Abstract


Functional vitamin B-6 status and long-term mortality in renal transplant recipients.


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BACKGROUND: Low plasma concentrations of pyridoxal 5′-phosphate (PLP) are common in renal transplant recipients (RTRs) and confer increased risk of long-term mortality. To our knowledge, it is not known whether low plasma PLP concentrations have functional (i.e., intracellular) consequences and, if so, whether such consequences are associated with increased risk of mortality.

OBJECTIVES: We assessed the association of plasma PLP with functional vitamin B-6 status and explored the potential association of functional vitamin B-6 status with long-term mortality in RTRs.

DESIGN: In a longitudinal cohort of 678 stable RTRs with a median follow-up of 5.3 y (IQR: 4.8-6.1 y) and 297 healthy controls, PLP, plasma 3-hydroxykynurenine (3-HK), and xanthurenic acid (XA) were analyzed via validated assays. PLP was used as direct biomarker for vitamin B-6 status, and the 3-HK:XA ratio was used as functional biomarker of vitamin B-6 status with a higher ratio reflecting worse functional vitamin B-6 status.

RESULTS: Median PLP, 3-HK, and XA concentrations were 41 nmol/L (IQR: 29-60 nmol/L), 40.1 nmol/L (IQR: 33.0-48.0 nmol/L), and 19.1 nmol/L (IQR: 14.5-24.9 nmol/L), respectively, in healthy controls compared with 29 nmol/L (IQR: 17-50 nmol/L), 61.5 nmol/L (IQR: 45.6-86.5 nmol/L), and 25.5 nmol/L (IQR: 17.2-40.0 nmol/L), respectively, in RTRs (all P < 0.001). RTRs had a higher median 3-HK:XA ratio (2.38; IQR: 1.68-3.49) than did healthy controls (2.13; IQR: 1.63-2.71) (P < 0.05). In RTRs, the 3-HK:XA ratio was inversely associated with plasma PLP (β = -0.21, P < 0.001). Moreover, a higher 3-HK:XA ratio was independently associated with increased risk of all-cause mortality (HR per SD increment: 1.30; 95% CI: 1.13, 1.49), cancer mortality (HR per SD increment: 1.47; 95% CI: 1.12, 1.95), and infectious disease mortality (HR per SD increment: 1.50; 95% CI: 1.21, 1.86) in RTRs.

CONCLUSIONS: Vitamin B-6-deficient RTRs have a worse functional vitamin B-6 status than do healthy controls and vitamin B-6-sufficient RTRs. Worse functional vitamin B-6 status in RTRs is independently associated with an increased risk of mortality particularly because of cancer and infectious disease. This trial was registered at clinicaltrials.gov as NCT02811835.

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