CRT - A ROOM FOR IMPROVEMENT?

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The VALID-CRT risk score reliably predicts outcome after cardiac resynchronization therapy in an real-world population

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Background: Several risk-stratification algorithms have been proposed as tool being able to predict outcome after cardiac resynchronization therapy (CRT). However most of them are based on complex variables making them unreliable and impracticable in clinical practice. The VALID-CRT risk-stratification algorithm is based on few variables that are routinely available.

Purpose: To confirm the value of the VALID-CRT risk score in predicting outcome and assess its association with clinical response in an unselected real-world CRT population.

Methods: The present analysis included all consecutive CRT patients (pts) enrolled in the CRT-MORE registry from 2011 to 2013 with complete data and outcome information. Pts were stratified in five groups (quintile 1-5) according to the VALID-CRT risk score. Adverse events for the analysis of clinical outcome comprised death from any cause and nonfatal heart failure (HF) events requiring hospitalization, which ever occurred first after CRT implantation. Clinical Response (CR) at 12-month follow-up was also assessed according to a hierarchical composite criteria which includes alive status, hospitalization for HF, and variations in NYHA functional class, respectively.

Results: We included 905 pts (mean age 70±10 years, 73% male, 47% ischemic, 61% NHIA III/IV, 21% with atrial fibrillation at the time of implantation, mean LVEF 29±7%). During a median follow-up of 1005 [627-1361] days 134 patients died, 79 had at least one HF hospitalization and 199 met the combined endpoint of death or HF hospitalization. 69% of pts displayed an improvement in their CR at 12 months. The mean VALID-CRT risk score was 0.317, ranging from -0.419 to Q5. The risk-stratification algorithm was able to predict total mortality after CRT (survival ranging from 93% Q1 to 77% Q5) HR=1.42, 95%CI: 1.25 to 1.61, p<0.001), HF hospitalization (event-free ranging from 96% to 90%), HR=1.24, 95%CI: 1.06 to 1.45, p=0.009) and the combined endpoint of death or HF hospitalization (event-free ranging from 78% to 69%); HR=1.34, 95%CI: 1.21 to 1.48, p<0.001). In comparison with pts with low-to-intermediate Risk profile (Q1-2-3) the CR was significantly lower in pts with high-to-very high risk profile (Q4-5) (55% vs 79%, p=0.001) and it decreases according to the severity of the risk profile (ranging from 89% Q1 to 49% Q5).

Conclusion: The VALID-CRT risk score reliably predicts outcome after CRT in an unselected, real-world population. Of interest, even if this score was validated for total mortality, normalization of QRSd to LV dimension improves prediction of survival in comparison with any cause death endpoint. Normalization of QRSd to LV dimension is a relatively simple method that might improve patient selection for CRT.

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Normalization of QRS duration to left ventricular dimension improves patient selection for cardiac resynchronization therapy

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Background: In patients with left bundle branch block (LBBB), QRSd duration (QRSds) is dependent on both myocardial conduction velocity and conduction path length. Previously, we demonstrated that normalization of QRSds to left ventricular (LV) dimension, to adjust for conduction path length, improved prediction of hemodynamic cardiac resynchronization therapy (CRT) response.

Objectives: This study evaluates the effect of normalization of QRSds to LV dimension on the prediction of CRT survival.

Methods: In this two-center study, we studied 250 heart failure patients (66±10 years, 66% male) with LV ejection fraction <35% and LBBB with QRS duration ≥120ms who underwent cardiac magnetic resonance (CMR) imaging before CRT implantation. CMR-derived LV end-diastolic volumes (LVEDV) were used for QRSd normalization (i.e. QRSd divided by LVEDV). The primary endpoint was a combined endpoint of death, left ventricular assist device or heart transplant.

Results: During a median follow-up of 3.9 years, 79 (32%) patients reached their primary endpoint. In univariable Cox regression analysis, unadjusted QRSd was unrelated to CRT outcome (p=0.367). In contrast, normalized QRSd was a strong predictor of survival that is routinely available.

Conclusions: Normalization of QRSd to LV dimension improves prediction of survival after CRT implantation. Normalization is a relatively simple method that might improve patient selection for CRT.