

P-127

### Quantitative assessment of right ventricular function by speckle tracking imaging in Eisenmenger syndrome

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Background: Pulmonary arterial hypertension (PAH) is characterized by progressive pulmonary vascular remodeling and increased right-sided cardiac pressures, leading to right heart failure. Speckle-tracking echocardiography (2DS) has emerged as a reliable noninvasive technique for assessing global and regional RV function in PAH. Eisenmenger syndrome (ES) differs significantly from other types of PAH in its physiology and prognosis. 2DS data are lacking in this specific population.

Aim: To assess the RV function by 2DS in ES and determine whether there are differences with other types of PAH.

Results : Clinical and echocardiographic variables were assessed in 14 consecutive patients with ES (mean age  $39 \pm 12$ ), and 15 patients with other types of PAH (mean age  $61.1 \pm 12$ ). 17 Patients were in functional class (FC) II (10 ES) and 11 patients were in FC III (4 ES). No difference was found between the 2 groups regarding 6MWT (380 $\pm$ 82 vs 384 $\pm$ 149,  $p=0.93$ ). mPAP and PVR assessed by right heart catheterisation were higher in the ES group ( $71.7 \pm 13$  mmHg vs  $41.6 \pm 9$  mmHg,  $p<0.01$  and  $12.9 \pm 2$  vs  $8.3 \pm 3$  UWood,  $p=0.05$ ).

Correlation between 2DS and conventional parameters was good ( : (TAPSE [ $r^2 = -0.91$ ], FAC [ $r^2 = -0.89$ ], RA/LA surface ratio [ $r^2 = -0.88$ ], peak systolic velocity [ $r^2=-0.84$ ], eccentricity index [ $r^2= -0.81$  ], Tei index [ $r^2= -0.81$ ]). No statistical difference was found between ES and other types of PAH regarding conventional parameters except for TAPSE ( $p=0.02$ , FAC  $p=0.13$ , S'  $p=0.77$  ), whereas 2DS showed a markedly less impaired RV function in the ES group ( $-18.87 \pm 1.66$  % vs  $-13.82 \pm 2.89$ %,  $p<0.001$ ), even when analysis was adjusted to FC in each group (FCII:  $-20.4 \pm 2.5$  vs  $-17.8 \pm 4$ %,  $p=0.12$ ; FC III:  $-15.6 \pm 1$  vs  $-9.3 \pm 2$ %,  $p=0.003$ ). 2DS segmental analysis of the RV free wall showed more pronounced difference in the apical segments ( $p<0.001$ ) in comparison with basal segments ( $p=0.57$ ) between the 2 groups, emphasizing the importance of RV apical function in PAH. Conclusion : 2DS provides a new tool to quantify global and regional longitudinal RV function in ES. Despite additional cyanosis-related comorbidities, the specific pathophysiology and hemodynamic conditions of ES are associated with relatively preserved RV systolic function.