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Cardiac contractility modulation in left ventricular systolic dysfunction: 1-year single Centre experience and clinical outcome

Matta M.; Devecchi C.; De Vecchi F.; Barbonaglia L.; Occhetta E.; Rametta F.

Sant"Andrea Hospital, Vercelli, Italy

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Introduction. Cardiac contractility modulation (CCM) is a treatment option for patients suffering symptomatic chronic heart failure (CHF) with reduced ejection fraction (LVEF) despite optimal medical therapy, who are not eligible for or non-responders to cardiac resynchronization therapy (CRT). Despite randomized trials showing benefit in the short term, data on mid-term follow-up (over 12 months) are limited to small observational studies.

Purpose. The aim of this observation, prospective study is to assess the impact of CCM therapy on quality of life, symptoms, exercise tolerance and left ventricular function in a population of patients with CHF and moderate-to-severe left ventricular systolic dysfunction.

Methods. Consecutive patients suffering from CHF with LVEF <45%, symptomatic, in NYHA class > II despite optimal medical therapy, underwent CCM implantation at our Centre from October 2017 to October 2018. Enrolled patients underwent baseline evaluation and at 3, 6 and 12 months with transthoracic echocardiogram, ECG, clinical assessment, 6-min hall walking test and Minnesota Living With Heart Failure Questionnaire (MLWHFQ).

Results. Overall, 10 patients underwent CCM implantation (100% males, mean age 70 ± 8 years, 80% ischaemic cardiomyopathy, mean LVEF 29.4 ± 8%). All patients had at least one hospitalization for worsening heart failure during the previous 12 months. After a mean follow-up of 15 months, 9 patients were alive, while one patient died for worsening heart failure precipitated by pneumonia 2 months following CCM implantation. Among the remaining 9 patients, LVEF improved non-significantly to 32.2 ± 10% (p = 0.092), 6-min walking test distance improved from 170 ± 132 m to 305 ± 99 m (p < 0.001), mean NYHA class improved from 3.0 ± 0.4 to 1.6 ± 0.5 (p = 0.003) and MLWHFQ score improved from 59.0 ± 33 to 34.0 ± 38 (p = 0.037) (Figure 1). Only 2 patients have been hospitalized during the 12 months, for worsening heart failure and sustained ventricular tachycardia, respectively. Overall, a net clinical benefit was detected in 6 out of 9 patients. Among the responders, 2 patients were device-naïve, presenting LVEF > 35%; one patient was a CRT non-responder, while the remaining 3 had narrow QRS. All the non-responders patients had ischaemic cardiomyopathy, one of them with a moderately reduced LVEF and one with a CRT.

Conclusion. CCM is effective in improving quality of life, symptoms and exercise tolerance, and reduces hospitalizations in patients with symptomatic CHF on top of optimal medical and electrical therapy. The benefit in responders is maintained over one year after implantation, so this treatment should be considered for highly symptomatic patients suffering from CHF and reduced LVEF.

Abstract Figure 1