

PULMONARY HYPERTENSION REFLECTS THE SEVERITY OF MYOCARDIAL DISEASE IN STAGE 2-5 CKD PATIENTS

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Introduction

Pulmonary Hypertension (PH) has a prevalence ranging from 19% a to 60% in stage 5 CKD patients on chronic dialysis (CKD-5D) and observational studies suggest that PH per se is a relevant risk factor for the exceedingly high cardiovascular (CV) mortality in this population. Left ventricular disorders and CKD-5D-related risk factors (e.g. volume overload, AV fistula, exposure to incompatible dialysis membranes and severe anemia) are implicated in PH in this population and kidney transplantation reverts pulmonary artery pressure (PAP) to normal in most patients. Although the risk for PH has been well-characterized in CKD-5D, only scattered data exist in the current literature in pre-dialysis CKD patients. In this study, we systematically screened an incident series of stage 2-5 CKD patients for PH and tested the relationship between PH and myocardial disease and background renal disease in the same population.

Methods

Eighty incident patients (50 M/ 30 F; age 60 ± 11) with stage 2-5 CKD (median GFR_{MDRD} : $29 \text{ ml} \cdot \text{min}^{-1} \cdot 1.73 \text{ m}^2$, Inter Quartile range $22\text{-}42 \text{ ml} \cdot \text{min}^{-1} / 1.73 \text{ m}^2$) were studied. Pulmonary Artery Pressure was estimated (ePAP) by Doppler echocardiography using the well-validated modified Bernoulli's formula based on maximum tricuspid regurgitation jet velocity (J Am Coll Cardiol 1985; 6:359–365) and PH was defined according to an established ePAP cutoff (35 mmHg). Parameters of Left Ventricular Mass (LVMI index) and volume overload/ LV diastolic dysfunction (Left Atrial volume, LAV) in patients with PH were compared with those in patients without PH.

Results

In the whole population, median ePAP was 15 mmHg (IQ range 10-29). Only seven patients (8.7%) met the diagnostic criteria of PH and no association was found between PH and background renal disease in this series. The prevalence of PH in stage 2-5 CKD patients was marginally higher than that reported in very large studies in the general population (~5%) like the Olmsted study (Circulation. 2009;119:2663-2670) but substantially lower than that reported (19-69 %) in a systematic review in CKD-5D patients (AJKD 2013 Apr;61(4):612-22). Of note (Figure 1) all patients with PH exhibited LVMI and LAV values exceeding the median value in CKD patients without PH, an observation pointing to cardiomyopathy as a mechanism conducive to PH at pre-dialysis stages of CKD.

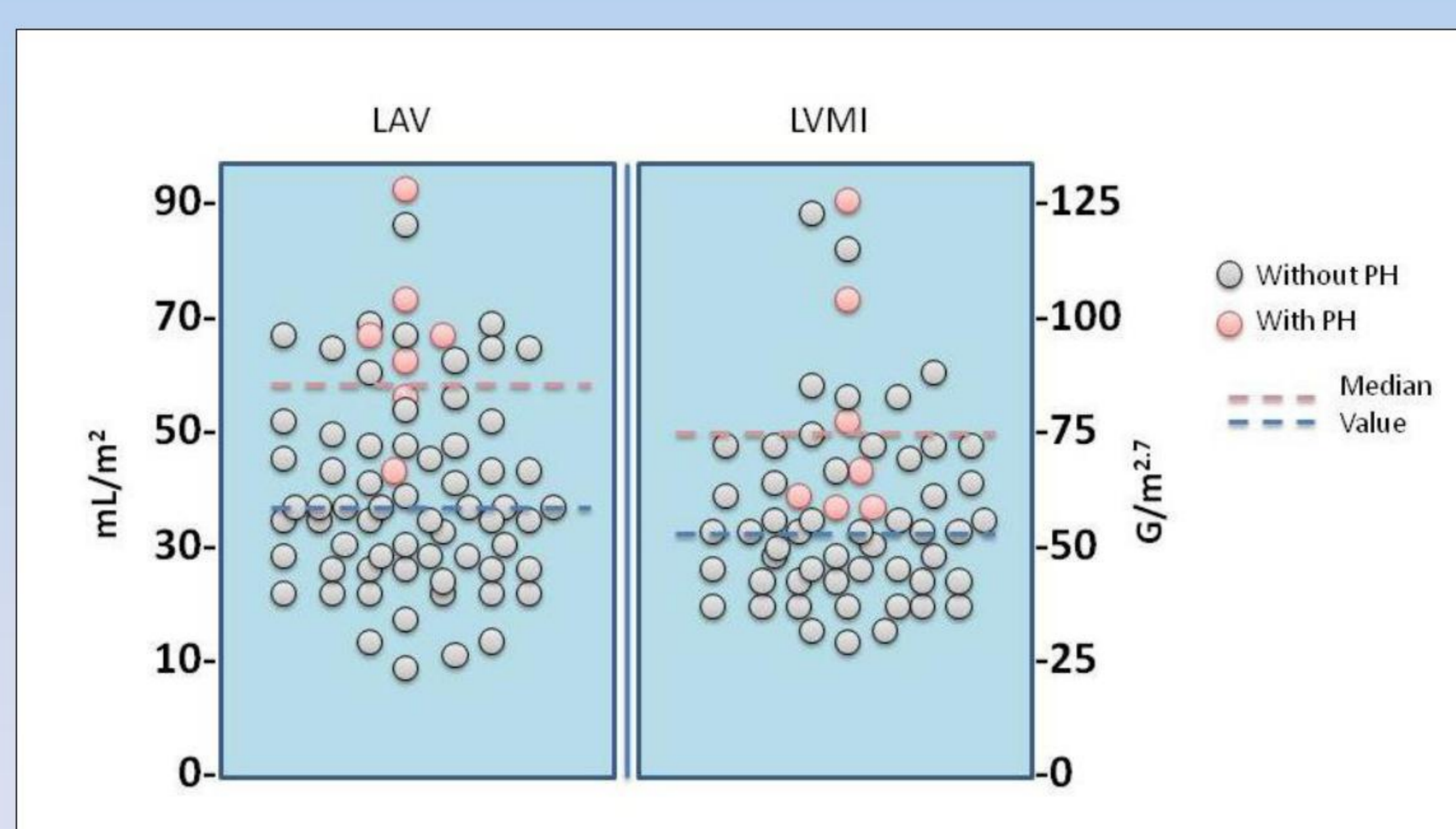


Figure 1: Scatterplot of Left atrial volume (LAV) and Left ventricular mass index (LVMI) in CKD patients with and without pulmonary hypertension

Conclusions

The incidence of PH among patients with CKD stage 2-5 is only marginally higher than that observed in population-based studies. PH in stage 2-5 CKD patients mainly reflects underlying LVH and diastolic dysfunction. PH in these patients should be regarded as an indicator of the severity of myocardial disease in these patients. Whether intensive surveillance of patients with PH and LVH and enlarged LAV may translate in better clinical outcomes warrants further studies.

