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Clinical and imaging determinants of residual tricuspid regurgitation after secondary tricuspid annuloplasty

Lozano Torres J.; Gonzalez Alujas MT.; Dentamaro I.; Gutierrez Garcia-Moreno L.; Valente F.; Teixido Tura G.; Galian Gay L.; Casas Masnou G.; Ferreira Gonzalez I.; Evangelista Masip A.; Tornos Mas P.; Rodriguez-Palomares JF.

University Hospital Vall d"Hebron, Cardiology, Barcelona, Spain

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BACKGROUND

Tricuspid regurgitation (TR) secondary to left valve disease has a relative high prevalence. Persistence of TR after valve surgery is an independent risk factor for worse long-term outcome. Cardiac magnetic resonance (CMR) has been considered the gold-standard technique to study the right ventricle, however, there is no data about CMR determinants of persistence of TR after surgery of secondary tricuspid annuloplasty.

PURPOSE

The aim of our study was to assess the main clinical and imaging determinants of recurrent TR after TR surgery.

METHODS

Observational, prospective, non-randomized study. All patients underwent surgery for TR (isolated or in combination to left sided valve disease) based on current ESC guidelines of valvular heart diseases. Patients were studied with clinical history, blood test, echocardiogram, CMR and right catheterization, and were followed in the outpatient, and cardiovascular mortality was registered.

RESULTS

43 patients were included. 3 died on the first 24 hours after surgery, before the assessment of TR, thus 40 patients were included for the analysis. 11 patients (27.5%) underwent isolated TR surgery and 29 (72.5%) in combination to left-sided valvular replacement (mitral:60%, aortic:10%, mitral + aortic:2.5%). They were followed for a mean time of 37.72 ± 27.35 months. Persistence of significative TR (moderate to severe) were found in 13 patients (32.5%).

In the univariate analysis, compared to patients without significative TR (absence to mild), significative TR was associated to higher indexed right ventricle end-diastolic volume (119.54 ± 37.95vs92.63 ± 32.18mL/m²,p = 0.03), higher right ventricle ejection fraction (54 ± 5.97vs46.74 ± 8.57%,p = 0.01), higher longitudinal RV strain (-20.44 ± 3.32vs-14.01 ± 6.27,p = 0.001), circular RV strain (-16.97 ± 2.34vs-13.56 ± 3.69,p = 0.003) and radial RV strain (28.46 ± 5.2vs22.26 ± 7.9,p = 0.01). No other statistical significance differences were observed in clinical history, blood test parameters, pulmonary pressure or imaging derived parameters. There was no statistical significative differences in mortality and heart failure hospitalization during follow-up (55,6%vs25.8%,p = 0.12).

After Logistic Regression analysis, circular RV strain (OR 0.12, 95%CI 0.02-0.74,p = 0.02) and radial RV strain (OR 0.42, 95%CI 0.19-0.93,p = 0.03) were considered the only significant predictor of significative residual TR. The ROC curve analysis showed an AUC of 0.76 for circular RV strain and AUC of 0.72 for radial RV strain.

CONCLUSIONS

Significative residual TR after tricuspid valve surgery still presents a high prevalence (32.5%). There was a no statistically significative trend to higher mortality and heart failure hospitalization during follow up. Our data suggest that right ventricular enlargement and preserved right ventricular function are associated to the presence of significant residual TR. However, a good ventricular function (assessed by strain parameters) seems to be the strongest predictor.