Combination of intra-articular autologous activated peripheral blood stem cells with growth factor addition/preservation and hyaluronic acid in conjunction with arthroscopic microdrilling mesenchymal cell stimulation
Improves quality of life and regenerates articular cartilage in early osteoarthritic knee disease.

Turajane T, Chaweewannakorn U, Larbpaiboonpong V, Aojanepong J, Thitiset T, Honsawek S, Fongsarun J, Papadopoulos KI.

Abstract

BACKGROUND: Trauma or osteoarthritis (OA) create articular cartilage defects that cannot efficiently heal, thus leading to significant long-term disability. Failed conservative treatment in cartilage diseases is a known condition that necessitates repair attempts but current methods are inadequate. Recent studies in OA animal models and humans, showed articular cartilage regeneration following combinations of drilling, adult stem cells, and intra-articular hyaluronic acid.

OBJECTIVE: In the present series, the authors evaluated the combination of repeated intra-articular (IA) autologous activated peripheral blood stem cells (AAPBSC) with growth factor addition/preservation (GFAP) along with hyaluronic acid (HA) in conjunction with arthroscopic microdrilling mesenchymal cell stimulation (MCS) in early osteoarthritic knee disease that failed conservative treatment.

MATERIAL AND METHOD: Four women and one man (median age 56, range 52-59 years) that failed conservative treatment were enrolled. Arthroscopic MCS was performed once in all patients with subsequent IA injection of AAPBSC with GFAP along with IA-HA intra-operatively, repeated at days 7 and 14. The patients were evaluated by WOMAC and KOO scores at baseline, one, and six months. Cancellous bone biopsies were performed to investigate cell attachment, proliferation, and differentiation by electron microscopy and histological staining.

RESULTS: All patients improved significantly in WOMAC and KOO scores at one and six months compared to baseline. No adverse effects were seen during the AAPBSC harvesting, arthroscopy and/or IA injections. One month post-surgery, all pain medications could be withdrawn. Electron microscopy scanning revealed cell attachment and proliferation while histological analysis demonstrated that the cell layer on the cancellous scaffold showed increased proteoglycan and glycosaminoglycan content indicating hyaline cartilage presence.

CONCLUSION: The combination of intra-articular (IA) autologous activated peripheral blood stem cells (AAPBSC) with growth factor addition/preservation (GFAP) along with hyaluronic acid (HA) in
conjunction with arthroscopic microdrilling mesenchymal cell stimulation (MCS) resulted in Quality of Life improvements measured by WOMAC and KOO scores and succeeded in regenerating articular cartilage in early osteoarthritic knee disease that failed conservative treatment. Further controlled studies are warranted to confirm the above results in larger groups.

PMID: 23745314 [PubMed - indexed for MEDLINE]