Medical Xpress

Stem cell therapy improves outcomes in severe heart failure

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A new stem cell therapy significantly improved long-term health outcomes in patients with severe and end-stage heart failure in a study presented at the American College of Cardiology's 65th Annual Scientific Session.

Among 109 patients randomized to receive the cell therapy or a placebo, those receiving the cell therapy, which involved extracting stem cells from a patient's own bone marrow, showed a 37 percent lower rate of the trial's primary endpoint, a composite of deaths, cardiovascular hospitalizations and clinic visits for sudden worsening of heart failure symptoms, over a 12-month period.

"To date, this is the largest double-blind, placebo-controlled stem cell trial for treatment of heart failure to be presented," said Timothy Henry, M.D., director of cardiology at Cedars-Sinai Heart Institute and one of the study's lead authors. "Based on these positive results, we are encouraged that this is an attractive potential therapy for patients with class III and class IV heart failure."

Heart failure, which affects an estimated 5.1 million people in the United States, is a condition in which the heart progressively weakens and cannot pump enough blood to meet the body's needs. Those with severe and end-stage heart failure—known as class III and IV heart failure on a scale developed by the New York Heart Association—often have no treatment options apart from a heart transplant or a left ventricular assist device, a heart pumping machine given to patients as a

temporary measure while they await a heart transplant.

The study was a phase 2 clinical trial for a new stem cell therapy known as ixmyelocel-T. Using this technique, a doctor extracts a sample of bone marrow from a patient, processes it for two weeks to "enhance" it by increasing the number of beneficial stem cells, and then injects the processed bone marrow product into the same patient's heart muscle. The goal of the procedure is to strengthen the heart by increasing the number of functioning heart muscle cells, an approach known broadly as regenerative therapy.

"We have a major unmet need for treating class III and IV heart failure," Henry said. "I think this trial provides strong evidence that regenerative therapies are very promising for this group of people, who currently have limited options."

The trial enrolled 109 patients with class III or IV heart failure resulting from ischemic cardiomyopathy, a type of heart failure that is related to restricted blood flow from a heart attack or coronary artery disease. Roughly half, 58 patients, were randomly assigned to receive intramyocardial ixmyelocel-T treatment, and 51 patients were assigned to receive a placebo. Patients in the control group underwent a bone marrow extraction and received a placebo injection two weeks later.

After 12 months of follow-up, the composite primary endpoint was seen in 38 percent of patients given the stem cell therapy, a significantly lower proportion than the 49 percent of patients experiencing the primary endpoint in the control group.

"Percutaneous intramyocardial delivery of this enhanced bone marrow product resulted in a significant reduction in cardiovascular clinical events compared to placebo," Henry said. "This is an exciting result and pushes us to do a larger trial to confirm this reduction in events."

Secondary endpoints included each of the endpoints within the composite primary endpoint, along with the total number of clinical events and assessments of patients' heart function and quality of life. The stem cell therapy was associated with beneficial results for most of these secondary outcomes, although the trial was not large enough to show statistical significance for these secondary findings.

Among patients given stem cell therapy, 3.4 percent died and 37.9 percent were hospitalized with cardiovascular problems, as compared to 13.7 percent and 49.0 percent, respectively, in the placebo group. Patients given stem cell therapy also had, on average, a longer amount of time until their first adverse event. Other measures of heart function and quality of life, including a walking endurance test and a measurement of the amount of blood pumped out of the left ventricle with each contraction, also suggested improvements in the group receiving ixmyelocel-T.

The trial builds upon lessons learned from previous smaller-scale stem cell studies, which have mostly shown modest improvements in outcomes for heart failure. Past trials with ixmyelocel-T have shown better results in patients with ischemic cardiomyopathy than in those with nonischemic cardiomyopathy, a form of heart disease that is caused by heart muscle disorders, so the new trial enrolled only patients with ischemic cardiomyopathy. In addition, previous studies have shown greater success with procedures in which the stem cells are injected percutaneously via the groin compared with open-heart surgery, so the new trial used a percutaneous approach.

A key limitation of the new trial is its modest size. Henry said the next step is to expand the investigation of percutaneous, intramyocardial ixmyelocel-T treatment in a larger sample of heart failure patients with ischemic cardiomyopathy.

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