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Rate, cause and costs of Heart Failure hospitalizations following ICD/CRT-D replacement: preliminary data from an Italian multicenter registry

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Background: Heart failure hospitalizations (HFHs) likely represent the main health care expenditure also in implantable cardiac defibrillators (ICDs) and cardiac resynchronization therapy defibrillators (CRT-D) recipients yet the event rate of HFH and the associated costs after device replacement or upgrade are unknown.

Purpose: To report HFH rates and associated costs within 12 months following ICD/CRT-D device replacement or upgrade procedure from ICD to CRT-D.

Methods: The DEtect long-term COmplications after icD rEplacement (DECODE) was a prospective, single-arm, multicenter cohort study exploring complications in ICD/CRT-D recipients undergoing device replacement or upgrade from ICD to CRT-D. All clinical and survival data of these patients at 12-month follow-up were prospectively analyzed. For each adjudicated HFH, the admission and discharge date were recorded, and ICD-9-CM diagnoses and procedure codes were obtained. The estimated reimbursement for each hospitalization was calculated according to the 2012 Italian national reimbursement rates.

Results: Between 2013 and 2015, 983 patients (mean age = 71 years, mean LVEF = 35%, NYHA class I/II = 75.6%) were enrolled: 900 (91.6%)

patients underwent device replacement (446 ICD/454 CRT-D) and 83 (8.4%) upgrade from ICD to CRT-D. After 12 months, 66 (6.7%) patients died, 40 (60.6%) for cardiovascular reasons. Fifty-five (5.6%) patients experienced at least 1 HFH. Overall, 91 HFH (9.6% event rate 95% CI, 7.7–11.7) occurred. Among the variables tested at univariate analysis, only LVEF \leq 35%, AF history and renal disease were confirmed as HFH predictors at multivariate analysis. HFH rate was significantly higher following upgrade procedures and occurrence of HFH was associated with an eleven-fold increased mortality risk (95% CI: 5.9 to 20.5; $p < 0.0001$). The cumulative cost associated with HFHs incurred over the 12 months follow-up was 515305 €. The mean cost per HFH was 5662±9497 € [ranging from 3144 € to 64479 €] while the mean cost per patient with events was 9369±12687 €.

Conclusion: Underlying cardiac disease and renal failure are the main drivers of HFH and mortality, and of higher healthcare expenditures in ICD/CRT-D recipients following device replacement or upgrade. Accurate clinical assessment is needed to support the decision-maker at the time of ICD replacement to take an appropriate clinical and economic sustainable decision.