ÖGO Symposium

Österreichische Gesellschaft für Orthopädie und orthopädische Chirurgie

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Regenerative Medizin am Bewegungssystem

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Treatment of Spinal cord injury with autologous bone marrow-derived mononuclear cells.

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Background: As many as 500 000 people suffer spinal cord injury each year, the condition affects mainly the most productive sector of the population (1). Despite advances in pre-hospital care, medical and surgical management, and rehabilitation approaches, many SCI sufferers still experience substantial neurological disability (2). Since the last decade the use of stem cell therapies, in particular bone marrow-derived stem cells that include hematopoietic and mesenchymal stem cells had been promoted. This cells secrete all kind of factors, which influence the direct environment of injured cells inducing neuroprotection by inflammation suppression together with neuroregeneration, allowing the reconstruction of totally damaged tissues and preventing partially damaged cells from evolving to cell demise (3,4). The mechanisms known are the stimulation of neovascularization and increase oxygenation, transdifferentiate into specific neuronal cells, promotion of synaptic connections and promotion of neuroplasticity (5–8). Several studies had been publish with positive results in acute and chronic patients (9).

Objective: Our principal aim was to prove the safety and effectiveness of the Neuron Point-Of-Care Stem Cell Therapy (N-POCST), an autologous bone marrow-derived mononuclear cells transplantation and bone marrow-derived plasma after an on-site separation by a closed system and reinfusion in the cerebrospinal fluid by a regular lumbar puncture. The study was performed under the condition of "Unproven intervention in Clinical Practice" described in the Ethical Principles for Medical Research Involving Human Subjects of the World Medical Association of Helsinki Declaration.

Method: The study was an open label pilot study in 61 patients with spinal cord injury. The primary endpoint was to document adverse effects and establish the safety profile of the intervention. The secondary endpoint was to evaluate the effects of N-POCST on functional impairment.

Results: After 6 months follow-up 62% of the patients improved muscular strength, 50% improved spasticity, 50% improved sensibility 37% improved bladder control and 93% referred a better general health status.

Conclusions: The method is safe and feasible and consistent with the effectiveness published before related to cell therapies.

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Transforming osteoarthritic chondrocytes to a better phenotype – assisted by human serum derivates

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Purpose:
Articular cartilage is an avascular tissue that is limited by its poor healing capacity to restore tissue damage from sports injuries or trauma, ultimately ensuring an instability and loss of mobility in the joint tissue leading to osteoarthritis. Autologous chondrocyte implantation (ACT) involves a surgical intervention by implantation of autologous cells that are cultivated in vitro. Confronting the problem that occurs during in vitro expansion onto 2D cell culture substrates is to overcome the state of dedifferentiation. In our current study, we investigated the proliferation rate and the preservation of the chondrogenic lineage of human osteoarthritic chondrocytes in monolayer culture.

Methods:
Human articular chondrocytes were isolated from osteoarthritic (OA) cartilage by enzymatic digestion and expanded in medium containing 10% FCS (control) for 30 days as P0 Cells were passaged and cultured as P1 where the medium is switched to 10% platelet-rich plasma (PRP) or 10% serum from platelet-rich fibrin (SPRF) for a further 3 days and maintained at normoxic (20% O2) or hypoxic (1% O2) conditions. Cell proliferation was measured by an XTT assay, and the chondrogenic differentiation potential was determined with RT-qPCR for chondrogenic gene expression markers COL2A1 (collagen type II, alpha 1) and COL1A1 (collagen type I, alpha 1) and matrix metalloproteinases MMP3, MMP13 at 24h and 72h respectively.

Results:
Results indicated that SPRF enhanced the proliferation rate of OA chondrocytes in comparison to the control and PRP from 24h to 72h significantly ($p<0.05$) on 2D substrates both under normoxic (20% O2)/hypoxic (1% O2) conditions. Gene expression analysis revealed that in OA chondrocytes COL1A1 was downregulated when cultured with PRP than in SPRF or control under normoxic/hypoxic conditions. COL2A1, a marker of redifferentiation in chondrocytes was significantly upregulated with a 15 fold increase ($p<0.05$) in PRP under normoxia and hypoxia than in control. CO2A1 was downregulated in SPRF than in the control from 24h to 72h. The index of cell differentiation (redifferentiation) COL2A1/COL1A1 ratio was upregulated in PRP with a 50 fold increase to control under normoxia and a 100 fold increase to control in hypoxia significantly ($p<0.05$). Whereas, COL 2A1/COL1A1 ratio was downregulated both under normoxia and hypoxia in SPRF to control from 24 h to 72h. Matrix metalloproteinases MMP3 and MMP13 was upregulated with 1.5 fold increase ($p<0.05$) in PRP under normoxia but downregulated under hypoxia to control and SPRF.

Conclusion:
Our current study implies that increased chondrocyte proliferation can be attained in vitro on 2D surfaces by the addition of PRP to the cells without an increased dedifferentiation both under normoxic and hypoxic culture conditions. In contrast, SPRF increases even faster proliferation at the expense of decreased Collagen II production, indicating that the growth factor composition of platelet-rich plasma varieties may have surprisingly different effects on the fate of cultured cells.

Der therapierefraktäre Feriensporn bzw Fascitis plantaris- Zielgebiet für PRP Therapie?

M. Matzner

Der klinisch schmerzhafte Fersensporn darf getrost als Volkskrankheit (10% bezeichnet werden. Dies umso mehr als er die Patienten über viele Wochen und auch Monate hinaus quält und zu Einbrüchen in der beruflichen als auch privaten Lesitungsfähigkeit führt. Hauptalter liegt zwischen 40- 60 Jahren und Frauen sind tendenziell eher betroffen als Männer.

Der Therapiepfad nach gegenwärtigen Stand umfasst Einlagen mit guter Unterstützung der Längsgewölbes zusammen mit Fersenhohl- und Weichlegung beidseits, NSAR, physikalische Massnahmen ebenso wie physiotherapeutische Übungen.Zusätzlich werden Infiltrationen mit und ohne Cortison vorgenommen, Stosswellentherapien angewandt ebenso wie die Röntgenschwachbestrahlung. Operationen kommt kein nachhaltiger Stellenwert zu. Als neue Option hat sich in den letzten Jahren zunehmend die Therapie mit autologem Plasma (PRP, ACP) einen Stellenwert verschafft.

Im Rahmen des Vortrages werden die Resultate von 7 (4 W, 3 M) eigenen Patienten mit der Literatur verglichen um den Stellenwert in der alltäglichen Praxis zu beleuchten.
In Vorwegnahme kann gesagt werden