Cartilage. 2013 Apr; 4(2): 144–152.

Intraarticular Administration of Dexamethasone after Mesenchymal Stem Cells Implantation Does Not Improve Significantly the Treatment of Preestablished Full-Thickness Chondral Defect in a Rabbit Model.

Maximiliano Espinosa, Alex Vaisman, Nicolas Nazal, David Figueroa, Marcela Gallegos and Paulette Conget·

Abstract

Objective: The aim of this study was to evaluate the contribution to hyaline cartilage regeneration of dexamethasone intraarticular administration after autologous mesenchymal stem cells (MSCs) implantation into a preestablished knee full-thickness chondral defect.

Design: Full-thickness chondral defects of 4.5 × 4.5 mm^2 were surgically made in both medial femoral condyles of adult male New Zealand rabbits. Two weeks later, autologous *ex vivo* expanded bone marrow–derived MSCs were embedded in hyaluronic acid and implanted into the chondral defects. Immediately and every week after the intervention, dexamethasone 0.25 mg/kg was intraarticularly administered (MSC/dexa-treated group). Six weeks after MSC transplantation, the animals were euthanized and condyles were characterized molecularly according to aggrecan, collagen type II, and collagen type I gene expression (quantitative reverse transcriptase-polymerase chain reaction) and histologically (hematoxylin–eosin staining). Data of MSC/dexa-treated condyles were compared with untreated, dexa-treated, MSC-treated, or normal unlesioned condyles.

Results: The ratio between collagen type II expression versus collagen type I expression in MSC/dexa-treated condyles was higher than one, even though the group mean value was not statistically different from that of untreated defects. Histological changes were observed between MSC/dexa-treated and untreated defects mainly in surface regularity and in hyaline matrix abundance. However, International Cartilage Repair Society score analysis did not support robust differences between those groups.

Conclusion: Intraarticular administration of dexamethasone after autologous MSC implantation into a preestablished full-thickness chondral defect does not contribute significantly to the regeneration of a tissue with molecular and histological characteristics identical to hyaline cartilage.