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Effect of adding an implantable cardioverter defibrillator on long-term survival in non-ischemic CRT patients stratified by Goldenberg risk score

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Background: There are limited and incomprehensive long-term data on the effects of adding an implantable cardioverter defibrillator (ICD) to cardiac resynchronization therapy (CRT) in patients with non-ischemic heart failure.

Purpose: We compared the long-term all-cause mortality and relative risk reduction in mortality of non-ischemic patients after CRT-P vs. CRT-D implantation stratified by their Goldenberg risk score.

Methods: In our retrospective registry, data of 1196 non-ischemic patients who underwent CRT implantation between 2000 to 2018 were collected. Goldenberg sudden cardiac risk score was calculated by the presence of atrial fibrillation, NYHA class > 2, age > 70 years, blood urea nitrogen > 26mg/dl and QRS width.

Results: In our registry from 1196 CRT implanted patients with non-ischemic heart failure, 716 patients had all the required data to calculate the Goldenberg score. From this cohort 379 (53%) had CRT-P and 337 (47%) CRT-D implantation. The mean value of the Goldenberg score was 2.7 in the total cohort, while a significantly higher score was found in the CRT-P group (CRT-P 2.9 ± 1.1 vs. CRT-D 2.5 ± 1.1 $p < 0.001$). During the median follow-up time of 4.9 years, 345 (48%) patients reached the primary endpoint, 220 patients (64%) with CRT-P and 125 patients (36%) with CRT-D. After comparing patients by low (≤ 3) and high (> 3) Goldenberg score, we found that CRT-D patients with lower risk score showed mortality benefit compared to CRT-P (HR 0.69; 95% CI 0.53-0.89; $p = 0.001$). In the contrary there was no apparent mortality benefit in CRT-D patients compared to CRT-P when high Goldenberg score subgroup was analyzed (HR 0.99; 95% CI 0.67-1.45; $p = 0.95$).

Conclusions: In non-ischemic heart failure patients, Goldenberg sudden cardiac risk score can be also applied. In CRT-D patients those with less co-morbidities and lower (≤ 3) Goldenberg risk score showed mortality benefit compared to CRT-P patients, while among patients with higher score (> 3) adding an ICD had no additional effect on all-cause mortality.