

Characterizing Acute STEMI Patients Across Multi-Country Real-World Data Sources: A Comparative Analysis

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Background

Cardiovascular diseases accounted for 17.9 million deaths globally in 2019, with the vast majority (85%) attributed to acute myocardial infarction. ST-elevation myocardial infarction (STEMI), a severe AMI subtype, results from acute coronary artery blockage, often due to plaque rupture and thrombosis. The 4th Universal Definition of Myocardial Infarction defines STEMI by elevated cardiac troponin and clinical evidence of ischemia. Presentations can vary significantly, from classic chest pain to dyspnea, nausea, or weakness. This study aims to accurately identify and characterize STEMI cases using multi-country real-world data, enabling a comprehensive and comparative assessment of STEMI patient characteristics and management between countries and database sources.

Methods

A retrospective cohort study was conducted using real-world data from over 1.2 billion patients. Inclusion criteria were a STEMI diagnosis, age ≥ 18 years, receipt of an electrocardiogram within days 0–3, inpatient visit on day 0, and catheterization on day 0 of the clinical encounter. The study period spanned from January 1, 2016, to most recent data available. Seven observational databases, Washington University in St. Louis, IQVIA™ Hospital CDM, IQVIA™ Open Claims, IQVIA™ PharMetrics linked with Ambulatory EMR (USA), Clinical-Hospital Center Zvezdara (Serbia), Ajou University School Of Medicine, and Yonsei University Health Systems (South Korea), formatted in the Observational Medical Outcomes Partnership (OMOP) common data model—were analyzed using the OHDSI CohortDiagnostics module via the Strategus framework. Baseline characteristics were summarized per database.

Results

Patient demographics were consistent across databases, with mean ages ranging from 58.8 to 65.2 years, predominantly male (61.5–78.8%). Treatment and diagnostic patterns varied substantially between databases. Aspirin administration was recorded in 85.3–99.6% of patients in five hospital databases, yet only 7.8–10.30% of patients in the other two databases. Similarly, platelet aggregation inhibitors were administered in 90.4–99.1% of patients in four databases, but only 4.9–24.2% of patients in the remaining three. Troponin was tested in 58.1–97.4% of patients in the four hospital-based databases, but only in 14.7–27.1% of patients in other databases. Symptom documentation was inconsistent: chest pain was recorded in 5–71% of patients, and dyspnea, nausea, or weakness in only 1.5–16%. Comorbidity data, such as hyperlipidemia, were better captured in some databases (53.2–72.9% of patients) than others.

(10.4–28.1% of patients).

Conclusion

This study underscores the substantial influence that database type has on the characterization of STEMI patients. The observed variability in the recording of diagnostic procedures, treatments, symptoms, and comorbidities highlights the limited data availability of certain data sources, particularly claims and non-hospital EMR databases. Given the acute nature of STEMI, hospital-based EMR databases offer a more accurate and comprehensive view of patient care. These findings emphasize the importance of selecting appropriate data sources when conducting research on acute cardiovascular conditions.