Pretreatment plasma vitamin B_{12} levels and acute chemotherapy-induced peripheral neuropathy in patients with colorectal cancer

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Background

- Acute chemotherapy-induced peripheral neuropathy (CIPN) is a severe and common toxicity induced by oxaliplatin [1].
- Vitamin B_{12} may have a nerve-regenerating function [2].
- We evaluated associations between **pretreatment plasma vitamin B_{12} levels** and **acute CIPN** in patients with colorectal cancer (CRC) receiving adjuvant **oxaliplatin**.

Method

- Population: 277 patients with CRC from prospective COLON cohort [3].
- Non-fasting blood samples collected before treatment.
- Exposure: plasma cobalamin (microbiological assay) and MMA (LC-MS/MS) measured by BEVITAL AS, Norway.
- Outcome: acute CIPN-induced modifications of oxaliplatin treatment, including dose reductions, regimen switches, and early discontinuations.
- Analyses: hazard ratios (HR) and 95% confidence intervals (CI) adjusted for age, sex, alcohol intake, smoking status, and physical activity.

Conclusion

- Higher plasma vitamin B_{12} levels associated with a higher risk of acute CIPN.
- Further studies are needed to elucidate the potential mechanism and clinical implications.

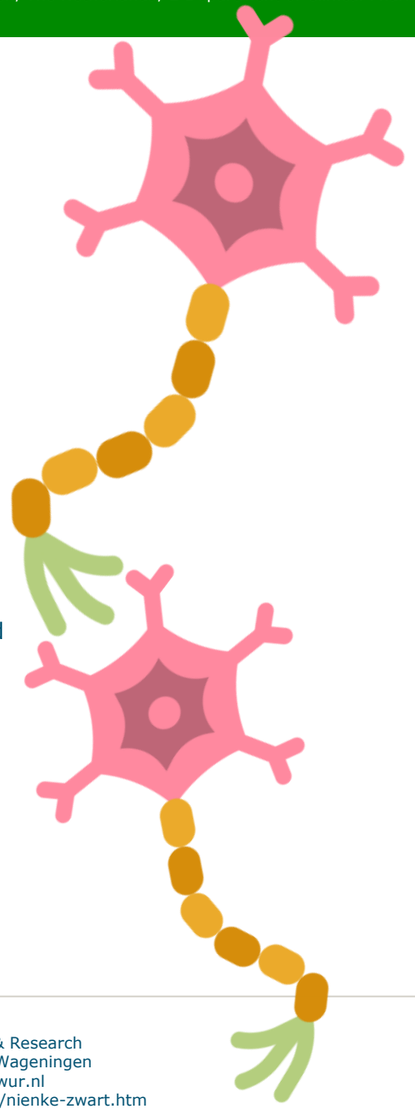

Table 1. Characteristics of the study population.

	Total study population (n=277)	Acute CIPN (n=127, 46%)	No acute CIPN (n=150, 54%)
Women	112 (40%)	43 (34%)	69 (46%)
Age (y)	63 (58-68)	64 (60-68)	63 (57-67)
Smoking status			
Current	23 (9%)	8 (6%)	15 (10%)
Former	155 (57%)	74 (58%)	81 (56%)
Never	94 (45%)	45 (35%)	49 (34%)
Physical activity (min/w)	718 (360-1200)	720 (390-1220)	700 (360-1200)
Alcohol intake (g/d)	8.0 (0.88-20.2)	8.2 (1.6-20.3)	7.9 (0.5-20.0)
Disease stage			
II	22 (8%)	11 (9%)	11 (7%)
III	255 (92%)	116 (91%)	139 (93%)
Chemotherapy regimen			
CAPOX	268 (97%)	124 (98%)	143 (96%)
FOLFOX	9 (3%)	3 (2%)	6 (4%)

Table 2. Associations between vitamin $B_{12,}$ MMA and acute CIPN.

Biomarkers	N/events	HR (95% CI)
Vitamin B12 per doubling	269/125	- (not linear)
T1	91/36	Ref
T2	89/38	1.23 (0.78-1.96)
T3	89/51	**1.98 (1.26-3.09)**
MMA per doubling	269/125	0.88 (0.67-1.15)
T1	92/42	Ref
T2	89/47	1.41 (0.92-2.18)
T3	88/36	0.89 (0.57-1.40)

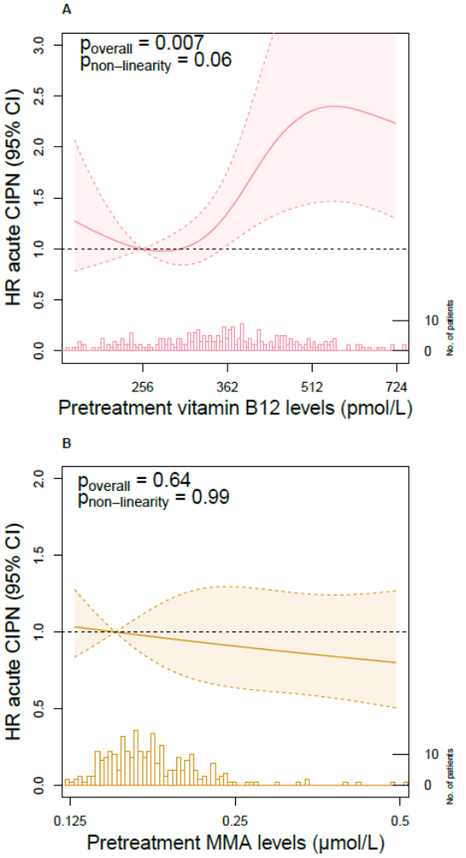

Figure 1. Restricted cubic splines showing association between A) vitamin B_{12} and acute CIPN and B) MMA and acute CIPN. Biomarkers were log2 transformed. Solid lines = HR, dashed lines = 95%CI, and reference values = median levels of first tertile. Knots at the 10th, 50th, and 90th percentiles.

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