

Adult stem cells may be beneficial for certain cardiovascular disorders and autoimmune diseases

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A review of previously published research suggests that stem cells harvested from an adult's blood or marrow may provide treatment benefit to select patients for some autoimmune diseases and cardiovascular disorders, according to an article in the February 27 issue of JAMA.

In broad terms, there are two types of stem cells, embryonic stem cells and adult stem cells. Human embryonic stem cells are isolated from a 4- to 5-day-old postfertilization blastocyst (an early form in the development of an embryo). Adult stem cells are located in tissues throughout the body and function as a reservoir to replace damaged or aging cells. Stem cell therapy is rapidly developing and shows great promise, "but clinical application has lagged due to ethical concerns or difficulties in harvesting or safely and efficiently expanding sufficient quantities. In contrast, clinical indications for blood-derived (from peripheral or umbilical cord blood) and bone marrow-derived stem cells, which can be easily and safely harvested, are rapidly increasing," the authors write.

Richard K. Burt, M.D., of the Northwestern University Feinberg School of Medicine, Chicago, and colleagues conducted a review of articles regarding clinical indications and outcomes for use of blood- and bone marrow-derived stem cells. A search of databases identified 323 reports that were examined for feasibility and toxicity, and 69 that were

evaluated for outcomes. These studies were published between January 1997 and December 2007.

For autoimmune diseases, 26 reports representing 854 patients reported treatment-related mortality of less than one percent (2/220 patients) for nonmyeloablative (not causing bone marrow suppression), less than two percent (3/197) for dose-reduced myeloablative, and 13 percent (13/100) for intense myeloablative regimens, i.e., those including total body irradiation or high-dose busulfan (a drug used in the treatment of some types of chronic leukemia).

“While all trials performed during the inflammatory stage of autoimmune disease suggested that transplantation of hematopoietic [formation of blood or blood cells] stem cells (HSCs) may have a potent disease-remitting effect, remission duration remains unclear, and no randomized trials have been published,” the researchers write.

For reports involving cardiovascular diseases, including 17 reports involving 1,002 heart attack patients, 16 reports involving 493 patients with chronic coronary artery disease, and three meta-analyses, the evidence suggested that stem cell transplantation performed in patients with coronary artery disease may contribute to modest improvement in cardiac function.

“Stem cells harvested from blood or marrow, whether administered as purified HSCs or mesenchymal [cells that develop into connective tissue, blood vessels and lymphatic tissue] stem cells or as an unmanipulated or unpurified product can, under appropriate conditions in select patients, provide disease-ameliorating effects in some autoimmune diseases and cardiovascular disorders. Clinical trials are needed to determine the most appropriate cell type, dose, method, timing of delivery, and adverse effects of adult HSCs for these and other nonmalignant disorders,” the authors conclude.

Source: JAMA and Archives Journals

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