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Estrogen status correlates with the calcium content of coronary atherosclerotic plaques in women.

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Abstract

BACKGROUND: Coronary artery calcium, a radiographic marker for atherosclerosis and a predictor of coronary heart disease (CHD), is less extensive in women than in men of the same age. The role of estrogen in the pathogenesis of coronary artery calcification is unknown. We examined the association of estrogen status with extent of calcification and atherosclerotic plaque in coronary arteries of deceased women.

METHODS: Coronary arteries were obtained at autopsy from 56 white women age 18–98 yr, 46 postmenopausal and 10 premenopausal. Exclusion criteria included patients with coronary stents, coronary artery bypass surgery, and medical-legal cases. Medical records were reviewed for demographics, CHD risk factors, menstrual status, and use of estrogen replacement therapy. Contact microradiography of coronary arteries assessed true calcium content and atherosclerotic plaque area was analyzed histologically.

RESULTS: The coronary arteries from estrogen-treated postmenopausal women had lower mean coronary calcium content ($P = 0.002$), mean plaque area ($P < 0.0001$), and calcium-to-plaque area ratio ($P = 0.004$) than those from untreated menopausal women. Estrogen status, age, diabetes, and hypertension predicted calcium and plaque area by univariate analysis. After controlling for these CHD risk factors, estrogen status remained an independent predictor of both calcium ($P = 0.014$) and plaque area ($P = 0.001$) in all women. Mean calcium area ($P < 0.05$) but not plaque area ($P = 0.44$) was significantly greater in women treated with estrogen replacement therapy than in premenopausal women. Coronary calcium ($P < 0.007$) and plaque area ($P < 0.03$) varied significantly with age in untreated postmenopausal women, but not in the estrogen-treated or premenopausal women ($P = 0.33$).

CONCLUSIONS: Estrogen status is associated with coronary calcium and plaque area independent of age and CHD risk factors. Estrogen may modulate the calcium content of atherosclerotic plaques, as well as plaque area and may slow the progression of atherosclerosis in women.

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