

## Supplemental materials

### Supplemental Table 1. Possible complaints, signs and symptoms associated with vitamin B12 deficiency

#### Hematologic

Anemia, increased mean corpuscular volume (MCV)

Hypersegmented white blood cells, neutropenia

Thrombocytopenia

Pancytopenia

#### Neurologic

Peripheral neuropathy

Subacute combined degeneration of the spinal cord

Erectile dysfunction

Ataxia, tinnitus, dizziness

Cognitive disturbances, including difficulties concentrating, focusing on specific task or remembering, thinking, word finding disturbances, mood changes

#### Neuropsychiatric

Depression, mania, delirium, psychosis

#### Other

Glossitis, gingivitis

Muscle cramps, fibromyalgia-like symptoms, joint pains

Fatigue

Complaints related to a possible underlying cause, like celiac disease, short bowel syndrome, pancreatic insufficiency

**Supplemental Table 2. Overview of relevant laboratory examinations in the patients**

Patient	A	B	C	D	E	F
Sex / age	F / 55	F / 17	F / 15	F / 33	F / 68	F / 62
Serum B12 (pmol/l)	51	112	94	190	301	249
HoloTC (pmol/l)	na	54	44	na	na	na
MMA (nmol/l)	na	178	218	na	37000	1380
HCys (µmol/l)	na	11	78.4	na	165	na
Folate (nmol/l)	9.8	19	6.7	na	>45	na
cB12 indicator	na	-0.3 <sup>a</sup>	-1.4 <sup>a</sup>	na	-5.2	-1.3
Hemoglobin (mmol/l)	7.0	8.3	8.0	7.5	7.5	na
MCV (fl)	105	88	93	na	110	na
Parietal cell antibodies	+	-	-	-	+	na
Anti-intrinsic factor antibodies	+	-	-	-	+	na
Comorbidity	Graves' disease, vitiligo	-	-		Hashimoto's disease	After RYGB

Reference values:

Serum B12 140 - 450 pmol/l; Holotranscobalamin (HoloTC) intermediate 32-70, normal 70-125 pmol/l; MMA, methylmalonic acid: < 300 nmol/l; HCys, homocysteine: < 10 µmol/l

Folate: 10 - 36 nmol/l; Hemoglobin: 7.5 - 9.5 mmol/l; MCV, mean corpuscular volume: 85-98 fl.

cB12, combined indicator of deficiency, -0.5-1.5, adequate; -1.5--0.5, low; -2.5--1.5, possible deficiency; <-2.5, probable deficiency. Ref. 44

na: not available

<sup>a</sup> the cB12 in patients B and C should be interpreted with caution as the application of this indicator has not validated in people below the age of 18 years.

Supplemental Table 3. Causes of cobalamin (vitamin B12) deficiency

1. Inadequate intake

Vegans or vegetarians

Alcohol abuse

2. Disturbed absorption

Autoimmune gastritis

Gastrectomy or gastric bypass

Diseases or resection of the ileum

Pancreatic insufficiency

Certain medications (metformin, proton pump inhibitors)

Bacterial overgrowth

3. Congenital

Transcobalamin-II deficiency

Absence or dysfunction of intrinsic factor

4. Chemical inactivation

Nitrous oxide