Stem Cell Transplant Shows “Landmark” Promise for Treatment of Degenerative Disc Disease: Mayo Clinic

March 7, 2014, Phoenix, AZ -- Stem cell transplant was viable and effective in halting or reversing degenerative disc disease of the spine, a meta-analysis of animal studies showed, in a development expected to open up research in humans. Recent developments in stem cell research have made it possible to assess its effect on intervertebral disc (IVD) height, Mayo Clinic researchers reported in a scientific poster today at the 30th Annual Meeting of the American Academy of Pain Medicine.

“This landmark study draws the conclusion in pre-clinical animal studies that stem cell therapy for disc degenerative disease might be a potentially effective treatment for the very common condition that affects people’s quality of life and productivity,” said the senior author, Wenchun Qu, MD, PhD, of the Mayo Clinic in Rochester, Minn.

Dr. Qu said not only did disc height increase, but stem cell transplant also increased disc water content and improved appropriate gene expression. “These exciting developments place us in a position to prepare for translation of stem cell therapy for degenerative disc disease into clinical trials,” he said.

The increase in disc height was due to restoration in the transplant group of the nucleus pulposus structure, which refers to the jelly-like substance in the disc, and an increased amount of water content, which is critical for the appropriate function of the disc as a cushion for the spinal column, the researchers concluded.

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The researchers performed a literature search of MEDLINE, EMBASE and PsycINFO databases and also manually searched reference lists for original, randomized, controlled trials on animals that examined the association between IVD stem cell transplant and the change of disc height. Six studies met inclusion criteria. Differences between the studies necessitated the use of random-effects models to pool estimates of effect.

What they found was an over 23.6% increase in the disc height index in the transplant group compared with the placebo group (95% confidence interval [CI], 19.7-23.5; p < 0.001). None of the 6 studies showed a decrease of the disc height index in the transplant group. Increases in the disc height index were statistically significant in all individual studies.

The authors commented that it is time to turn attention to the much-needed work of determining the safety, feasibility, efficacy of IVD stem cell transplant for humans.

“A hallmark of IVD degenerative disease is its poor self-repair capacity secondary to the loss of IVD cells. However, current available treatments fail to address the loss of cells and cellular functions. In fact, many invasive treatments further damage the disc, causing further degeneration in the diseased level or adjacent levels,” said the lead study author Jason Dauffenbach, DO. “The goal of tissue engineering using stem cells is to restore the normal function and motion of the diseased human spine.”

(correspondence to: Wenchun Qu, email: qu.wenchun@mayo.edu)

Poster 216 – Intervertebral Disc Stem Cell Transplant is Associated with Increases in Disc Height—A Meta-Analysis of Animal Randomized, Controlled Trials

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