Abstract: **P2474**

**Noninvasive estimation of pulmonary capillary wedge pressure by novel 3D speckle tracking echocardiography and validation study by cardiac catheterization**

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**Topic(s):**
3D Echocardiography

**Citation:**
Background: We previously reported that pulmonary capillary wedge pressure (PCWP) was noninvasively evaluated by 2D speckle tracking echocardiography (STE). Recently, novel software was introduced to examine volume and function of left ventricular and left atrium (LA) by 3D­STE automatically.

Purpose: We sought to compare the PCWP estimated by conventional 2D­STE (2D­ePCWP) and by novel 3D­STE (3D­ePCWP), and validate those values by cardiac catheterization.

Methods: Echocardiography and catheterization were performed in 29 patients (age 72±2) (7 ischemic heart disease, 2 hypertensive heart disease, 5 dilated cardiomyopathy, 12 valvular heart disease and 3 primary pulmonary hypertension). The ePCWP (mmHg) is noninvasively obtained as 10.8 – 12.4 x Log (left atrial active emptying function / minimum volume) as we previously reported. Echocardiography was performed just before the catheterization and we analyzed the 2D and 3D data by novel off-line software. 3D data was automatically analyzed and the border settings were fixed at default (ES60, ED30). (Figure)

Results: 2D­ePCWP and 3D­ePCWP had a good correlation with PCWP invasively obtained by catheterization (r=0.87 and 0.83, respectively, both p<0.001). There was an excellent correlation between 2D­ePCWP and 3D­ePCWP (r=0.94, p<0.001) and there was a good correlation between 2D­LA volume index and 3D­ LA volume index (r=0.80, p<0.001). Bland-Altman analysis revealed a good agreement between 2D­ePCWP and 3D­ePCWP, and between 2D­ePCWP and 3D­ePCWP without fixed and proportional bias.

Conclusion: This study demonstrated that PCWP might be noninvasively assessed by not only 2D­STE but also 3D­STE with reasonable accuracy and 3D­STE might have utility and value in the routine clinical practice.
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Figure: Time volume curve of left ventricle and left atrium (LA).

Maximum LA Volume (maxV) → Pre atrial contraction LA Volume (preAV) → Minimum LA Volume (minV)

LA total EF = (maxV – minV)/maxV x 100%
LA active EF = (preAV– minV)/preAVx 100%
The ePCWP = 10.7 – 12.4 x log (LA active EF/minV index)