

Additional benefit of echocardiographic optimization of cardiac resynchronization therapy devices according to specific echocardiographic and clinical parameters

Marija Brestovac*,
Blanka Glavaš Konja,
Martina Lovrić Benčić,
Vlatka Rešković Lukšić,
Sandra Jakšić Jurinjak,
Joško Bulum,
Zvonimir Ostojić,
Kristina Gašparović,
Jadranka Šeparović Hanževački

University of Zagreb School of Medicine, University Hospital Centre Zagreb, Zagreb, Croatia

KEYWORDS: cardiac resynchronization therapy optimization, echocardiographic optimization, myocardial dyssynchrony.

CITATION: *Cardiol Croat.* 2023;18(5-6):139. | <https://doi.org/10.15836/ccar2023.139>

***ADDRESS FOR CORRESPONDENCE:** Marija Brestovac, Klinički bolnički centar Zagreb, Kišpatičeva 12, HR-10000 Zagreb, Croatia. / Phone: +385-99-7742-627 / E-mail: marija.brestovac@gmail.com

ORCID: Marija Brestovac, <https://orcid.org/0000-0003-1542-2890> • Blanka Glavaš Konja, <https://orcid.org/0000-0003-1134-4856> • Martina Lovrić Benčić, <https://orcid.org/0000-0001-8446-6120> • Vlatka Rešković Lukšić, <https://orcid.org/0000-0002-4721-3236> • Sandra Jakšić Jurinjak, <https://orcid.org/0000-0002-7349-6137> • Joško Bulum, <https://orcid.org/0000-0002-1482-6503> • Zvonimir Ostojić, <https://orcid.org/0000-0003-1762-9270> • Kristina Gašparović, <https://orcid.org/0000-0002-1191-4831> • Jadranka Šeparović Hanževački, <https://orcid.org/0000-0002-3437-6407>

Introduction: Cardiac resynchronization therapy (CRT) contributes to left ventricle ejection fraction and NYHA improvement in patients with severe heart failure. In literature, echocardiographic (ECHO) benefits of CRT were found in a wide spectrum of different ECHO parameters.¹⁻⁴ In this study we compared ECHO benefit of echocardiographic optimization of CRT device with the standard, ECG method in a spectrum of different ECHO parameters.

Patients and Methods: An overall of 146 patients were analyzed according to the method of CRT optimization. The first group (OPT) was optimized by ECHO signs of dyssynchrony whereas the second group (ECG) was analyzed using QRS duration. Changes in QRS duration, NYHA, left ventricle end-systolic volume (Δ ESV), end-diastolic volumen (Δ EDV), ejection fraction (Δ EF), global longitudinal strain (GLS), mean pulmonary artery pressure (PAP), mitral regurgitation (MR), Δ NTproBNP, septal flash (SF), atrioventricular dyssynchrony (AVd), interventricular dyssynchrony using difference in onset of pulmonary and aortic ejection (PV/AV) and quality of life using SF-36 questionnaire were compared between the groups in a follow up period of 6 months.

Results: No additional benefit of one group over the other was found for QRS duration reduction ($p=0.366$), NYHA ($p=0.221$), Δ ESV ($p=0.093$), Δ EF ($p=0.218$), GLS ($p=0.665$), MR ($p=0.278$), PAP ($p=0.433$) and QoL ($p=0.213$) whereas a faster and higher reduction in Δ EDV ($p=0.045$), Δ NTproBNP ($p=0.037$), SF ($p=0.0014$), AVd ($p=0.002$), PV/AV ($p=0.041$) was found in OPT group favoring ECHO optimization.

Conclusion: Echocardiographic optimization of CRT contributes to an additional echocardiographic benefit over the standard method in reduction of NTproBNP, Δ EDV and SF, AVd and PV/AV.

RECEIVED:
March 25 2023

ACCEPTED:
March 29, 2023



LITERATURE

- Gallard A, Bidaut A, Hubert A, Sade E, Marechaux S, Sitges M, et al. Characterization of Responder Profiles for Cardiac Resynchronization Therapy through Unsupervised Clustering of Clinical and Strain Data. *J Am Soc Echocardiogr.* 2021 May;34(5):483-493. <https://doi.org/10.1016/j.echo.2021.01.019>
- Stephansen C, Kronborg MB, Witt CT, Kristensen J, Gerdes C, Sommer A, et al. Reproducibility of measuring QRS duration and implications for optimization of interventricular pacing delay in cardiac resynchronization therapy. *Ann Noninvasive Electrocardiol.* 2019 May;24(3):e12621. <https://doi.org/10.1111/anec.12621>
- van der Bijl P, Khidir M, Ajmone Marsan N, Delgado V, Leon MB, Stone GW, et al. Effect of Functional Mitral Regurgitation on Outcome in Patients Receiving Cardiac Resynchronization Therapy for Heart Failure. *Am J Cardiol.* 2019 Jan 1;123(1):75-83. <https://doi.org/10.1016/j.amjcard.2018.09.020>
- Calle S, Delens C, Kamoen V, De Pooter J, Timmermans F. Septal flash: At the heart of cardiac dyssynchrony. *Trends Cardiovasc Med.* 2020 Feb;30(2):115-122. <https://doi.org/10.1016/j.tcm.2019.03.008>