Cardiovascular Event Rates after Myocardial Infarction or Ischemic Stroke in Older Medicare Patients

Suying Li,[1] Yi Peng,[1] Xinyue Wang,[1] Yi Qian,[2] Pin Xiang,[2] Sally W. Wade,[3] Haifeng Guo,[1] J. Antonio G. Lopez,[2] Yehuda Handelsman,[4] and Charles A. Herzog[1,5]

[1]Chronic Disease Research Group, Minneapolis, MN; [2]Amgen, Thousand Oaks, CA; [3]Wade Outcomes Res and Consulting, Salt Lake City, UT; [4]Metabolic Inst. of America, Tarzana, CA; [5]Hennepin County Medical Center, Minneapolis, MN

Introduction

- The clinical burden of cardiovascular disease (CVD) is high in the US. Approximately 92.1 million adults had CVD, 2011-2014: myocardial infarction (MI), 7.9 million; stroke, 7.2 million (ref).
- Age is a known risk factor: CVD prevalence was 12%, 40%, 70%, and 86% for ages 20-39, 40-59, 60-79, and ≥ 80 years (ref).
- Association of diabetes (DM) with recurrence of MI or ischemic stroke (IS) is unknown.

Objectives

- To describe CV event rates in older Medicare patients after MI or IS in 2012.
- To estimate recurrence of MI and IS in 2008 cohorts over up to 6 years of follow-up.
- To examine association between DM and recurrence or incidence of CV events, all-cause death, and composite events over 1 year of follow-up.

Methods

- Retrospective observational cohort study of older (aged ≥ 66 years) Medicare beneficiaries, 2008 and 2012, using 2007-2013 20% Medicare datasets.
- Separate MI and IS cohorts for each study year (**Figure 1**).
- Single event outcomes: MI, IS, unstable angina (UA), transient ischemic attack (TIA), CABG/PCI, all-cause death.

- Composite outcomes:
  (1) MI, IS, or UA;
  (2) MI, IS, UA, or death;
  (3) MI, IS, UA, or CABG/PCI; and
  (4) MI, IS, UA, CABG/PCI, or death.
- Statistical analyses:
  - Calculated percentages of patients with each outcome and event rates for 1-year follow-up.
  - Estimated cumulative incidence of events for 2008 cohort over 6 years, Kaplan-Meier method.
  - Estimated cumulative incidence of non-death events considering death as competing event.
  - Fine and Gray model incorporating death as a competing event to estimate relative risk (RR) of outcomes not including death.
  - Cox regression to estimate RRs for outcomes including death.
  - Adjusted for age, sex, race, and baseline conditions including prior CV events (MI, IS, UA, TIA, or CABG/PCI) and comorbid conditions.

Results

- 2012: 26,548 patients discharged from MI hospitalizations, 17,728 from IS hospitalizations.
  - MI cohort: mean age, 80.1 years, 85.9% white, 8.6% black, 58.0% female.
  - IS cohort: mean age, 80.9 years, 81.7% white, 11.9% black, 64.4% female.

- 2008: 26,460 patients with MI (mean follow-up time, 2.65 years); 17,566 with IS (mean follow-up time, 2.62 years).
- 2008 MI and IS cohorts: **Figures 2, 3** show cumulative recurrence of MI or IS, incidence of other CV events, cumulative all-cause death.
- DM significantly associated with MI recurrence (RR, 1.44; 95% CI, 1.31-1.59) and IS recurrence (RR, 1.26; 95% CI, 1.12-1.42) (**Figure 4**).

Limitations

- Observational study using Medicare claims data. Due to possible residual confounding, severity of illness could not be fully controlled.
- Findings may not generalize to entire US population.

Conclusions

- Mortality and rates of recurrent CV events after MI or IS are high for older patients.
- DM was significantly associated with MI or IS recurrence.
- Aggressive intervention for secondary prevention (such as controlling hyperglycemia) of CV events in this high-risk population may be warranted.

Reference

- Heart Disease and Stroke Statistics—2017 Update. A Report From the American Heart Association.

