

Poster presentation

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Quantification of the response of the right ventricle to the volume overload from asd and papvr

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Introduction

Right-to-left shunts cause right ventricular (RV) enlargement due to volume overload. The precise relationship between the amount of the volume overload and the degree to which the RV dilates in response has not been well characterized.

Purpose

To characterize the relationship between volume overload and RV size in adult patients with atrial septal defect (ASD) and/or partial anomalous pulmonary venous return (PAPVR).

Methods

We studied 33 patients (53 ± 17 yrs, male 33%); 19 (58%) with ASD, 12 (36%) with PAPVR, and 2 (6%) patient with a combination of both lesions. Patients were imaged at 1.5-Tesla using an 8-element, phased-array coil (GE Signa, EXCITE, GE Medical Systems, Milwaukee, Wisconsin, USA). Images were acquired with ECG gating and breath holding. Short axis images were acquired using a steady-state free precession pulse sequence (FIESTA) with the following parameters: TR/TE 3.3 ms/1.4 ms, 20 views per segment, FOV 35×35 cm, acquisition matrix 192×160 , slice thickness 8 mm, slice gap 0 mm, flip angle 45 degrees, receive bandwidth 125 kHz. Left ventricular (LV) and RV volumes were determined by manual segmentation of the short axis images. The degree of RV volume overload was determined as the difference between RV

and LV stroke volume. RV volumes were indexed to body surface area.

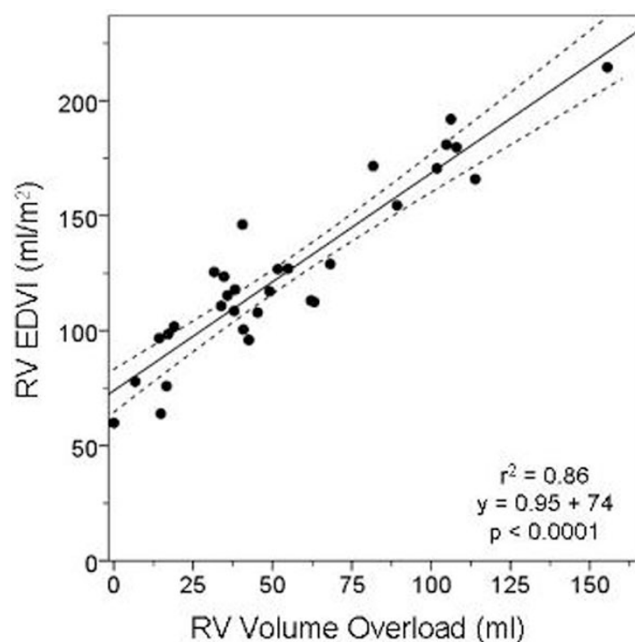


Figure 1

Results

Mean LV and RV ejection fraction was $62 \pm 6\%$ and $56 \pm 6\%$ respectively and mean RV end-diastolic volume index (EDVI) was 124 ± 37 ml/m². Mean RV volume overload was 54 ± 37 ml. There was a strong linear relationship between RV volume overload and RV EDVI ($r^2 = 0.86$, $p < 0.0001$) (figure 1).

Conclusion

There is a strong linear relationship between RV volume overload and RV EDVI. This can be helpful in determining whether the response of the RV to a given volume overload is appropriate. If the RV volume is discordant from the expected RV size than the clinician should entertain other additional diagnoses such as concomitant cardiomyopathy or pulmonary hypertension.

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