Introduction and Aims: Vitamin D deficiency and cardiovascular autonomic dysfunction, both strongly associated with cardiovascular risk, are common in the kidney disease population. Though we have previously shown that vitamin D supplementation is associated with normalization in cardiac autonomic tone in healthy humans, this relationship in the setting of kidney disease is not understood.

Methods: Fifteen subjects (87% male, 41±4yrs) with IgA nephropathy (estimated glomerular filtration rate 101±7ml/min/1.73m²; proteinuria 1.03g/24h) were studied pre- and post-28d of high-dose oral vitamin D₃ supplementation (cholecalciferol, 10,000 IU/day). Cardiac autonomic tone, quantified by power spectral analysis of heart rate variability [low-frequency power, high-frequency power, and overall cardiosympathetic/parasympathetic balance], was measured at baseline and in response to graded angiotensin II challenge pre- and post- vitamin D₃ supplementation.

Results: Both 25-hydroxy vitamin D (63±7 vs 136±12 nmol/L, p<0.001) and 1,25-dihydroxy vitamin D (107±9 vs 126±13 pmol/L, p=0.14) levels increased but no changes in baseline measures of cardiac autonomic tone were observed. However, vitamin D₃ supplementation was associated with an improvement in the cardiac autonomic responses to AngII challenge, particularly associated with an increase in cardioprotective parasympathetic activity throughout the stressor which was most strongly observed in those subjects with the highest levels of 1,25-dihydroxy vitamin D (Figure 1).

Conclusions: Increased serum vitamin D, particularly increased 1,25-dihydroxy vitamin D, caused by oral vitamin D₃ supplementation is associated with improved and cardioprotective autonomic response to a physiological stressor in subjects with IgA nephropathy.