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The Menopause Society™
Leading the Conversation

New Study Identifies Potential Predictive Biomarker for Sarcopenia in Midlife Women

Low creatinine-to cystatin C ratio associated with lower muscle volumes and poorer gait speeds

CLEVELAND, Ohio (March 19, 2025)—Menopause is associated with a decline in estrogen, which increases visceral fat mass and decreases bone density, muscle mass, and muscle strength. This can lead to immobility and related health problems. A new study suggests there may be an easy way to predict which women are most at risk—low creatinine-to-cystatin C ratios. Results of the study are published online today in *Menopause*, the journal of The Menopause Society.

Women are more vulnerable to decline in muscle mass and function after menopause. Not only does that make them frailer, but it also increases their risk of developing other adverse health outcomes such as diabetes, malnutrition, and mortality. Losing muscle function can seriously affect a woman's quality of life and ability to live independently. It can also create a significant financial burden.

To date, muscle mass is most accurately measured with 3D-imaging technologies, such as magnetic resonance imaging (MRI). The problem is that these tests are expensive and rely on highly trained staff to compute highly technical calculations. Other types of available diagnostics, such as measures of handgrip strength and physical performance, are time-consuming and require specially trained personnel. There is a need for simpler and more practical methods that can simultaneously assess total skeletal muscle mass and function.

Researchers in a new study that followed nearly 900 women over 6.6 years suggested that a woman's creatinine-to-cystatin C ratio (CCR) might be associated with muscle volume and gait speeds. They found very limited research in this area because there did not appear to be any relevant studies previously conducted.

Creatinine is generated by skeletal muscles as a waste product of muscle metabolism. It is typically filtered through the kidneys and excreted in urine and provides the energy transfer mechanism for muscle contraction. Cystatin C is a protein produced by cells in the body.

On completion of their study, the researchers concluded that, together, creatinine and cystatin C provided a reliable biomarker of total skeletal muscle mass and function that is independent of kidney function. They assessed MRI-measured muscle volumes, as well as muscle strength, using multiple measures. Their findings showed that a low CCR at baseline was associated with lower fat-free muscle volumes and poorer gait speeds 6 years later.

Survey results are published in the article "Low creatinine to cystatin C ratio is associated with lower muscle volumes and poorer gait speeds in the longitudinal Integrated Women's Health Program cohort."

“Because both muscle volume and poorer gait speed are constituents of current diagnostic criteria of sarcopenia, CCR may be a tool to help identify midlife women at risk of developing early sarcopenia and associated probability of adverse health outcomes. Regardless of baseline risk, all midlife women should strive to mitigate loss of muscle mass with regular resistance training and adequate dietary protein intake to help prevent frailty as they age,” says Dr. Stephanie Faubion, medical director for The Menopause Society.

For more information about menopause and healthy aging, visit www.menopause.org.

The Menopause Society (formerly The North American Menopause Society) is dedicated to empowering healthcare professionals and providing them with the tools and resources to improve the health of women during the menopause transition and beyond. As the leading authority on menopause since 1989, the nonprofit, multidisciplinary organization serves as the independent, evidence-based resource for healthcare professionals, researchers, the media, and the public and leads the conversation about improving women’s health and healthcare experiences. To learn more, visit menopause.org.