

Abstract

The thesis describes the application of cultured bone marrow stem cells in the therapy of focal chondral defect of the knee joint. In the experimental part of the work, the goal was to quantitatively and qualitatively compare two sampling sites of bone marrow monocytic aspirates, the iliac crest bone and the proximal tibia, in order to determine a suitable cell source for advanced cell therapy. The sample analysis showed that the amount of monocytic cells and the yield of stem cells from the aspirate obtained were significantly higher in the bone marrow from the iliac crest. We did not find significant qualitative differences between the two sources of stem cells. In the clinical part of the work, I present a description of the surgical procedure and the results of a 1-year follow-up of patients after the implantation of cultured stem cells from the bone marrow, under the name BiCure[®] orthoMSCp (Bioinova, Prague, Czech Republic), fixed on a commercially available 3D scaffold Chondrotissue[®] (BioTissue AG, Geneva, Switzerland) using coagulated autologous platelet-rich plasma. The primary objective of the clinical study included the evaluation of the short-term and long-term safety of the applied medical product. The secondary objective of the work included the assessment of the effectiveness of the therapy using a questionnaire survey and the assessment of structural changes in the treated defect using magnetic resonance 1 year after the operation. The work demonstrates the safety and very good clinical result of the treatment of a focal cartilaginous defect of the knee joint using cultured stem cells from the bone marrow.

Key words

bone marrow, cartilage defect, cell therapy, mesenchymal stem cells, knee joint