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CLINICAL USE OF AMNIOTIC FLUID IN OSTEOARTHRITIS : A SOURCE OF CELL THERAPY

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Introduction:. Amniotic fluid is an unique fluid made by nature; it is a cocktail of mesenchymal stem cells with antibacterial property, which is used in the present study as the cell therapy source for the repair of damaged cartilage, synovial membrane snd other adjacent structures. supporting muscles and supporting ligaments. Whether amniotic fluid is effective as cell therapy source in case of Osteoarthritis is the intention behind the present study. Method:The 52 cases who were ultimately enrolled for this trial of amniotic fluid cell therapy in case of longstanding degenerative osteoarthritis not responding to conventional pharmacological or non pharmacological treatment. These patients were randomized, Group A (26 patients; 14 male and 12 female, age varying from 39-78 years, mean 51.4±4.6yrs SD) was treated with 40 mg triamcinolone (in 1ml +9ml normal saline) and Group B (also contained 26 patients, female 14 and male 12, age varying from 41-82 years, mean 49±6.4yrs SD) was treated with freshly collected amniotic fluid 10 ml, as source of cell therapy. Result:If the overall impact of treatment in Group A is assessed and compared with the results of Group B ,it can be noted that a mean 92.3 percent patients showed improvement in the steroid treated group (A) compared to a mean 88.46 percent of the patients in the amniotic fluid group (B) at the completion of the first month from the procedure ($p < .01$)..). The value for the 5^{th}, 6^{th} , 9^{th}, 12^{th} and 24^{th} months for Group A were noted as decreasing uniformly: mean 26.92 percent, 23.07 percent, 19.23 percent, 15.38 and 15.38 percent respectively. The identical value for the 5^{th} , 6^{th}, 9^{th}, 12^{th} and 24^{th} months for Group B were mean 65.38 percent, 57.69 percent, 53.84 percent, 50 and 46.15 percent respectively.The results are supported by analysis of the VAS (visual analogue pain scale), WD (Walking distance in Meters) and HAQ (Health Assessment Questionnaire) assessments. The results demonstrated a significant improvement in VAS at third month which was sustained at the sixth month interval assessment in both groups, but more so in the cell therapy group (B) ($p < 0\ 001$). Again, a better and more positive improvement trend was noted at the 3^{rd} and 6^{th} month assessments in WD (walking distance in Meters) in case of Group B (cell therapy group with amniotic fluid), when compared to the steroid treated Group A. The health analysis questionnaire results also supported the VAS and WD results of Group A and B. justifying the validity and superiority of cell therapy from the steroid therapy in this preliminary report (p<O OI). Conclusion :Though the epidemiological background of Groups A and B are grossly randomized, the result of the therapy (shown in Graph 1 and Table 2), strongly supports the potential of this new form of cell therapy in case of advanced osteoarthritis. The present treatment proved to be much superior to and longer lasting than the conventional widely practiced therapy with corticosteroid instillation at the joint in case of degenerative advanced osteoarthritis.

Disclosure: All authors have declared no conflicts of interest.

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THE COMBINATION OF AUTOLOGOUS MESENCHYMAL STEM CELLS, ACELLULAR DERMAL MATRIX AND GROWTH FACTORS FOR CARTILAGE REGENERATION IN EXPERIMENTAL CARTILAGE DEFECT MODEL IN NONHUMAN PRIMATES

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Articular cartilage defects are commonly associated with trauma, osteonecrosis and osteochondritis. Tissue engineering based on mesenchymal stem cell (MSCs) therapy is a highly promising approach to repair articular cartilage. Implantation of uncommitted MSCs can repair full-thickness cartilage defects but does not yield biomechanically adequate regenerated tissue. This study explored utilization of a new three-dimensional MSC-loaded acellular dermal matrix (ADM) to replace damaged cartilage by providing chondroinductive matrix and maintaining MSCs inside the cartilage defect, in an experimental model of knee joint cartilage defect in Cynomolgus monkeys. All MSC samples were characterized for cell yield, proliferation capacity and phenotypes. Chondrogenic differentiation was studied using micromass culture and analyzed by histology, immunohistochemistry and electron-microscopy. This study showed that MSCs could be differentiated into the chondrogenic lineage under the stimulation of suitable chondrogenic factors. They expressed mesenchymal markers and were negative for hematopoietic markers. MSC-ADM constructs grown for 7-days had significantly higher cell numbers compared with that of the number initially seeded. When MSCs-ADM graft was transplanted to injured knee joint of cartilage defect, marked regeneration of the medial meniscus was evident, and the cartilage defect improved at 20–24 weeks. Degeneration of the articular cartilage, osteophytic remodeling, and subchondral sclerosis were reduced in MSC-ADM--treated joints. The histological score and X-ray results were consistently improved than those of the control group. Immunohistochemical analysis showed negative expression of matrix metalloproteinase (MMP) -1 and MMP-3. In conclusion, these results proved feasibility of MSC-ADM cell therapy for cartilage regeneration in nonhuman primates.

Disclosure: All authors have declared no conflicts of interest.