Neurologic improvement detected in rats receiving stem cell transplant

February 10 2012

In a study to be presented today at the Society for Maternal-Fetal Medicine's annual meeting, The Pregnancy Meeting, in Dallas, Texas, researchers will report that early transplantation of human placenta-derived mesenchymal stem cells into the lateral ventricles of neonatal rats with birth-related brain damage is possible, and that the donor cells can survive and migrate in the recipient's brain. The study was designed to have the rat's brain damage mimic brain injury in infants with very low birth weight.

One of the major causes of neonatal brain damage is preterm delivery. Despite enormous efforts to prevent it, brain injury accounts for a major part of the clinical problems experienced by survivors of premature birth. The enormity of this problem is indicated by the occurrence of: cognitive, behavioral, attention related and/or socialization deficits in twenty-five to fifty percent of cases in this group; and major motor deficits in five to ten percent of cases in this group.

The majority of neonatal encephalopathy cases are found in infants with a very low birth weight, and include both hypoxia-ischemia and inflammation, a double-hit. Approximately 63,000 infants are born in the United States with a very low birth weight (one to five percent of all live births). In order to understand the effect of such a double-hit insult in very premature infants, this study, Early Intracranial Mesenchymal Stem Cell Therapy After a Perinatal Rat Brain Damage, was undertaken to investigate the neuroprotective effects of mesenchymal stem cells therapy on postnatal rats, whose injury was designed to mimic brain

injury in infants with a very low birth weight.

"Stem cells are a promising source for transplant after a brain injury because they have the ability to divide throughout life and grow into any one of the body's more than 200 cell types, which can contribute to the ability to renew and repair tissues," said Martin Müller, MD, with the University of Bern, Obstetrics and Gynecology, Bern, Switzerland, and one of the study's authors. "In our study, the donor cells survived, homed and migrated in the recipient brains and neurologic improvement was detected."

Assessment of the post-experiment brain damage indicated a neuroprotective effect of mesenchymal stem cell transplantation and a combination of mesenchymal stem cell and erythropoietin (a modulator substance the subjects received on postnatal days six, seven and eight) therapy.

In addition to Müller, the study was conducted by Andreina Schoeberlein, Ursula Reinhart, Ruth Sager and Marianne Messerli, University of Bern, Obstetrics and Gynecology, Bern, Switzerland; and Daniel Surbek, University Hospital of Bern, Obstetrics and Gynecology, Bern, Switzerland.

More information: A copy of the abstract is available at www.smfmnewsroom.org/annual-me … 1-meeting-abstracts/

Provided by Society for Maternal-Fetal Medicine