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### **Correlation of the right atrial volume with the right ventricular end-diastolic pressure**

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#### **Introduction**

The right ventricular end-diastolic pressure (RVEDP) is an important parameter for the assessment of the right ventricular function. It is determined invasively by cardiac catheterization. The right atrium is directly subjected to the RVEDP through the open tricuspid valve. In case of elevated pressure the right atrium is susceptible to dilation due to its thin-walled structure. This suggests that the right atrial volume evaluated non-invasively by cardiovascular magnetic resonance imaging (CMR) can indicate chronic diastolic dysfunction of the right ventricle.

#### **Methods**

35 patients with dilated right ventricle due to chronic pulmonary regurgitation were subjected to cardiac catheterization and CMR to evaluate the necessity of pulmonary valve replacement. In CMR the regurgitant fraction of the pulmonary artery and the end-diastolic right ventricular volume were determined. In addition, the right atrial volume was assessed using ECG-gated cine steady state free precession (SSFP) sequences for the acquisition of gapless slices in the axial plane: In each slice the endocardium was manually contoured, and the resulting volumes were added according to the modified Simpson's rule. Patients with tricuspid insufficiency were excluded from the study.

#### **Results**

The normalization of the right atrial volume to body surface area resulted in the right atrial volume index (RAVI), which was on average  $60.8 \pm 20.1$  ml/m<sup>2</sup>. Cardiac catheterization revealed a mean RVEDP of  $10.4 \pm 2.7$  mmHg, each of the values correlating well with the respective right atrial pressure (mean  $9.1 \pm 2.6$  mmHg,  $r = 0.91$ ,  $p < 0.001$ ). Furthermore, the correlation between RVEDP and RAVI was shown to be statistically significant ( $r = 0.45$ ,  $p = 0.007$ ) despite scatter of individual values.

#### **Conclusions**

The right atrial volume index determined by cardiovascular magnetic resonance imaging correlates well with RVEDP. Hence it is a parameter for diastolic dysfunction of the right ventricle that can be assessed non-invasively.