

**Vitamin D status and bone mass density in adolescents with Fontan circulation**

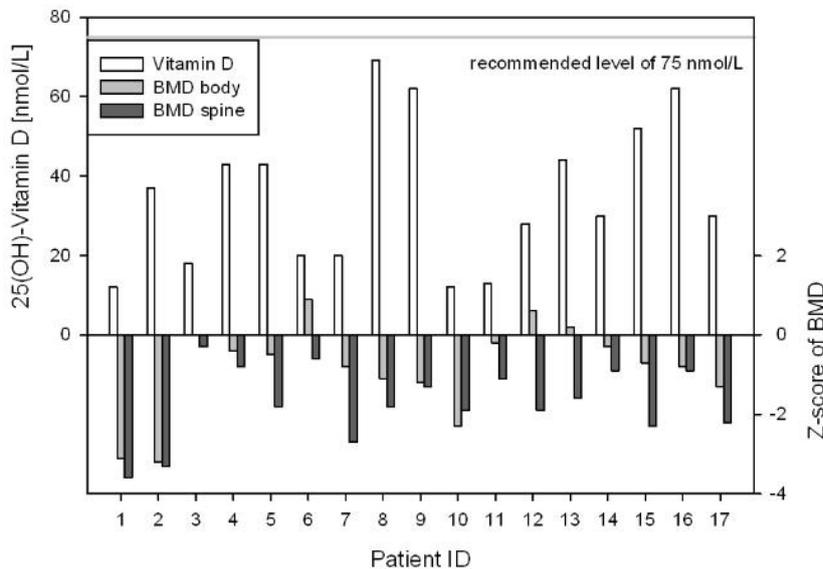
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**Introduction:** Although patients with a Fontan circulation are at risk of malnutrition and growth delay, the implications on vitamin D metabolism and bone health have barely been investigated.

**Methods:** We prospectively measured serum levels of 25-OH-vitamin D in a nationwide cohort of Fontan patients aged 16 to 18 years old. We also measured bone mass density by narrow fan-beam dual energy x-ray absorptiometry (DXA) scan. The DXA results were compared to age and gender matched reference data and expressed as Z-scores.

**Results:** Seventeen consecutive patients were recruited from our pre-transition national Fontan clinic. All 17 patients had vitamin D levels < 75.0 nmol/L, which has been suggested as a lower limit in patients with chronic illness. Thirteen patients (76%) had vitamin D insufficiency with levels <50.0 nmol/L, 9 (53%) patients had deficiency with values <37.5 nmol/L and two patients (12%) had severe vitamin D deficiency with non-measurable values <12.5 nmol/L. The DXA showed abnormally low z-scores of  $-1.7 \pm 0.9$  (mean  $\pm$  SD) ( $p < 0.001$ ) for columna and  $-0.8 \pm 1.1$  ( $p = 0.009$ ) for total body measurement respectively. There was no correlation between DXA result and vitamin D level.

**Conclusion:** Adolescent Fontan patients have a high prevalence of vitamin D deficiency and low bone mass density, however, without these two being correlated. Whether the vitamin D deficiency is due to limitations in sun exposure and dietary intake of vitamin D, or if vitamin D deficiency and insufficient bone mass density are differently related to the Fontan circulation is unknown. Future studies should investigate pathogenesis of both vitamin D deficiency and low bone mass density, as well as determine fracture implications and identify interventions.



Figur 1. Vitamin D levels in nmol/L and bone mass density by Z-score for each of the patients.