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Profiles of Coronary Artery Disease in Women

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Abstract

Coronary heart disease is reaching epidemic proportions in women. Therefore, it is important that risk factors in women be recognized and that a correct diagnosis of coronary heart disease be made early. Treatment options should be discussed with each patient and guidelines for prevention of further disease should be established.

Key words: Coronary heart disease, diagnosis, treatment, and prevention.

The purpose of this article is to demonstrate the differences between men and women in the incidence, diagnosis, morbidity, and mortality of coronary artery disease. Coronary artery disease is difficult to diagnose in women because of high false-positive and false-negative stress test results. Therefore, fewer women are sent for therapeutic treatment such as cardiac catheterization. This paper will discuss risk factors, diagnosis, treatment, and prevention of coronary artery disease in women.

Epidemiology

Coronary heart disease is reaching epidemic proportions in women. With increased longevity, more women are living many years in menopause. Coronary artery disease is the leading cause of death among women.¹

Risk factors

The risk of coronary heart disease was highest among smokers who started before the age of 15 years.² On stop-

ping smoking, one third of the excess risk of coronary heart disease was eliminated within two years of cessation. Thereafter, the excess risk returned to the level of those who never smoked during the interval of 10-14 years following the cessation. Women who stop smoking will experience immediate benefit as well as a further long-term decline in excess risk of coronary heart disease to the level of those who never smoked. Risk factors for coronary disease in young women include hypertension, hypercholesterolemia, diabetes mellitus, familial coronary disease, and smoking. Long-term prognosis is excellent for those without advanced diabetes mellitus and renal failure. Risk factors for coronary disease in women are similar to those of men. Despite the risk to women from heart disease, nearly all randomized, controlled studies on risk factors, treatment, and outcomes of cardiovascular disease have exclusively involved men, and an extrapolation of those findings to women has resulted in several misinterpretations. More recent studies that were controlled for different age and risk factors in women found that women have tended to be referred for angiography, coronary artery bypass graft surgery, and angioplasty significantly less often than men. A gender bias may contribute to the lower referral rate for women.³

Role of estrogen in coronary artery disease

The protective effect of endogenous estrogen is commonly believed to explain the gender gap in the risk of coro-

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nary heart disease and the diminished protection in women during menopause.⁴

Diagnosis

Overall, women were referred for cardiac catheterization significantly less often than men (18% vs. 7%, $p=0.03$).⁵ As compared with men, women had a significantly lower pretest probability of coronary artery disease (as estimated by their physician) and a lower rate of positive exercise stress-test results. After accounting for differences in these two factors, sex was not an independent predictor of referral for catheterization. Furthermore, physicians' estimate of evidence found that the physicians were underestimating the risk of coronary disease in women. Furthermore, physicians' predictions did not underestimate the probability of any obstructive coronary disease in men and women who subsequently underwent catheterization. Cardiologists made appropriately lower pretest predictions of categories of disease in women with possible coronary artery disease than in men. These assessments, along with women's lower rate of positive exercise stress-test, rather than bias based on sex, accounted for the lower rate of catheterization among women.⁶

Acute myocardial infarction

Female patients with coronary artery disease have an increased risk for myocardial infarction in the postmenopausal period because the protective effects of estrogen no longer exist. The clinical profile of acute myocardial infarction in women shows that infarction occurs most often in the postmenopausal period (80%).⁷ A history of previous illness is present in 73% of the cases. Risk factors are present in the majority (75%) of the cases. Common risk factors are hypertension (49%) and diabetes mellitus (34%) in the infarction cases. Infarction occurs more commonly in women not using oral contraceptives and it occurs mostly (77%) in multiparous women. The majority of the patients present with typical chest pain. Promonitory symptoms occur in only a few patients (14%). Complications occur more frequently in 40% of the cases. Mortality rate appears to be high (18%); the most common cause of mortality being cardiogenic shock. Women with acute myocardial infarction have a worse prognosis than men, but the excess risk is confined to the first 30 days and is only partly explained by age and other baseline variables.⁸ The tendency for women to receive less vigorous treatment than men must be remedied before gender can be considered to be an independent determinant of risk. Although there are no clinical trials involving women, three female cohort studies of aspirin and prevention of myocardial infarction have been published with conflicting results. Although a general recommendation for asymptomatic women to take aspirin to prevent myocardial infarction is not currently indicated, the best available data suggest a beneficial effect, particularly in women at high risk for coronary artery disease. The clinician should therefore consider aspirin use in each patient individually.⁹

