No association found between ischemia and rate of congestive heart failure hospitalization following cardiac resynchronization therapy

**Background**

Analyses of clinical trials of cardiac resynchronization therapy (CRT) have shown better echocardiographic and health outcomes in patients with anterior nonischemic cardiomyopathy compared with ischemic cardiomyopathy. However, CRT was beneficial to both groups of patients, and a statistically significant effect modification by etiology was demonstrated only for echocardiographic outcomes. In other research, greater extent of myocardial scarring explained the less favorable CRT results observed in the presence of ischemic cardiomyopathy compared with nonischemic cardiomyopathy. A history of ST-elevation myocardial infarction (STEMI) increases the probability of and magnitude of myocardial scarring, and thus might serve to identify patients likely to have a poor health outcome from CRT.

**Methods**

*Study Design:* Retrospective cohort study

*Data Source:* Administrative medical claims and enrollment data for individuals who had healthcare coverage with Humana Inc., a healthcare company providing insurance to more than 25.5 million Medicare Advantage and commercial members as of December 31, 2012. 

*Inclusion Criteria:*
- STEMI plus ICD procedure (CPT code 33225 for left ventricular pacing lead add-on or plus 33249 for implantation or replacement of defibrillator with leads on same day) in 2013
- Continuous enrollment 12 months before and 12 months after implantation

*Exclusion Criteria:* Lack of hospitalization for CHF during 12 months prior to implantation

*Exposure Groups:* Patients were categorized as ischemic or nonischemic according to the presence or absence of ≥2 comorbid conditions (diagnosis code procedure code from precluded lists). Within the ischemic group, patients with a history of STEMI were identified according to diagnosis code. Patients with ischemia but no STEMI diagnosis were not included in any analysis since some could have had a diagnosis of STEMI earlier than within the past 12 months and no documentation during that time period.

*Outcome:* CHF hospitalization during 12 months following implantation

**Statistical Analyses:** Fisher’s exact test with two-tailed p-values was used to evaluate the significance of the association between ischemia and postimplantation hospitalization.

**Disclosures**

*AC Powell: Employee; Company Relationship; HealthHelp, LLC, Payer-Provider Sydicate. Stock or Stock Options; Company Relationship; Select Medical Holdings, Team Health Holdings, Amtibug Corp., Century Corp., CVS Health, Community Health Systems, HCA Holdings, Tenet Healthcare Corp., Board Membership; Company Relationship; PayerGuide.

*EM Kreis: Employee; Company Relationship; HealthHelp, LLC.

*TL Rogstad: Employee; Company Relationship; Humana Inc.*

*UO Dinhomaib: Employee; Company Relationship; HealthHelp, LLC, Stock or Stock Options; Company Relationship; Johnson & Johnson, Merck, Pfizer, Eisai, Prescription Drugs, Cigna, Proctor and Gamble, Halyard Health Inc.*

*SE Price: Employee; Company Relationship; Humana Inc.*

*JD Simmons: Employee; Company Relationship; Humana Inc.*

**Figure 2. Postimplantation Hospitalization for CHF**

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<tr>
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<th>Ischemic</th>
<th>Nonischemic</th>
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<td>A. Ischemic vs. Nonischemic</td>
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<td>B. STEMI-STEMI vs. Nonischemic</td>
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**Conclusions and Implications**

- In this population with a recent CHF hospitalization, no association was found between the presence of ischemic heart disease, or even an ischemic event likely to produce a high degree of scarring, and the likelihood of being hospitalized for CHF in the year after undergoing CRT.
- In all of the groups, patients had a ≥24% chance of CHF admission in the year post-implantation although they had experienced a CHF admission in the year prior.
- No evidence was found in this claims analysis to support restricted use of CRT in patients with a history of ischemic heart disease or signs of myocardial scarring. These results are consistent with previous randomized controlled trials.

**Limitations**

- The precise degree of myocardial scarring was not available from claims data.
- Results may have been confounded by unmeasured demographic and clinical differences between groups, other than etiology, at baseline. However, groups were somewhat similar in disease severity in that all patients had been recently hospitalized for CHF.

- The individuals included in the sample may not have been nationally representative, as the health plan to which the patients belonged is not perfectly nationally distributed.

The ischemic group was more likely to be hospitalized for CHF in the year following implantation for CRT, but the difference was not significant (p = 0.39).

The ischemic-STEMI subgroup and the nonischemic-STEMI subgroup had similar 1-year hospitalization rates (p = 1.00), even though patients with STEMI rates would not be expected to have the greatest scar burden.

**References**


