

## **Vitamin D Deficiency is a Predictor of Outcome in Heart Failure; Supplementation Improves Outcome**

*Shauer, Ayelet; Zwas, Donna; Helman, Yaron; Keren, Andre; Lotan, Chaim; Admon, Dan; Gotsman, Israel*

*Hadassah Hebrew University, Cardiology, Jerusalem, Israel*

**Aims:** Vitamin D deficiency is a highly prevalent, global phenomenon. The prevalence in heart failure patients and its effect on outcome is less clear. We evaluated vitamin D levels and vitamin D supplementation in patients with HF and its effect on mortality.

**Methods and Results:** 25(OH)D levels were evaluated in HF patients from a health maintenance organization (HMO), and compared to the rest of the members of the HMO. Patients with HF (N=3,009) had a lower median 25(OH)D level compared to the control group (N=46,825): 36.9nmol/L (interquartile range 23.2-55.9) versus 40.7nmol/L (26.7-56.9) respectively,  $P<0.00001$ . The percentage of patients with vitamin D deficiency (25(OH)D<25nmol/L) was higher in patients with HF compared to the control group (28% versus 22%,  $P<0.00001$ ). Only 8.8% of the HF patients had optimal 25(OH)D levels ( $\geq 75$ nmol/L). Median clinical follow-up was 518 days. Cox regression analysis demonstrated that vitamin D deficiency was an independent predictor of increased mortality in patients with HF (hazard ratio (HR) 1.52, 95% confidence interval (CI) 1.21-1.92,  $P<0.001$ ) and in the control group (HR 1.91, 95% CI 1.48-2.46,  $P<0.00001$ ). Vitamin D supplementation was independently associated with reduced mortality in HF patients (HR 0.68, 95% CI 0.54-0.85,  $P<0.0001$ ). Parameters associated with vitamin D deficiency in HF patients were decreased previous solar radiation exposure, body mass index, diabetes, female gender, pulse, decreased calcium and hemoglobin levels.

**Conclusions:** Vitamin D deficiency is highly prevalent in HF patients and is a significant predictor of reduced survival. Vitamin D supplementation was associated with improved outcome.