Utility and futility of MitraClip implantation in secondary mitral regurgitation in a real-world population: the role of 3D transthoracic echocardiography

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Introduction: Two recent prospective trials have been published, reporting opposite results on the efficacy and utility of the MitraClip (MC) procedure in patients with secondary mitral regurgitation (SMR). A ratio between the effective regurgitant orifice area (EROA) and left ventricular end-diastolic volume (LVEDV) ≥0.150 by two-dimensional (2D) transthoracic echocardiography (TTE) has been proposed to identify patients with disproportionate SMR, who would benefit from MC.

Purpose: To assess the prognostic role of clinical and echocardiographic parameters in a real-world population of SMR patients undergoing the MC procedure at our Institute.

Methods: Ninety-two patients underwent MC implantation. We retrospectively reviewed their clinical, and laboratory data, as well as 2D and three-dimensional (3D) TTE, and intraoperative transoesophageal echocardiography (Figure 1). The primary endpoint was a composite of cardiovascular death and/or hospitalisation for heart failure within 12-months follow-up.

Results: Thirty-one patients reached the endpoint (EP+), 61 did not (EP−).

Demographics and anti-remodelling drugs were similar in EP+ and EP−. Among comorbidities and laboratory data, EP+ significantly differed from EP− in smoking history, and extracardiac artery disease prevalence (65% vs. 39%, and 39% vs. 16%, respectively); EuroScore II (12.2% vs. 5.2%); NYHA class ≥3 (94% vs. 69%); haemoglobin (12±2 vs. 13±2 g/dL), and brain natriuretic peptide levels (855 [426–1500] vs. 357 [170–902] pg/mL). At 2D TTE no significant difference emerged, including the SMR grade, except for the tricuspid annular plane systolic excursion (Figure 2). Biventricular 3D ejection fraction was significantly lower in EP+ vs. EP− (Figure 2). Residual intraoperative SMR grade after MC deployment was 1.9±0.6 in EP+ vs. 1.3±0.5 in EP− (p<0.001).

Conclusion: The proposed cut-off for EROA/LVEDV ratio may be suboptimal for predicting the MC utility in real-world populations. Rather, prognosis may be more influenced by the patient’s pre-operative clinical status, right ventricular systolic function, 3D left ventricular ejection fraction, and by the success of the procedure.