

Younger women with acute MI had more in-hospital deaths than men of the same age

Vaccarino V, Parsons L, Every NR, Barron HV, Krumholz HM, for the National Registry of Myocardial Infarction 2 Participants. Sex-based differences in early mortality after myocardial infarction. *N Engl J Med*. 1999 Jul 22;341:217-25.

QUESTION

In women with acute myocardial infarction (MI), is being younger associated with a greater risk for in-hospital mortality than it is for men of the same age?

DESIGN

Cohort study of participants enrolled in the National Registry of Myocardial Infarction 2 study.

SETTING

1658 hospitals in the United States.

PARTICIPANTS

384 878 patients who were 30 to 89 years of age (mean age 69 y, 60% men) and were admitted to the hospital with acute MI. Mean age was greater for women than for men (72 vs 66 y, $P < 0.001$). Patients who had been transferred from or to other acute-care hospitals were excluded.

ASSESSMENT OF RISK FACTORS

Age and sex. Data were also abstracted from medical records for race, insurance status, coexisting conditions (MI, angina,

congestive heart failure, stroke, coronary artery bypass grafting [CABG], percutaneous transluminal coronary angioplasty [PTCA], hypertension, diabetes, hypercholesterolemia, and current smoking), clinical indications of MI severity, management in the first 24 hours after MI, time from symptom onset to presentation at hospital, characteristics of the hospitals, and year of discharge.

MAIN OUTCOME MEASURE

In-hospital mortality.

MAIN RESULTS

The in-hospital mortality rate was 17% for women and 12% for men. Sex-based relative differences (i.e., higher mortality rates for women than for men) were greatest among younger patients (6.1% for women vs 2.9% for men < 50 y of age, $P < 0.001$ for the overall interaction between age and sex) and were no longer statistically significant after 74 years of age. After adjustment for age in logistic regression, the odds ratio for death among women decreased from 1.54 to 1.18 (95% CI 1.16 to 1.20). When the interaction

between age and sex was included in the model, the odds for death in women relative to men was 11% (CI 10% to 12%) greater for each 5-year decrease in age. After further adjustment for race, insurance status, medical history, presence of clinical abnormalities, management in the first 24 hours, and time to presentation, women had increased odds for death (odds increase 7.0%, CI 5.9% to 8.1%) relative to men for every 5-year decrease in age. Results were similar when the hospital characteristics were added to the model.

CONCLUSION

Younger women with acute myocardial infarction were at greater risk for in-hospital mortality than men of the same age.

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COMMENTARY

Women are less likely than men to have MI, but when they do, it usually occurs at an older age. The increased morbidity and mortality rates noted in women have been attributed to older age and more comorbid disease, including diabetes mellitus and hypertension. The report by Vaccarino and colleagues is unique because it finds sex differences in younger—not older—patients. The clinical importance of this observation is limited by the fact that only 16% of the women were < 60 years old, with presumably < 10% under 50 years of age. Nevertheless, it is an interesting observation.

The baseline risk factors in these women included more diabetes, hypertension, previous heart failure, and previous stroke. They presented later to the hospital and had more nondiagnostic changes on electrocardiography. More women were admitted with hypotension, tachycardia, heart failure, and cardiogenic shock. They were less likely to receive aspirin, β -blockers, thrombolytic therapy, PTCA, or CABG. Women had more bleeding complications, probably because heparin doses were too high.

Neither coexisting conditions like diabetes nor the lower rate of established treatments explained the mortality differences in this

analysis. The authors speculate that a hypercoagulable state or vasospasm more often triggers MI in younger women with less coronary artery narrowing than in men or older women. The accompanying editorial (1) implicates genetic variations in density or type of estrogen receptors. I have been impressed that almost all young women with MI smoke cigarettes. The worse outcome could be caused by less protective collateral circulation development from lack of previous ischemic stimulation. Most important, this registry documents underuse of lifesaving interventions for both sexes (aspirin, β -blockers, angiotensin-converting enzyme inhibitors, and reperfusion therapy), and double-digit mortality risk for most patients with MI despite a 50% incidence of non-Q-wave MI. Randomized trials underestimate the unacceptably high morbidity and mortality rates that still exist with MI.

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Reference

1. Wexler LF. Studies of acute coronary syndromes in women—lessons for everyone [Editorial]. *N Engl J Med*. 1999;341:275-6.