamin B12, copper and vitamin E deficiencies and treat Refer to neurologist and haematologist 	<p>Grade D EL 4</p> <p>GPP</p> <p>GPP</p>
<p>Zinc and copper deficiency</p> <ul style="list-style-type: none"> If both zinc and copper low, consider prescribing two Forceval daily for three months and recheck levels 	GPP

<ul style="list-style-type: none"> • Check both zinc and copper levels when considering zinc or copper replacement • With mild zinc or copper deficiency, consider giving two Forceval daily and recheck levels after three months • With severe zinc deficiency and normal or borderline copper levels, treat with high dose zinc supplement for three months and recheck levels. If no improvement or copper levels fall, refer for specialist advice • With severe copper deficiency, refer for specialist advice • When giving additional zinc and copper, maintain a ratio of 8 to 15 mg zinc to 1 mg copper. Close monitoring is required if higher zinc or copper doses are indicated because each affects the absorption of the other. If necessary, ask for expert advice 	<p>Grade D EL 4 GPP GPP</p> <p>GPP Grade D EL 4</p>
<p><u>Prolonged vomiting/dysphagia/poor oral intake/risk of thiamine deficiency</u></p> <ul style="list-style-type: none"> • If people present with prolonged vomiting or dysphagia, refer back to the bariatric centre for investigation • People, who present with prolonged vomiting or dysphagia, are at risk of thiamine deficiency. Give additional thiamine and vitamin B co strong immediately (thiamine 200–300 mg daily, vitamin B co strong 1 or 2 tablets, three times a day) • For those unable to tolerate thiamine orally or with clinical suspicion of acute deficiency intravenous thiamine should be given 	<p>GPP Grade D EL 4</p> <p>Grade D EL 4</p>
<p>Pregnancy</p> <ul style="list-style-type: none"> • Women are advised to avoid pregnancy for the first twelve to eighteen months following surgery to allow weight stabilisation and a varied nutritious diet • Women with a BMI <29.9kg/m², planning for pregnancy, should take an additional 400 micrograms/day folic acid prior to conception until the 12th week of pregnancy • Women with type 2 diabetes mellitus or a BMI >30 kg/m² should take 5 mg folic acid until the 12th week of pregnancy. Check for vitamin B12 deficiency before starting • Refer to specialist antenatal care • Replace vitamin A in supplements from retinol to beta carotene form or take preconception or pregnancy specific vitamin and mineral supplement • Pregnant women, following bariatric surgery, should undergo nutritional screening during each trimester. This should include ferritin, folate, vitamin B12, calcium, vitamin D, vitamin A • Pregnant women, following bariatric surgery, especially those who have had long-limbed bypass or BPD/DS procedures, may be at risk of low vitamins E and K levels. These should be monitored during pregnancy if clinically indicated • A more frequent review with the specialist bariatric dietitian may be required • Reference ranges change in pregnancy. Please refer to perinatal reference ranges when checking blood results http://perinatology.com/Reference/Reference Ranges/Reference for Serum.htm 	<p>Grade D EL 4</p> <p>Grade D EL 4</p> <p>Grade D EL 4</p> <p>Grade D EL 4 Grade D EL 4</p> <p>Grade D EL 4</p> <p>Grade D EL 4</p> <p>Grade D EL 4 GPP</p>
<p>Adolescents</p>	

<ul style="list-style-type: none"> Adolescents who have undergone bariatric surgery should be monitored for dietary adherence and nutritional assessment on a regular basis due to changes in body composition, growth and sexual development 	GPP
<p>Malabsorptive procedures</p> <ul style="list-style-type: none"> Individuals who have malabsorptive procedures have a higher prevalence of post-surgery nutritional deficiencies and care should remain with the specialist centre For OAGB/MGB with BP limb length of 150cm or less, follow RYGB nutritional recommendations For OAGB/MGB with BP limb length of greater than 150cm or SADIs, follow BPD/DS nutritional recommendations 	GPP GPP GPP

EL =Evidence level and depicts where the majority of evidence lies. GPP= Good practice point. BPD/DS=duodenal switch, OAGB /MGB, One anastomosis gastric bypass /mini gastric bypass, SADIs, single anastomosis duodenal ileal bypass with sleeve gastrectomy, RYGB=Roux-en-y gastric bypass, CKS =clinical knowledge summary.