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Human umbilical cord blood-derived mesenchymal stem cell implantation for osteoarthritis of the knee.

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Abstract

INTRODUCTION: This study aimed to investigate the clinical outcomes after human umbilical cord blood-derived mesenchymal stem cell (hUCB-MSC) implantation for medial compartment (MC) osteoarthritis of the knee.

MATERIALS AND METHODS: Inclusion criteria were patients older than 60 years, with a kissing lesion of the MC, a full-thickness chondral defect $\geq 4 \text{ cm}^2$ of the medial femoral condyle (MFC), and a varus deformity $\geq 3^\circ$ on a long cassette scanogram. The mean age was 64.9 ± 4.4 years and the mean chondral defect of the MFC was $7.2 \pm 1.9 \text{ cm}^2$. A mixture of sodium hyaluronate and hUCB-MSC was implanted into the chondral defect and a high tibial osteotomy was performed in all patients. International Knee Documentation Committee (IKDC), visual analog scale (VAS), and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores were evaluated preoperatively and 1 year and 2 years postoperatively. Cartilage regeneration

was evaluated in 14 (56%) patients by second-look arthroscopy at 1 year postoperatively.

RESULTS: Twenty-five patients underwent hUCB-MSC implantation. IKDC, VAS, and WOMAC scores at 1 year and 2 years improved significantly compared to preoperative scores. These scores at 1 year and 2 years were not significantly different between the body mass index (BMI) < 25 group and BMI ≥ 25 group. However, the < 65-year-old group showed superior IKDC scores at 1 year and 2 years and VAS score at 2 years than the ≥ 65-year-old group. Younger age and larger size of the chondral defect were associated with a significantly greater improvement in IKDC, VAS and WOMAC scores at 2 years. Second-look arthroscopy demonstrated International Cartilage Repair Society-Cartilage Repair Assessment grade I in six (42.9%) patients and grade II in eight (57.1%).

CONCLUSIONS: hUCB-MSC implantation regenerated cartilage satisfactorily and showed satisfactory clinical outcomes in patients older than 60 years who had MC osteoarthritis.

KEYWORDS: Mesenchymal stem cell; Osteoarthritis; Second-look arthroscopy; Umbilical cord blood

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