Right atrial performance of adult patients with repaired tetralogy of fallot

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Background: Patients with repaired Tetralogy of Fallot (rToF) present anatomic and hemodynamic sequelae which may impact the right heart mechanics. Right ventricular adaptation to prolonged loading conditions should not be considered in isolation from the right atrium, because the atrial function affects that of the ventricle.

Purpose: This study aims to describe the right atrial performance using the echocardiographic right atrial longitudinal strain in a population of adult patients with rToF.

Methods: Echocardiographic images of adult patients (>18 years old) with rToF were retrospectively reviewed, and atrial reservoir (rRAS), conduit (cRAS), and contractile (aRAS) right atrial longitudinal strain were calculated. A group of healthy subjects (CTR) with comparable sex, age, and body surface area was included for comparison. Invasive cardiac catheterization data were also collected for patients with rToF.

Results: Sixty patients were included in the study: 30 with rToF (age 34 ± 9 years old) and 30 healthy subjects (age 34 ± 11 years old). Patients with rToF presented a lower value of rRAS, cRAS, and aRAS when compared to CTR (rRAS: rToF 20.83 ± 8.44% vs CTR 36.22 ± 9.53%, p<0.0001; cRAS: rToF -11.22 ± 6.41% vs CTR -22.67% ± 8.88%, p<0.0001; aRAS: rToF 9.67 ± 5.94% vs CTR 14.28 ± 6.35%, p=0.03). rRAS presented a good positive correlation with systolic peak velocity at tissue doppler imaging (p=0.006) and a trend toward positive correlation with right ventricle global longitudinal strain (p=0.08) and with the tricuspid annular plane systolic excursion (p=0.07). No correlation was found between invasive right ventricle end-diastolic and -systolic pressure and echocardiographic right atrial longitudinal strain parameters.

Conclusion: Adult patients with rToF presented a lower value of right atrial longitudinal strain, indicating an impaired atrial performance. Right atrial longitudinal strain provides additional insight for the comprehensive evaluation of right heart mechanics and should be systematically evaluated during the follow-up of adult patients with rToF.