Utilization of Guideline-Directed Device Therapies in Heart Failure Patients: A Real-World Analysis Using Electronic Health Record Data

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**Introduction**: Guideline-directed device therapy improves outcomes for eligible patients with heart failure with reduced ejection fraction (HFrEF). Utilization rates of device therapies in HFrEF following the 2012 ACCF/AHA/HRS Focused Update for Device-based Therapies of Cardiac Rhythm Abnormalities have not been well studied. We sought to analyze utilization of guideline-directed device therapy in newly indicated HFrEF patients from 2012-2016 using aggregated Electronic Health Record (EHR) data.

**Methods**: Computable phenotyping algorithms for ICD indications were developed as part of the GLIDE HF (GuideLine Indications Detected in EHR for HF) program and used diagnoses, procedures, measures, prescriptions, and the output of Natural Language Processed (NLP) provider notes. Algorithms were assessed using the Optum® EHR de-identified data of 1.54 million US patients with a diagnosis of HF, cardiomyopathy, or prior infarct. HFrEF patients with >1 year of prior records with a new Class 1 or Class 2a indication for an ICD or CRT-D from 2012-2016 were included in the newly-indicated analysis.

**Result**: From 2012-2016, records showed 91,667 HFrEF patients were newly indicated for an ICD or CRT-D. Guideline-recommended devices were used in 3619 of 11,756 (30.8%) CRT-D indicated patients and in 6,196 of 78,477 (9.47%) ICD-indicated patients. Among 75,757 patients meeting a Class I ICD indication, 5,986 (7.9%) were implanted with ICDs, whereas among 2,464 patients meeting a Class I CRT-D indication, 1264 (51.3%) were implanted with a CRT-D. While implantable device therapy utilization was low in indicated patients, 91,357 (99.7%) had records of imaging of the left ventricle, 72,289 patients (80.1%) had records of changes to HF medication with follow-up imaging, and 46,637 (50.9%) had prior coronary interventions or diagnostic catheterizations prior to the date of indication.

**Conclusion**: In this contemporary cohort of HF patients, a substantial proportion of potentially eligible patients did not receive ICD or CRT-D therapy, especially when compared with other cardiovascular interventions and treatments in these patients. Further research is warranted into the factors associated with the use of devices in patients with current Class I guideline indications.