

## Role of the tricuspid annulus in functional tricuspid regurgitation development after early isolated mitral valve surgery: is it an old story?

Volpato V.; Mantegazza V.; Tamborini G.; Gripari P.; Muratori M.; Italiano G.; Fusini L.; Pepi M.

Centro Cardiologico Monzino, IRCCS, Milan, Italy

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**Background.** Functional Tricuspid Regurgitation (FTR) has been described as a common condition after isolated mitral valve (MV) surgery, affecting patients' prognosis. Thus, in cases without significant tricuspid regurgitation (TR) but tricuspid annular (TA) dilatation, TV annuloplasty is currently recommended. Studies suggesting the currently used cut-off for definition of TA dilatation were based on 2D echocardiography (2DE) and included patients treated with MV surgery with heterogeneous MV disease, degree of cardiac remodeling and heart rhythm. As the management of severe MR has moved towards an earlier surgical treatment, few data are available about the incidence of FTR in the population undergoing early isolated MV surgery without TR, but 2DE satisfying criteria for TA dilatation.

**Aims.** To test, in patients treated with early isolated MV surgery for MV prolapse (MVP), without TR and either normal or dilated TA (i) if the currently used 2D TA cut-off is predictive of FTR and cardiac events development (ii) how right chambers' remodeling assessed by 3D echocardiography (3DE) affects TA dimension.

**Methods.** We studied 159 patients (age  $61 \pm 11$ ) treated with early isolated MV surgery between 2010 and 2017. Eligible patients were those with 3DE images; normal left and right ventricular (LV and RV) function; sinus rhythm; normal or elevated right ventricular systolic pulmonary artery pressure (sPAP); normal or dilated TA by 2DE; absent TR. The decision to not perform TV annuloplasty in patients with TA dilatation was based on the surgical inspection. All patients underwent a complete 2DE, 3DE analysis was performed using custom software, including LV, RV, left atrial (LA) and right atrial (RA) assessment. 3D TA dimension were obtained using MPR. Clinical and 2DE follow-up was performed at  $36 \pm 6$  months after surgery, major adverse cardiac events (MACEs, including cardiac hospitalization, cardiac death, arrhythmias) and FTR were recorded.

**Results.** Based on 2DE TA dimensions, patients were divided in group 1 (N = 68, 43%,  $TA \geq 21$  mm/m<sup>2</sup>) and group 2 (N = 91, 57%, normal TA). Patients in group 1 showed larger RA volume, RV basal diameter and TA area ( $p < 0.05$ ) by 3DE compared to group 2 (Table). At the multivariate analysis, only the 3D RA volume, RV basal diameter and RV function were independently correlated to the TA area ( $p < 0.05$ ). At the follow-up, no differences were noted between groups in FTR development and MACEs at the Kaplan-Meier analysis (Fig.). At the COX analysis, 2DE TA dilatation failed to result a predictor of cardiovascular events (model's X<sub>2</sub>,  $p > 0.05$ ).

**Conclusions.** In patients undergoing early MV surgery, the currently defined TA dilatation by 2DE may not necessarily evolve in FTR, and a larger cut-off may be needed. In this population, the evaluation of right chambers' dimension and function may better define the probability to develop FTR.

Abstract Figure. Fig

Echographic characteristics	Group 1	Group 2	p
LV EDV (ml/m <sup>2</sup> )	95 ± 16	94 ± 19	>0.1
LV EF (%)	59 ± 5	59 ± 5	>0.1
LA Volume (ml/m <sup>2</sup> )	51 ± 14	45 ± 14	<0.01
RV EDV (ml/m <sup>2</sup> )	68 ± 14	71 ± 14	>0.1
RV EF (%)	54 ± 5	55 ± 5	>0.1
RV free wall strain (%)	-27 ± 5	-28 ± 4	>0.1
RV Basal diameter (mm/m <sup>2</sup> )	21 ± 4	19 ± 3	<0.01
RA Volume (ml/m <sup>2</sup> )	36 ± 9	28 ± 8	<0.01
TA Area (cm <sup>2</sup> /m <sup>2</sup> )	6.3 ± 1.4	5.7 ± 1.2	<0.01
sPAP (mmHg)	35 ± 7	34 ± 8	>0.1

LV= left ventricle, RV= right ventricle, LA= left atrium, RA= right atrium, TA= tricuspid annulus EDV= end diastolic volume, EF= ejection fraction, sPAP= systolic pulmonary artery pressure.

