Early ICD implantation and survival after out-of-hospital cardiac arrest

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Background: It is unclear whether an implantable cardioverter-defibrillator (ICD) is generally beneficial in survivors of out-of-hospital cardiac arrest (OHCA) of cardiac etiology.

Aim: We studied the association between ICD implantation and survival in patients with cardiac etiology or initial shockable rhythm in OHCA, using the Swedish Registry for Cardiopulmonary Resuscitation (SRCR).

Methods: All cases in the SRCR during 2010 to 2020 with cardiac etiology or initial shockable rhythm who were discharged alive included. We examined the association between ICD and survival using propensity score. Propensity scores (919 candidate predictors before feature selection) were estimated using gradient boosting, Bayesian additive regression trees, neural networks, extreme gradient boosting and logistic regression. Cox regression was used to model survival. The primary outcome was death or recurrent cardiac arrest.

Results: The 90-days event rate was 25% in the ICD group, compared with 52% in those without ICD. With regards to the average treatment effect (ATE) the overall hazard ratio 0.38 (95% CI 0.26-0.56) for ICD vs. no ICD. The overall average treatment effect on those treated (ATT) was 0.31 (95% CI 0.22-0.44). In the 15 subgroup analyses, every point estimate were below 1, with the most pronounced association noted in those with a history of acute myocardial infarction (HR 0.07 [95% CI 0.02-0.32]). All ATE and ATE estimates were aligned.

Conclusions: Mortality in survivors of OHCA occurs early after discharge, and prompt implantation of an ICD is associated with 62% lower probability of death and recurrent cardiac arrest overall.