

## Higher levels of serum phosphorus are associated with coronary calcification post heart transplantation

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**Background:** A higher serum phosphorus level, although within the normal range has been linked to coronary artery and aortic calcification in the non-transplant population. Coronary calcification is mostly associated with donor-derived lesions, and is uncommon within the first years after heart transplantation.

**Purpose:** We aimed to investigate the association of phosphorus levels with plaque calcification after heart transplantation.

**Methods:** A total of 156 patients who underwent virtual histology intravascular ultrasound (VH-IVUS) studies for cardiac allograft vasculopathy (CAV) surveillance and had fasting serum phosphorus levels <4.5 mg/dL, were included in the analyses. IVUS analyses were performed in the proximal left anterior descending artery, and plaque composition of dense calcium (DC) was evaluated using VH-IVUS, and presented as percent DC of total plaque volume. The patients were separated into 3 groups according to tertiles of serum phosphorus levels.

**Results:** Mean recipient and donor ages were 54±13 and 31±14 years, re-

spectively. Mean serum phosphorus in recipients was 3.5±0.6 mg/dL, with median time after transplantation at the IVUS studies of 6 (3,10) years. There were no significant differences in %DC between phosphorus tertiles in patients who underwent IVUS within 6 years after transplantation ( $p=0.11$ , Fig. 1A). However, beyond 6 years after transplantation, we observed an incremental association between phosphorus levels and the extent of calcification ( $p=0.02$ , Fig. 1B). In this group, serum phosphorus levels significantly correlated with %DC (standardized  $\beta=0.29$ ,  $P=0.008$ ), and this correlation remained significant after adjustment for donor age, recipient age, and eGFR (standardized  $\beta=0.26$ ,  $P=0.001$ ).

**Conclusion:** Higher serum phosphorus levels were associated with a level-dependent increase in calcified coronary artery plaque in patients starting 6 years post heart transplant. Long-term exposure to higher serum phosphorus, even within the normal range, might promote plaque calcification after heart transplantation.