Treatment

Hormone Replacement

Postmenopausal women should consider hormonal replacement, after appropriate counseling that would cover the benefits and risks of this therapy.¹⁰ The exact mechanism of estrogen is still under investigation; however, it has shown to reduce LDL and increase the HDL levels in the patients who take estrogen. The normal regime involves the use of 0.625 mg of conjugated estrogen or its equivalent synthetic estrogen. As unopposed estrogen can lead to endometrial hyperplasia and eventually uterine adenocarcinoma, concomitant use of progesterone is mandatory in patients who have not had a hysterectomy. Recent data suggests that the use of estrogen replacement in menopausal women reduces the incidence of coronary artery disease by 25-50%. There are many proven benefits of hormone replacement therapy, including the prevention of osteoporosis and urogenital atrophy. Decisions about when it is too late to start estrogen, or when it is time to stop it, will need to be made for the individual patient.

Cardiac catheterization

Catheterization and angioplasty rates in men were more than five times higher than those of women. Investigation rates were significantly lower in women than in men. Comparing treatment and outcome of acute myocardial infarction in men and women, it was found that women were older and more often had histories of previous hypertension and previous congestive heart failure. Cardiac catheterization, performed in 88% of women and 87% of men, showed similar rates of 1, 2, and 3 vessel disease and similar characteristics of the infarction-related artery. The differences in hospital mortality between men and women are due to a combination of pre- and in-hospitalization factors in women. The excess mortality is not due to differences in disease severity, as evaluated by cardiac catheterization information.¹¹ Thrombolytic therapy also was used less often in women, although information about eligibility for treatment was not available to determine if this difference was due to treatment bias or differences in eligibility. Both coronary angiography and coronary angioplasty were used less frequently in women. However, of the patients who had coronary angiography, equal proportions of women and men receive angioplasty and/or coronary artery bypass surgery. Hospital mortality was 16% for women and 11% for men, although this difference was diminished by age adjustment. Mortality was higher in women undergoing bypass surgery, but this difference, too, was less apparent after age adjustment. Despite the high levels of risk factors and mortality, coronary angiography and angioplasty were used less often in women. Among those who underwent coronary angiography, there were no gender differences.

Prevention

For menopausal women, it is important to determine a personal profile of unmodifiable (family history, age, and

race) and modifiable risk factors. The goal for every woman must be to control coronary risk factors, such as smoking, hyperlipidemia, diabetes mellitus, sedentary lifestyle, weight control, and stress, and to use hormone replacement therapy, which has been proven to be amenable to modification strategies.¹² Prevention programs can safely recommend nonpharmacologic interventions, such as better diet, more exercise, and not smoking.¹³⁻¹⁵

In all age groups and among patients with a principal diagnosis of anginal or chronic ischemia, men were significantly more likely than women to undergo revascularization in both regions.¹⁶ It has only recently been recognized that there are significant gender effects on heart disease and that women face increasing risks as they age. Findings indicate that over the first postmyocardial infarction year, women had a greater risk of death, cardiac distress, and reinfarction. Cardiac medical care and social disadvantages were found among the postmyocardial infarction women, including less aggressive cardiac care. Differences in treatment of suspected acute cardiac ischemia by sex may be a practice variation, or phenomenon, rather than a uniform bias. When these differences occur, they may represent overtreatment in men, rather than inadequate treatment in women.

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