Abstract: P1405

3D echocardiographic assessment of right ventriculo-arterial coupling in mitral valve prolapse

Authors:
LF Filippetti¹, OH Huttin¹, CV Venner¹, RA Aubert¹, YJ Juilliere¹, CSS Selton-Suty¹, ¹Hospital Brabois of Nancy, cardiology - Vandoeuvre les Nancy - France,

Topic(s):
3D Echocardiography

Citation:
Background: Both pulmonary artery pressure (PAP) and right ventricular (RV) function have shown their value in the prognostic evaluation of patients with mitral valve prolapse (MVP). Echocardiography which allows simultaneous pressure estimation and volume measurement by 3D allows an approach of arterial (Ea) and ventricular elastance (Emx) and of right ventriculo-arterial coupling (RVAC), usually derived from pressure-volume loops, and could be of interest in the assessment of the RV-PA unit.

Methods: Thirty normal patients (group Nl, mean age 52.7±15.9) and 75 patients with stable MVP (mean age 52.4±15.4 (ns for age), 39 (group MVP1) with no or mild mitral regurgitation (MR) and 36 (group MVP2) with moderate to severe MR) underwent echocardiography including 3D RV acquisition. RV end-systolic volume (ESV), end-diastolic volume (EDV), stroke volume (SV) (mL) and ejection fraction (EF) (%) were obtained 3D echo (3DE) volumetric analysis (GE, EchoPac). mPAP was estimated from echo using Chemla’s formula (mPAP = 0.61 x sPAP + 2mmHg). Pulmonary artery effective elastance (Ea) was estimated as mPAP/SV (mmHg/mL), RV maximal end-systolic elastance (Emax) as mPAP/ESV (mmHg/mL), and RVAC as Ea/Emax. Ea, Emax and RVAC were compared between the 3 groups of patients using ANOVA.

Results: Mean LVEF was similar in the 3 groups. There was a significant differences in mPAP (NI: 15.6±3.0; MVP1: 16.3±3.3; MVP2: 22.9±11.1, p=0.001).

RVEDV (NI: 81.3 ± 19.2; MVP1: 80.1 ± 22.0; MVP2: 96.1 ± 28.6, p=0.09), RVEF (NI: 50.4 ± 4.4; MVP1: 49.3 ± 5.5; MVP2: 46.6 ± 6.6, p=0.02) and RVESV (NI: 39.9 ± 9.8; MVP1: 40.8 ± 12.8; MVP2: 52.0 ± 19.5, p=0.01) were significantly different among the 3 groups. There was a non significant trend toward progressive increase in Ea (NI: 0.41 ± 0.12; MVP1: 0.45 ± 0.15; MVP2: 0.53 ± 0.30, p=0.07) and E max (NI: 0.42 ± 0.11; MVP1: 0.45 ± 0.17; MVP2: 0.53 ± 0.31, p=0.11) among the 3 groups but RVAC was not significantly different (NI: 0.99 ± 0.17; MVP1: 1.04 ± 0.22; MVP2: 1.05 ± 0.37, ns).

Conclusion: 3D echocardiography allows a complete analysis of the RV-PA unit and is able to reveal subtle changes in its equilibrium. Together with an increase in RV volumes and decrease in RVEF, our study reveals a progressive increase in arterial elastance in parallel with the severity of MR, compensated by an increase in ventricular elastance to maintain RV – PA coupling in those stable patients with MVP.