Genetic factors may predict depression in heart disease patients

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Individuals with heart disease are twice as likely to suffer from depression as the general population, an association the medical community has largely been unable to explain. Now, a new study by researchers at The Miriam Hospital, in conjunction with The Montréal Heart Institute, University of Montréal and McGill University, reveals there may be genetic variations that contribute to depression in heart disease patients.

According to the study, published in the April issue of the *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, the genes are related to the vascular system, suggesting that vascular health - which includes the body's network of blood vessels, arteries and veins - may be a predictor of depression in individuals with heart disease. This is the first large-scale genetic study of depressive symptoms in cardiac patients.

"Depression can significantly impact quality of life for heart disease patients and can increase the risk for additional cardiac events or even death," said lead author Jeanne M. McCaffery, PhD, of The Miriam Hospital's Weight Control and Diabetes Research Center. "Although it's too early to begin to speculate about the possible clinical implications of these findings, it's intriguing to think that there may be a genetic explanation as to why people with heart disease are more susceptible to depression."

Researchers say several mechanisms have been suggested to account for

the greater prevalence of depression among cardiac patients, including the stress of a poor prognosis and systemic inflammation, although little attention has been paid to date about the possibility of a genetic cause. According to previous studies, approximately 15 to 20 percent of heart disease patients experience depression, with the highest rates seen among those who recently experienced a cardiac event. In contrast, depression affects about seven percent of the general population in the United States.

The current study focused on 977 patients with cardiovascular disease who had either a 50 percent or higher blockage in at least one major coronary artery or a documented heart attack. Of these patients, 21 percent were female and the average age was 59 years. Symptoms of depression were measured using a standardized self-reported questionnaire recommended by the National Heart, Lung and Blood Institute (NHLBI).

Researchers targeted 59 different candidate genes because of their relevance to a biological pathway of interest or their prior association with depression in medical literature. The genes include those related to inflammation; platelet aggregation, or clumping; endothelial function involving the cells that line the inner surface of blood vessels; and omega-3 fatty acid metabolism, which can affect the hardening of the arteries.

Following genotyping and statistical analyses, the research team discovered that genetic variations involving endothelial dysfunction - a hallmark for vascular diseases, such as atherosclerosis - and platelet aggregation appear to contribute to depressive symptoms.

Specifically, they identified one marker within the vonWillebrand factor (vWF) gene that appears to have a significant association. vWF is a protein produced by the endothelium that is critical to the initial stages

of blood clotting by helping platelets stick to damaged blood vessels. When elevated in concentration, VWF is a strong predictor of endothelial dysfunction and a risk factor for atherosclerosis.

"Although further study is needed, our findings suggest that endothelial dysfunction may be a novel mechanism contributing to depressive symptoms among heart disease patients," said McCaffery, who is also an assistant professor of psychiatry and human behavior at The Warren Alpert Medical School of Brown University.

Researchers note that the candidate gene approach used in the study is limited by the current knowledge of the biology of depression in cardiac patients. They call for genome-wide association studies - which involve the study of genetic variations across the entire human genome - to further identify other genes and pathways that may be associated with depression and heart disease.

Source: Lifespan (news : web)