9th Annual Women's Heart & Vascular Symposium

Acute Coronary Syndrome in Women: An Overview

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For decades, cardiovascular disease—specifically, myocardial infarction (MI)—was thought to be a disease of men. The major acute coronary syndrome (ACS) trials that guide daily clinical practice disproportionately enrolled men, thus promoting this fallacy. Fortunately, the medical literature and the lay media have increasingly recognized that heart disease is the primary cause of death in women and that cardiovascular disease has no sex preference.

Traditional cardiac risk factors of diabetes, smoking, obesity, and hypertension affect the cardiovascular system differently in men and women.[1] In the INTERHEART study of more than 27,000 patients, diabetes increased risk in women 4-fold, but only 2.5-fold in men. In a 12-year follow-up to a Norwegian epidemiologic study, smoking increased a woman's risk more than a man's (relative risk, 3.3 vs 1.9), especially in women 35 to 44 years old (relative risk, 7.1 vs 2.3).[2] Women are thought to be protected from cardiovascular disease, particularly coronary artery disease, by endogenous estrogen, which has wide-ranging effects throughout the circulatory system.[3] Estrogen positively affects the cholesterol profile by increasing high-density lipoproteins and decreasing low-density lipoproteins.[4] Estrogen also relaxes smooth muscle cells, leading to lower blood pressure, and is thought to assist in the body's clearance of cellular free radicals that may otherwise increase inflammatory processes and promote cardiovascular disease.[5]

Loss of the beneficial estrogen effect after menopause may help explain why women present later in life with cardiovascular disease, particularly ACS. Interestingly, replacing estrogen after menopause has not proved beneficial and actually increases cardiovascular risk (both arterial and venous).[6] In the GUSTO IIb (Global Use of Strategies to Open Occluded Arteries in Acute Coronary Syndromes) trial, women who presented with ACS were older and more likely than men to have diabetes, hypertension, and congestive heart failure.[7,8] However, after 70 years of age, these differences became less pronounced, thus supporting the loss-of-estrogen theory.[9]

Women and men with ACS may present with different symptoms. In a large review of patients with ACS, 37% of women and 27% of men reported no chest pain.[10] Women more often reported upper back, neck, or jaw pain; dyspnea; and weakness.

Not recognizing symptoms often delays diagnosis of ACS. However, even after diagnosis, women are less likely than men to be referred for coronary angiography, percutaneous intervention, and fibrinolysis, which delays definitive treatment for many and places the myocardium at further risk. Women also receive less intensive medical therapy both during and after an ACS event. These sex-related factors cumulatively have lasting effects, and post-ACS outcomes are consistently poorer in women than in men.[11]

The pathophysiology of ACS may also differ by sex. Plaque erosion is the most frequent cause of ACS in women; in men, it is plaque rupture.[12] Plaque erosion is seen on intravascular imaging in up to one third of women with ACS, even when no lesions are identifiable angiographically.[12] Plaque rupture, in contrast, is more easily identifiable angiographically.[12] Spontaneous coronary artery dissection (SCAD), an uncommon cause of ACS, occurs almost exclusively in women. In a prospective cohort of patients with SCAD, more than 90% of patients were female; in addition, 25.7% of all patients presented with ST-segment-elevation MI, and 74.3% presented with non-ST-segment-elevation MI.[13] A high degree of suspicion for SCAD is crucial in women with ACS because immediate medical therapy may provide better outcomes than percutaneous coronary intervention.[13] Although there is no consensus on medical therapy for SCAD, most women are treated with aspirin and β-blockers. This

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combination can lower the risk of recurrence, but in approximately 10% of patients, it will not prevent it.[13]

Meanwhile, the medical community continues to raise awareness of cardiovascular disease as the leading cause of death and an important driver of morbidity and mortality in both sexes, with a growing emphasis on the need to study its effects in women. Recognizing sex disparities in the diagnosis and treatment of cardiovascular disease is of the utmost importance.

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