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Comparison of outcomes in patients with ST elevation myocardial infarction with vs without iron deficiency anemia in united states from 2007-2014

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Introduction: 20,000 in 100,000 (approximately one in five) females suffer worldwide from iron deficiency anemia (IDA). IDA also accounts for the largest proportion of anemia worldwide and in United States. The Objective of this study is to study outcomes in terms of rate of revascularization, in-hospital mortality and incidence of cardiogenic shock in patients with ST-Elevation Myocardial Infarction (STEMI) with and without Iron Deficiency Anemia.

Methods: We examined National Inpatient Sample (NIS) database from years 2007-14 for all hospital admissions with acute STEMI using ICD9 codes. The National (Nationwide) Inpatient Sample (NIS) is the largest all-payer inpatient care database in the United States, containing data on more than seven million hospital stays. We compared baseline characteristics of the two groups using parametric and non-parametric tests for continuous variables and Chi-Squares test for dichotomous variables. Multivariate logistic regression was used to analyze the likelihood of revascularization (Percutaneous Coronary Intervention (PCI) and Coronary Artery Bypass Graft (CABG)), cardiogenic shock and in-hospital mortality. We adjusted for age, sex, race, payer, income quartiles, hospital location, region, size and teaching status. Multiple comorbidities were also accounted for during our analysis (e.g. congestive heart failure (CHF), coagulopathy, diabetes mellitus (DM), chronic kidney disease (CKD) chronic pulmonary disease, history of coronary stent, history of CABG etc.). Missing values for covariates adjusted by using multivariate imputation by chained equations technique to ensure valid statistical inference.

Results: Iron deficiency anemia was present in 46,740 of 2,011,233 (2.32%) patients in the STEMI population. Patients with IDA were more elderly (mean 71.52 vs 65.61 p<0.001) and more likely to be females (54% vs 35%, p<0.01). IDA population was also more likely to have multiple comorbidities e.g. CHF, DM and complications of DM, coagulopathy, chronic pulmonary disease, hypertension, lymphoma, CKD, valvular disease, peripheral vascular disease, weight loss and neurological disease (p<0.01 for all). They were also diagnosed less often at teaching hospitals (45% vs 48%, p<0.01). Mean and median length of stay was longer for patients having IDA (mean 7.76 vs 5.26, p<0.001; median 6.00 vs 3.00, p<0.001). After adjustment for aforementioned covariates, patients with IDA were less likely to undergo revascularization (odds ratio 0.84, CI 0.79 to 0.88 p<0.001). IDA was also associated with increased in-hospital mortality (odds ratio 1.08 , CI 1.02 to 1.15, p<0.001) and higher incidence in cardiogenic shock (odds ratio 1.12, CI 1.05 to 1.23, p<0.001).

Conclusions: Despite changes in STEMI care in United states over the past 2 decades, patients with IDA remain less likely to receive revascularization. STEMI patients having IDA continue to remain at an elevated risk of cardiogenic shock and in-hospital mortality.