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Diagnosis and Treatment of Coronary Heart Disease in Women: Systematic Reviews of Evidence on Selected Topics

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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-Based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care in the United States. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions and new health care technologies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

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We welcome written comments on this evidence report. They may be sent to: Director, Center for Practice and Technology Assessment, Agency for Healthcare Research and Quality, 6010 Executive Blvd., Suite 300, Rockville, MD 20852.

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Structured Abstract

Objectives. The Agency for Healthcare Research and Quality (AHRQ) and the National Institutes of Health Office of Research on Women's Health funded the University of California, San Francisco-Stanford Evidence-based Practice Center to perform systematic reviews and meta-analyses on four key topics related to coronary heart disease (CHD) in women: (1) accuracy of exercise myocardial perfusion imaging and echocardiography for diagnosis of CHD in women, (2) lipid lowering treatment to reduce risk of CHD in women, (3) diabetes as a risk factor for CHD in women, and (4) troponin as a prognostic factor for CHD in women. For each question, we also attempted to provide evidence stratified by race or ethnicity. We used standard methods to systematically review the medical literature to address each topic. The evidence identified was reviewed and graded, data were abstracted and the findings summarized for each topic.

Search Strategy. We developed specific search terms for each of the four key topics and performed standardized searches of electronic databases. We also reviewed bibliographies and sought suggestions from our peer reviewers. Authors of studies that met selection criteria but did not report findings by gender were contacted and asked to provide gender-specific outcomes.

Selection Criteria. Inclusion and exclusion criteria were defined for each of the four systematic reviews. Titles and abstracts were reviewed by investigators who coded each for eligibility. The full text of eligible articles was reviewed independently by two physician investigators using standardized forms to classify eligibility, rate quality and abstract data. The findings of all eligible studies rated good or fair quality were included in the summary estimates.

Data Collection and Analysis. Titles and abstracts were entered and coded using EndNote® (Niles Software, Inc). Data from the standardized review forms were entered in an Access (Microsoft® Corporation) database to allow tracking of eligibility, quality and study design. Abstracted data were also stored electronically in a database (EXCEL, Microsoft® Corporation).

Main Results

Overall

- Findings from 82 otherwise eligible studies could not be included in the systematic reviews because data were not stratified by gender. We contacted the author of these studies twice requesting data for women and received data from 19 studies (23 percent).
- Little evidence was available regarding the key questions as they pertain to women of different races/ethnicities. For this reason, only the review of diabetes as a risk factor for CHD provides summary findings by ethnicity.

Accuracy of exercise myocardial perfusion imaging and echocardiography for diagnosis of CHD in women

- We found 14 eligible studies that provided data on the accuracy of noninvasive tests in 893 women. Ten studies examined the accuracy of myocardial perfusion imaging and four examined the accuracy of exercise echocardiography.
- In women, the overall accuracy of both exercise myocardial perfusion imaging and exercise echocardiography for diagnosis of CHD is low with positive likelihood ratios of 2.5 to 3 and negative likelihood ratios of about 0.3.
- The accuracy of exercise myocardial perfusion imaging for diagnosis of CHD is not clinically different in women compared to men.
- There is little difference in the accuracy of exercise myocardial perfusion imaging and exercise echocardiography for diagnosis of CHD in women.
- The accuracy of exercise myocardial perfusion imaging for diagnosis of CHD is similar whether thallium or sestamibi is used as the imaging agent.

Efficacy of lipid lowering to reduce risk of CHD in women

- Although 20 clinical trials of the effects of lipid lowering therapy included women, only nine published results by gender. By contacting study investigators, we were successful in obtaining data on women from two additional trials. Thus, we were able to analyze results from 11 trials that included 15,917 women.
- In women with known CHD, treatment with lipid lowering therapy reduces risk of CHD mortality 26 percent, nonfatal myocardial infarction (MI) 36 percent and major CHD events 21 percent. There was insufficient evidence to show that lipid lowering reduces rates of revascularization procedures and no evidence of a reduction of risk in total mortality.
- For women without CHD, there is insufficient evidence to determine whether lipid lowering reduces risk for any clinical outcome.

Diabetes as a risk factor for CHD in women

- We found 17 eligible studies that included 43,944 women (4,522 with diabetes and 39,422 without diabetes).
- Adjusted summary odds ratios (ORs) for CHD mortality and nonfatal MI due to diabetes are higher among women than men, but summary ORs for all-cause mortality are slightly higher in men than women. All of the differences between men and women are modest and not statistically significant.
- The summary odds ratio for CHD mortality due to diabetes is 2.9 (95% confidence interval [CI], 2.2-3.8) for women and 2.3 (95% CI, 1.9-2.8) for men. The summary OR for nonfatal MI due to diabetes is 1.7 (95% CI, 1.3-2.3) for women and 1.6 (95% CI, 1.1-2.2) for men. The summary OR for all-cause mortality due to diabetes is 1.9 (95% CI, 1.7-2.3) for women and 2.1 (95% CI, 1.7-2.7) for men.

- Summary estimates for risk of CHD mortality due to diabetes for nonwhite men and women are similar to those for whites.
- The difference in relative risk for CHD outcomes between men and women is progressively attenuated with adjustment for major cardiovascular risk factors. This finding may be due to the fact that women with diabetes have more risk factors or more severe risk factor abnormalities in comparison to women without diabetes than is the case for men with and without diabetes.

Prognostic value of troponin for CHD in women

- We identified eight eligible cohort studies that provided data on 3,169 women and 4,070 men.
- Elevated troponin was observed in 35 percent of women and 39 percent of men with non-ST elevation acute coronary syndromes.
- Women with acute coronary syndromes were older and more likely to have diabetes and hypertension than men.
- An elevated troponin indicates a similar increase in risk of death for both women (summary OR 2.63; 95% CI 1.75-3.95) and men (OR 2.83; 95% CI 1.92-4.17).
- An elevated troponin indicates a greater increase in risk of nonfatal MI for women (summary OR 1.80; 95% CI 1.28-2.54) than men (OR 1.06; 95% CI 0.8-1.41).

Conclusions. The major problem in performing these systematic reviews was that data stratified by sex and race/ethnicity from completed studies are often not available. We recommend that, in addition to requiring participation of women and minorities in research, the National Institutes of Health, U.S. Food and Drug Administration, and other funding and regulatory agencies insist that outcome data by subgroup be published or archived and made easily available to meta-analysts.

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