

# Right Ventricular Free Wall Strain - A Better Index of Right Ventricular Performance than TAPSE and Doppler Tissue Velocity?

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**Introduction:** Both tricuspid annular peak systolic excursion (TAPSE) and tricuspid lateral annular systolic velocity ( $S'$ ) are recommended for the evaluation of right ventricular (RV) systolic performance, despite being confounded by tricuspid regurgitation (TR). The usefulness of RV free wall longitudinal strain (FWLS) as an alternative index of RV performance has not been established across a wide range of RV ejection fraction (EF) and TR severity. Accordingly, to determine the influence of these variables, we studied the relationships between TAPSE,  $S'$  and FWLS with RV EF measured from cardiac magnetic resonance (CMR).

**Methods:** We studied 158 patients (table; RVEF 9-72%), who had both CMR (1.5T), and 2D echocardiography within  $1.5\pm 3$  days. CMR RVEF was measured using the method of disks. Apical 4-chamber view was used to measure TAPSE (M-mode) and  $S'$  (pulsed-wave Doppler), both in a basal segment of the RV free wall, and peak systolic FWLS (Epsilon Imaging).

**Results:** Moderate correlations were seen (fig.) between both TAPSE and  $S'$  with RVEF, whereas FWLS showed a higher correlation. With  $\geq$ moderate TR ( $n=37$ ) the correlations between TAPSE and  $S'$  with RVEF were poor ( $r=0.03$  and  $r=0.13$ , respectively), while for FWLS the correlation was moderate ( $r=0.47$ ). In patients with  $RVEF\leq 40\%$ , correlation between FWLS and RVEF was higher than for TAPSE and  $S'$  ( $r=0.42$  vs.  $0.29$  and  $0.26$ , respectively).

**Conclusions:** Because FWLS is less confounded by TR and RV dysfunction, it is a better index of RV performance than TAPSE and  $S'$ .

Figure

	Mean $\pm$ SD
Age (years)	48 $\pm$ 19
% Male	41
<b>Echocardiography</b>	
TAPSE (cm)	1.9 $\pm$ 0.6
RV S' (cm/s)	10.8 $\pm$ 3.0
<b>CMR</b>	
RVEF (%)	42 $\pm$ 16
RVEDV (mL)	211 $\pm$ 80
RVESV (mL)	128 $\pm$ 75

