Stem cell therapy following meniscus knee surgery may reduce pain, restore meniscus

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A single stem cell injection following meniscus knee surgery may provide pain relief and aid in meniscus regrowth, according to a novel study appearing in the January issue of the *Journal of Bone and Joint Surgery* (*JBJS*).

More than one million knee arthroscopy procedures are performed each year in the U.S. primarily for the treatment of tears to the meniscus – the wedge-shaped pieces of cartilage that act as "shock absorbers" between the thighbone and shinbone in the knee joint.

In the first-of-its-kind study, "Adult Human Mesenchymal Stem Cells (MSC) Delivered via Intra-Articular Injection to the Knee, Following Partial Medial Meniscectomy," most patients who received a single injection of adult stem cells following the surgical removal of all or part of a torn meniscus, reported a significant reduction in pain. Some patients?24 percent of one MSC group and 6 percent of another?experienced at least a 15 percent increase in meniscal volume at one year. There was no additional increase in meniscal volume at year two.

"The results demonstrated that high doses of mesenchymal stem cells can be safely delivered in a concentrated manner to a knee joint without abnormal tissue formation," said lead study author C. Thomas Vangsness, Jr., MD. "No one has ever done that before." In addition, "the patients with arthritis got strong improvement in pain" and some experienced meniscal regrowth.

Specific Study Details

The study involved 55 patients, ages 18 to 60, who underwent a partial medial meniscectomy (the surgical removal of all or part of a torn meniscus) at seven medical institutions. Patients were randomly placed in one of three treatment groups: Group A patients (18) received a "low-dose" injection of 50 million stem cells within seven to 10 days after meniscus surgery; Group B patients (18), a higher dose of 100 million stem cells; and the "control group (19)," sodium hyaluronate only. Patients were assessed to evaluate safety, meniscus regeneration through MRI and X-ray images, overall condition of the knee joint and clinical outcomes through two years. While most of the patients had some arthritis, patients with severe (level three or four) arthritis, in the same compartment as the meniscectomy, were excluded from the study.

Key Study Findings

- There was no abnormal (ectopic) tissue formation or "clinically important" safety issues identified.
- There was "significantly increased meniscal volume," determined by an MRI in 24 percent of the patients in the low-dose injection group (A) and six percent of the high-dose injection group (B) at one year. There was no statistical increase in meniscal volume at two years.
- No patients in the control group (non-MSC group) met the 15 percent threshold for increased meniscal volume.
- Patients with osteoarthritis experienced a reduction in pain in the stem cell treatment groups; there was no reduction in pain in the control (non-MSC group).

"The results of this study suggest that mesenchymal stem cells have the potential to improve the overall condition of the knee joint," said Dr. Vangsness. "I am very excited and encouraged" by the results. With the success of a single injection, "it begs the question: What if we give a series of injections?"

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