Sex hormone levels may affect heart disease risk in post-menopausal women

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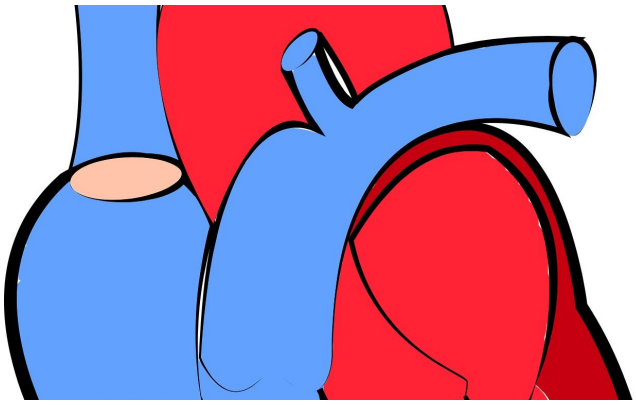

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In post-menopausal women, having a higher blood level of a male hormone (testosterone) and a higher ratio of the male-type to-female type (estrogen) of hormones is associated with a higher risk of heart disease later in life, according to research published today in the *Journal of the American College of Cardiology*.

The risk for cardiovascular disease is much lower in women than men until women reach the age of 50 years of age, then risk rises dramatically after menopause. Previous studies have demonstrated that higher androgen and lower estrogen levels are associated with risk factors for heart disease in post-menopausal women; however, other studies show conflicting results, so the relationship between sex hormones and cardiovascular events in post-menopausal women remains unclear.

In this study, which is one of the largest and among the longest follow up of studies of this kind, researchers used data from the Multi-Ethnic Study of Atherosclerosis (MESA) to evaluate the association of sex hormone levels with incident cardiovascular disease, coronary heart disease and heart failure over a 12-year follow-up in 2,834 post-menopausal women free of cardiovascular disease at baseline.

Sex hormone concentrations were measured using fasting serum samples. Every nine-12 months, participants or their next of kin were interviewed over the telephone regarding hospital admissions, outpatient cardiovascular diagnoses and procedures, and death. Hospital records were obtained for 98 percent of reported hospitalized cardiovascular disease events and some medical record-based information was obtained for 95 percent of outpatient encounters.

A higher testosterone to estradiol ratio was associated with an elevated risk for incident cardiovascular disease, coronary heart disease and heart failure. Higher total testosterone was associated with an increased risk for coronary heart disease and total cardiovascular disease (defined as coronary disease plus stroke events), while higher estradiol levels were associated with a lower risk of coronary heart disease. Additionally, the risk for cardiovascular disease and coronary heart disease were approximately linear across the range of total testosterone, testosterone to estradiol ratio and estradiol levels, but there was a U-shaped associated between testosterone to estradiol ratio and heart failure with the extreme ends at a higher risk for heart failure.

"Although sex hormone levels may be linked to future cardiovascular events, it is unclear what the best intervention is to modify sex hormone levels for risk reduction," said Erin D. Michos, MD, MHS, associate professor of medicine at the Johns Hopkins University School of Medicine and senior author on the study. "However, a sex hormone profile higher in male hormones may identify a woman at higher risk for cardiovascular disease who may benefit from other risk reduction strategies."

In an accompanying editorial comment, Virginia M.

Miller, Ph.D. professor of physiology and surgery and director of the Mayo Clinic Women's Health Research Center writes that while this study provides new insight into relationships and endogenous hormones and cardiovascular events, more research is needs to better understand the "complex hormonal environment affecting cellular and organ functions involved in the development and progression of cardiovascular disease in women as they age."

Miller said, "Defining cardiovascular risk for women should account for individualized profiles of genetic variants in enzymes associated with steroid metabolism, uptake and receptors in conjunction with risk for specific cardiovascular pathologies. This approach is precision medicine."

More information: *Journal of the American College of Cardiology* (2018). DOI: 10.1016/j.jacc.2018.01.083

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