Research Letter

Improving Selection of Mitraclip Candidates in Advanced Chronic Heart Failure: Look Right to Predict Right

Background

The benefit of Mitraclip in patients with advanced chronic heart failure (ACHF) is uncertain because patients with severe left ventricular function may continue to have a poor prognosis despite successful mitral regurgitation (MR) correction. To avoid futile procedures, there is a need to identify which patients with ACHF and severe functional MR are likely to benefit from the procedure. In this multicenter prospective study we sought to evaluate preoperative predictors of improvement after Mitraclip.

Methods

We screened all patients with ACHF, ejection fraction <30% ,and severe functional MR (4+/4+) who underwent Mitraclip implantation from March 2013 to March 2017 at the Città della Salute e della Scienza Hospital in Turin, the Policlinico San Matteo in Pavia, and the University Heart Centre in Zurich, and enrolled patients with a successful Mitraclip implantation (postprocedural residual MR ≤2+/4+).

All patients underwent physical and laboratory examination, echo Doppler, and right heart catheterization 48 hours before Mitraclip implantation. Right ventricular dysfunction (RVD) was defined as tricuspid annular plane systolic excursion (TAPSE) ≤14 mm, right atrial pressure (RAP) ≥8 mm Hg, and pulmonary artery (PA) pulsatility index (PAPi = [PA systolic pressure − PA diastolic pressure]/RAP) ≤2.5.

Patients were followed for 12 months. The primary end point was the improvement in HF defined as improvement to New York Heart Association (NYHA) functional class I or II (assessed by means of a questionnaire[1]) with no hospitalizations for HF within 12 months after the index procedure.

Results

We enrolled 91 patients (age 63.8 ± 7.7 years, 81% male, 64% with ischemic cardiomyopathy, ejection fraction 22.8 ± 3.7%, 41% in NYHA functional class IV). After 12 months, 37 (41%) met the primary end point, 67 (74%) reported an improvement of symptoms. Moreover, hospitalization rate compared with the year before Mitraclip decreased from 1.85 ± 0.9 to 0.8 ± 0.7 (P < .001).

In univariate analysis, patients who met the primary end point had more ischemic heart disease, lower N-terminal pro−B-type natriuretic peptide (NT-proBNP), higher estimated glomerular filtration rate (eGFR), and less RVD. RVD predicted the primary end points assessed by means of echo Doppler (TAPSE: odds ratio [OR] 1.5; P < .01) and right heart catheterization (PAPi: OR 1.8 [P < .01]; RAP: OR 1.7 [P < .01]). Among RVD definitions, PAPi ≤2.5 was the best predictor of the primary end point. In multivariate analysis (including PAPi, ischemic heart disease, NT-proBNP, and eGFR), only the absence of RVD (PAPi >2.5) was associated with the primary end point (hazard ratio [HR] 4.0, 95% confidence interval 2.4−8; P = .02; sensitivity 93%, specificity 40%, area under the receiver operating characteristic curve 0.70). The primary end point was achieved in 34 of the 66 patients (51%) without RVD and in only 3 of the 25 (8%) with RVD (negative predictive value 88%; Fig. 1). Patients with RVD were rehospitalized more often than those without RVD (64% vs 32%; P = .006).

Discussion

Despite an advanced stage of HF and low EF, many patients reported an improvement of symptoms and a reduction of hospitalizations for heart failure in the first year after Mitraclip implantation. RVD, an established predictor of events in ACHF,[2,3] was the only preoperative predictor of the primary end point; the other preoperative parameters failed to discriminate between patients who improved after Mitraclip and nonresponders, in line with previous reports on nonselected patients with heart failure undergoing Mitraclip implantation.[4,5]

RVD as assessed by PAPi showed a high negative predictive value and a low positive predictive value. These results indicate that RVD may be considered as a marker of futility for Mitraclip, whereas accurate predictors of good clinical response after Mitraclip are still lacking. Newer nontraditional approaches may be needed.[6]

This study is limited by the lack of a control group and small sample size. The latter may have concealed the effects of other variables besides RVD.

In conclusion, our data suggest that PAPi may be useful in risk stratification of patients undergoing evaluation for Mitraclip.

Advanced HF Remission
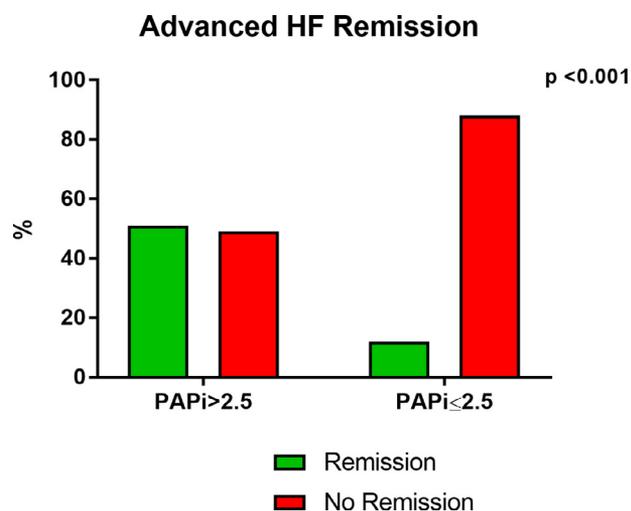
Fig. 1. Fraction of remission. HF, heart failure; PAPi, pulmonary artery pulsatility index.

Disclosures

None.

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.cardfail.2019.02.010.

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