Figure 1. Study Design

Table 1. Cardiovascular Events and All-Cause Death over 1 Year after an Index Event of MI or IS in 2008 and 2012

Study Cohort	MI	IS	UA	TIA	CABG /PCI	Death	MI, IS, or UA	MI, IS, UA, or Death	MI, IS, UA, CABG/PCI	MI, IS, UA, CABG/PCI or Death
2008						Event, %				
MI	7.6	1.7	0.2	0.7	10.0	32.0	9.4	37.7	16.7	44.2
IS	1.9	6.6	0.1	1.9	1.4	32.4	8.4	37.7	9.3	38.5
2012										
MI	7.2	1.7	0.2	0.6	9.3	31.6	8.9	37.2	15.4	42.8
IS	1.6	6.7	*	1.7	1.4	31.6	8.2	36.8	9.0	37.5
2008						Multiple event rate per 100 patient-years				
MI	12.5	2.5	0.3	0.9	14.5	43.2	15.3	58.5	29.8	72.9
IS	2.8	10.1	0.2	2.7	2.2	44.1	13.0	57.1	15.2	59.3
2012										
MI	11.6	2.5	0.3	0.8	12.3	42.2	14.4	56.6	26.7	68.9
IS	2.4	10.2	0.04	2.5	1.8	42.6	12.6	55.2	14.4	57.0

* Value is suppressed due to smaller event size (10 events or less) according to CMS reporting rules.
MI, myocardial infarction; IS, ischemic stroke; UA, unstable angina; TIA, transient ischemic attack; CABG, coronary artery bypass grafting; PCI, percutaneous coronary intervention.

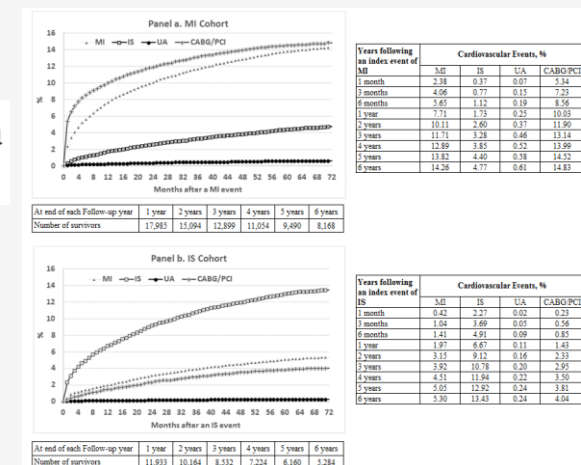**Figure 2. Cumulative Incidence of CV Events after MI or IS in 2008**

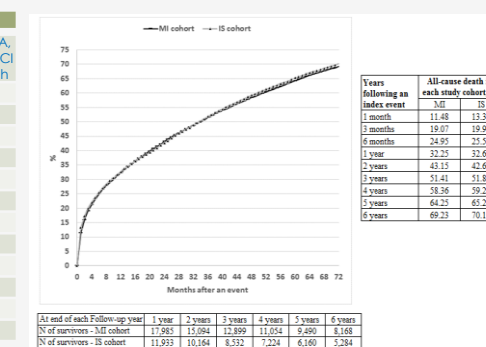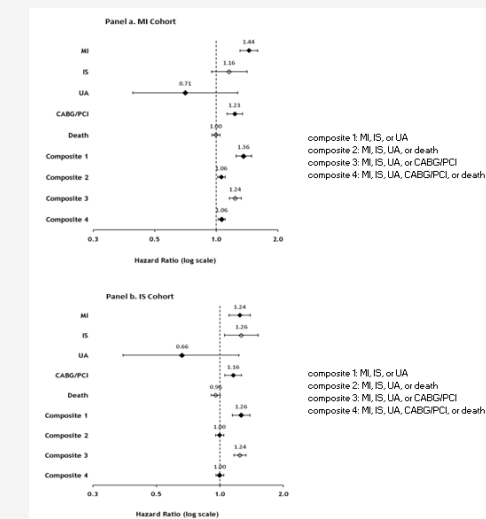**Figure 3. Cumulative Incidence of Death after MI or IS in 2008**

Figure 4. Adjusted Risk Ratio of Outcomes Associated with Diabetes in 2012 MI and IS Cohorts (DM vs. non-DM)