Women with unstable angina received fewer cardiac procedures than did men but were less likely to develop other cardiac events

Roger VL, Farkouh ME, Weston SA, et al. **Sex differences in evaluation and outcome of unstable angina.** JAMA. 2000 Feb 2;283:646-52.

QUESTION

Are men and women who present to the emergency department (ED) with unstable angina investigated and treated differently and are their long-term outcomes different?

DESIGN

Inception cohort study with mean follow-up of 6 years.

SETTING

Olmsted County, Minnesota, United States.

PATIENTS

All patients living in Olmsted County who presented to the ED with chest pain for the first time from 1982 to 1992 and who met the criteria for unstable angina: symptoms of angina at rest for > 20 minutes, new-onset exertional angina (Canadian Cardiovascular Society criteria for ≥ class 3 angina), variant angina, or angina after myocardial infarction (MI). Exclusion criteria were ongoing MI and other causes of chest pain. 1306 men (mean age 60 y) and 965 women (mean age 67 y) were included. Follow-up for mortality was complete.

ASSESSMENT OF PROGNOSTIC FACTORS

At presentation to the ED, data were collected on sex; age; diabetes mellitus; history of hypertension, hypercholesterolemia, or MI; familial coronary artery disease; typical angina; prolonged pain; electrocardiographic findings; and U.S. Agency for Health Care Policy and Research risk category (high, intermediate, or low).

MAIN OUTCOME MEASURES

Use of cardiac procedures within 90 days of diagnosis, all-cause mortality, and cardiac events (cardiac death, nonfatal MI, nonfatal cardiac arrest, and congestive heart failure). Data are presented as relative risks (RRs) for men compared with women and adjusted for baseline characteristics.

MAIN RESULTS

At diagnosis, women were older ($P < 0.001$) than men, and fewer were smokers (16% vs 26%, $P = 0.001$); women had higher rates of history of hypertension (55% vs 39%, $P = 0.001$), history of hypercholesterolemia (51% vs 40%, $P = 0.001$), typical angina (81% vs 75%, $P = 0.001$), abnormal electrocardiographic findings (59% vs 53%, $P = 0.001$), and other ST-T changes (33% vs 26%, $P = 0.001$). In the category of use of cardiac procedures within 90 days of ED visit, men were less likely than women to have noninvasive diagnostic tests only (RR 0.85, 95% CI 0.74 to 0.98) and more likely to have any noninvasive test (RR 1.21, CI 1.09 to 1.35), stress testing (RR 1.43, CI 1.26 to 1.63), coronary angiography (RR 1.59, CI 1.38 to 1.82), or combined noninvasive tests and angiography (RR 1.80, CI 1.53 to 2.12). After adjustment for baseline characteristics, men had a higher risk for cardiac events (RR 1.21, CI 1.03 to 1.42) and showed a trend toward increased all-cause mortality (RR 1.23, CI 0.99 to 1.54, $P = 0.07$).

CONCLUSION

Among patients who were diagnosed for the first time with unstable angina after presenting to the emergency department with chest pain, women received fewer cardiac procedures than did men within 90 days; after adjustment for baseline characteristics, men experienced worse outcomes during follow-up.

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For correspondence: Dr. V.L. Roger, Mayo Clinic, 200 First Street Southwest, Rochester, MN 55905 USA. FAX 507-266-0228.

COMMENTARY

Roger and colleagues hypothesized that women presenting to the ED with unstable angina receive less care and have worse outcomes than men. The researchers' surrogate marker for care, cardiac procedures, may fall short of providing appropriate details about optimal medical therapy and what revascularization was done. Interestingly, although their hypothesis deserves exploration, they do not examine the interaction between sex, diagnostic procedure use, and long-term clinical outcomes.

We would like to know more about the patients in this study than is provided. Details of previous medical therapy and clinical events after admission, such as recurrent angina and the response to medical therapy, are of prognostic importance and often influence decisions about angiography and revascularization (1). The association of clinical events with invasive procedures, revascularization, and their temporal distribution over the follow-up period could provide additional insight.

What could account for the finding that baseline-adjusted risk for long-term adverse events was lower in women? One possible explanation may relate to the higher prevalence of hypertension in women, which is expected to be associated with more left ventricular hypertrophy, electrocardiographic abnormalities, and a greater propensity for microvascular angina (2).

What are the implications for clinical practice? We still do not know what rate of invasive procedures for unstable angina best serves women and men. Fortunately, data have become available for better risk assessment incorporating cardiac markers and quantitative evaluation of ST-segment shift. The importance of risk assessment coupled with enhanced medical and revascularization strategies provides new cause for optimism in the care of such patients (3).

Padma Kaul, MSc
Paul W. Armstrong, MD
University of Alberta
Edmonton, Alberta, Canada

References

1. **Armstrong PW, Fu Y, Chang WC, et al.** Acute coronary syndromes in the GUSTO-IIb trial: prognostic insights and impact of recurrent ischemia. The GUSTO-IIb Investigators. Circulation. 1998;98:1860-8.
2. **Iriarte M, Caso R, Murga N, et al.** Microvascular angina pectoris in hypertensive patients with left ventricular hypertrophy and diagnostic value of exercise thallium-201 scintigraphy. Am J Cardiol. 1995;75:335-9.
3. **Ohman EM, Armstrong PW, Christenson RH, et al.** Cardiac troponin T levels for risk stratification in acute myocardial ischemia. GUSTO IIA Investigators. N Engl J Med. 1996;335:1333-41.