Cardio fitness levels of breast cancer patients may affect survival

May 23 2012

Women receiving care for breast cancer have significantly impaired cardio-pulmonary function that can persist for years after they have completed treatment, according to a study led by scientists at Duke University Medical Center.

The findings, reported online in the Journal of Clinical Oncology, also provide initial evidence that poor cardio-pulmonary function may be a strong predictor of survival among women with advanced breast cancer.

"We know that exercise tolerance tests, which measure cardiopulmonary function, are among some of the most important indicators of health and longevity in people who do not have cancer; however, relatively little research has been done assessing the clinical importance of these tests in patients with cancer," said Lee Jones, PhD, associate professor at Duke and lead author of the study. "Our work provides initial insights into the effects a cancer diagnosis and subsequent therapy may have on how the heart, lungs and rest of the body work together during exercise."

Treatment regimens for breast cancer have saved lives, contributing to a decline in death rates of about 2.2 percent a year since 1990. But successful treatments often come at a heavy price to the cardiopulmonary system, including the lungs, heart, blood, and skeletal muscle.

Certain types of chemotherapy can impair the heart's pumping function, reduce the ability of red blood cells to carry oxygen throughout the body,

and diminish the ability of muscle cells to work efficiently. Patients may also experience secondary effects of therapy, becoming less active and gaining weight, which can also impair cardiopulmonary function.

To begin to understand the direct and indirect effects of therapy on breast cancer patients, Jones and his colleagues examined cardiopulmonary function at rest and during exercise in 248 women in various stages of treatment for breast cancer. All completed a carefully controlled cardio-pulmonary exercise test on a stationary bike, which escalated until the patients reached maximum exertion. At that point, the researchers took a measurement called VO2-peak, the gold standard assessment of cardiopulmonary function that athletes use to measure fitness levels and design training programs.

The researchers found that women with breast cancer, regardless of treatment status, had significantly worse cardio-pulmonary function than healthy women of the same age who were sedentary. Even among patients who had completed cancer therapy years previously, cardiopulmonary function levels were markedly impaired, suggesting that fitness levels may not recover after therapy. More striking, approximately a third of women in the study had a cardiopulmonary function score below the threshold that suggests people can function independently – do household tasks, walk up and down stairs, or walk a half mile.

Among the patients with advanced breast cancer, median survival was significantly longer for women with higher cardiopulmonary function. Median survival was 36 months in high-fitness patients vs. 16 months in the low-fitness patients.

"Fitness level may be an important biomarker of survival among cancer patients," Jones said. "But the beautiful thing about fitness is that we can improve it with exercise training. Although we currently do not know if

improving fitness in cancer patients is associated with longer survival, our data provides initial evidence to pursue this question."

Jones said the findings of this study indicate that exercise may be a good intervention for cancer patients both during and after therapy. His team at Duke has several studies underway examining the effects of exercise training on women with breast cancer, plus patients with other cancers.

Provided by Duke University Medical Center