Abstract: P1541

The relation between right ventricular-pulmonary circulation coupling and aging in healthy population

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Citation: Propose. The aim of the study was to evaluate the right ventricular (RV) structure and functional adaptation to age, in particular the RV pulmonary circulation (PC) coupling and physiologic correlates.

Methods. 1177 healthy subjects aged 16-100 years were enrolled. They underwent general medical evaluation and a comprehensive TTE included RV systolic such as tricuspid annular plane systolic excursion (TAPSE), pulmonary artery systolic pressure (PASP) derived from the tricuspid regurgitation (TR), the derived RV-pulmonary circulation (PC) coupling or TAPSE/PASP, pulmonary vascular resistances (PVR) derived from TR/RV outflow tract velocity (RVOT VTI) and diastolic function parameters. The cohort was divided in 4 groups of age: group 1: 300 subjects from 18 to 35 years; group 2: 383 subjects from 36 to 50; group 3: 451 from 50 to 79 years and group 4: 43 subjects > than 80 years of age. The oldest subjects were completely independent in daily living activities. The groups were compared by ANOVA and the difference was adjusted by gender, BMI and mean arterial pressure. For each group the difference between genders was tested by T-Test. Multivariate analysis was used to evaluate the relationship between RV function and structure indexes and covariates selected according to pathologic relevance.

Results.

There was a progressive increase in blood pressure (BP) according to age. The RV longitudinal diameter, right E/A ratio, right ventricular outflow tract acceleration time and TAPSE/PASP decreased according to age increase (p<0.0001). The right atrial volume indexed by BSA, PASP, PVR increase with age (p<0.0001). Either TAPSE or Sm were unaffected by age. Women had constantly smaller RV longitudinal diameters, right atrium volume index, TAPSE and TAPSE/PASP (p<0.001). In the multiple regression analysis, though the proportion of variance of the dependent variables predicted by the independent ones was very small, age, BSA, gender, E/Em and the longitudinal diameter of the RV were independent predictors of TAPSE/PASP. Heart rate, left ventricular (LV) diastolic function, stroke volume (SV) and TR were independently related to Sm, while age, BSA, LV diastolic function and SV were independently related to TAPSE.

Conclusion

With ageing there is a progressive involvement not only of the LV in terms of adaptation to increase afterload related to arterial stiffness but also of the RV. With age PVR and PASP increase while RV contractility is still unchanged. While the RV adapts very well to volume overload, even the physiologic increase in PASP with age, causes a RV-PC coupling impairment.