

Detailed evaluation of right atrial dysfunction in patients with corrected tetralogy of Fallot by three-dimensional speckle tracking echocardiography

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The goal: Three-dimensional (3D) speckle tracking echocardiography (STE) could encompass the benefits of 2D and 3D echocardiography allowing to see the heart as it is: a 3D organ. In the recent studies, alterations in ventricular deformations could be demonstrated in adult patients with corrected tetralogy of Fallot (cTOF) by 3DSTE. The present study was designed to assess 3DSTE-derived right atrial (RA) volumetric and strain parameters in cTOF.

Patients and Methods: A total of 17 cTOF patients were involved into the present study. Their results were compared to 18 age- and gender-matched healthy controls. All subjects have undergone complete 2-dimensional Doppler echocardiographic and 3DSTE measurements.

Results: Significantly increased RA volumes respecting heart cycle could be detected in cTOF patients. Total and passive atrial emptying fractions proved to be significantly decreased in patients with cTOF ($26.4 \pm 12.4\%$ vs. $39.1 \pm 8.8\%$, $p=0.001$ and $11.2 \pm 6.8\%$ vs. $19.8 \pm 9.0\%$, $p=0.003$, respectively). Global and mean segmental peak longitudinal ($17.0 \pm 10.9\%$ vs. $30.8 \pm 11.2\%$, $p=0.0008$ and $20.6 \pm 10.7\%$ vs. $34.4 \pm 10.5\%$, $p=0.0005$) and area strains ($20.2 \pm 18.8\%$ vs. $41.0 \pm 19.8\%$, $p=0.003$ and $28.1 \pm 19.8\%$ vs. $49.1 \pm 19.7\%$, $p=0.004$) and global radial peak strain ($9.5 \pm 5.6\%$ vs. $15.0 \pm 10.0\%$, $p=0.05$) proved to be reduced in cTOF patients as compared to controls. Global pre-atrial contraction circumferential strain was significantly decreased in cTOF patients ($3.9 \pm 6.9\%$ vs. $10.8 \pm 11.0\%$, $p=0.03$).

Conclusions: Complex evaluation of RA dysfunction could be allowed by 3DSTE including volumetric and strain analysis.

KEYWORDS: three-dimensional, speckle-tracking, echocardiography, right atrium, tetralogy of Fallot.

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