

**Can the echocardiography and NT-proBNP replace magnetic resonance imaging to study the right ventricle in volume overload?**

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**Objective:** To detect in adult patients, late after repair of tetralogy of Fallot (TOF) or pulmonary atresia + VSD with volume overload, possible correlation between myocardial parameters assessed at rest by clinical status, ECG, echocardiography, serum NT-proBNP levels, cardiopulmonary test and cardiovascular magnetic resonance (CMR).

**Methods and results.** The study included 50 patients (50% male, mean age  $30.64 \pm 13.30$  years, minimum age 16 years, maximum 70 years) with prior cardiac surgery intervention of TDF (90%) or pulmonary atresia + VSD (10%). 82% of the patients had functional class according to the New York Heart Association I.

A standard examination was performed using a transthoracic echocardiogram.

The right ventricular systolic function was assessed using: the fraction of the systolic-diastolic,  $dp / dt$ , TAPSE, TDI, S wave of the tricuspid valve, right ventricular MPI, right ventricular systolic pressure, peak velocity of the wave E', and wave A', maximum slope of systolic blood pressure and the pulmonary regurgitation index.

We performed cardiac MRI with gadolinium in 49 adult patients.

At baseline we determined also maximal exercise capacity ( $V'O_2$ peak), serum NT-proBNP levels, quality of life by means of the SF-36, and the TAAQOL Congenital Heart Disease questionnaires.

The analysis of these data shows a significant correlation between the TAPSE, the S wave, the fraction of the right ventricle and the right ventricular ejection fraction estimated by CMR.

A TAPSE value of 15.9 mm and S-wave value of 9.4 cm/s correspond to 45% of cardiac EF estimated by CMR.

The NT-proBNP has a negative correlation with  $VO_2$  max ( $r = -0.19$ ,  $p = 0.045$ ), and positive correlation with the general conditions (NYHA) ( $r = 0.31$ ,  $p = 0.0021$ ), with the area of the right atrium ( $r = 0.46$ ,  $p = 0.0001$ ).

The QRS duration, which corresponds to the right ventricular end-diastolic volume of 150 ml/m<sup>2</sup> is 160 msc. Right ventricular end-diastolic area which corresponds to 150 ml/m<sup>2</sup> is 38 mm<sup>2</sup>.

**Conclusion:** all echocardiographic parameters, the serum level of NT-proBNP, ECG and clinical assessment can be a valuable support in management of these patients, but need further validation studies.