Implant failure predictors of left bundle branch pacing used as cardiac resynchronization therapy: importance of left ventricular diameter and QRS morphology

F. R. Graterol1; M. Pujol-Lopez1; R. Borras1; B. Ayala1; E. Guasch1; M. Regany-Closa1; J. B. Guichard1; M. A. Castel1; E. Arbelo1; A. Porta-Sanchez1; M. Sitges1; I. Roca-Luque1; A. Doltra1; L. Mont1; J. M. Tolosana1

1Hospital Clinic of Barcelona, Barcelona, Spain

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Background: Left bundle branch pacing (LBBP) is considered an alternative to cardiac resynchronization therapy (CRT). However, LBBP is not suitable for all heart failure patients.

Purpose: The aim of our study was to identify predictors of unsuccessful LBBP implantation in CRT candidates.

Methods: A cohort of consecutive patients with indications for CRT were included. Clinical, echocardiography and electrocardiographic variables were prospectively recorded.

Results: A total of 157 patients were included in the analysis. The LBBP implant was successful in 129/157 (82.2%) patients, and the implant failed in 28/157 patients (17.8%). The causes of failed implantation were as follows: unsatisfactory paced QRS (21/28; 75%); impossibility of screwing the helix (4/28; 14.3%); lead instability (2/28; 7.1%); and high pacing thresholds (1/28; 3.6%). Left ventricular end diastolic diameter (LVEDD), nonspecific intraventricular conduction delay morphology (IVCD), and QRS width were predictors of failed implants according to the univariate analysis. In a multivariable regression analysis, LVEDD [OR 1.44 per 5 mm increase (95% CI 1.13, 1.82) p=0.003] and IVCD [OR 2.96 (95% CI 0.74, 11.84) p=0.09] were independent predictors of unsuccessful LBBP implantation. An LVEDD of 60 mm has 75% sensitivity and 67% specificity to predict LBBP implant failure.

Conclusions: When LBBP was used as CRT, LVEDD and IVCD predicted unsuccessful implantation. IVCD triples the possibility of failed implantation independently of LVEDD. Caution should be exercised when considering these parameters to plan the best pacing strategy in patients.