

The Effect of Combined Use of Platelet Rich Plasma and Adipose Derived Stem Cells on Fat Graft

Survival

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Abstract:

Background:The efficacy of autologous fat transplantation is reduced by fat absorbsion and fibrosis due to fat necrosis.The effect of platelet rich plasma, adipose derived stem cell and their combination on fat graft survival was investigated in this study (1-5).

Methods:In the experiment, inbred Fischer 344 rats were used for isogenous form of transplantation.Rats were seperated into 4 groups (n=10).Platelet rich plasma(PRP) was prepared from blood obtained from donor rats.Inguinal fat pads were harvested.Adipose derived stem cells(ADSC) were isolated,expanded three passages and labeled with Dil.Fat tissues were mixed with 0.2 ml DMEM in group A, 0.2 ml PRP in Group B,0.2 ml of 5×10^6 Dil labeled ADSC in group C,and a combination of PRP and ADSC in group D.Fat preparations were injected subcutaneously into the scalp of the rats.After 3 months the fat grafts were extirpated and weighed.The volumes were measured by the liquid overflow method

Tissue sections from fat biopsy were stained with hematoxylin-eosin,triple and VEGF.The histologic parameters evaluated included the number of capillary structures, cyst vacuoles, fibroblasts and intact adipocytes.The number of each parameter were counted on an area of $335076.3 \mu\text{m}^2$ by Clemex Vision lite 3,5 visual analysing programme.In vitro growth factor (VEGF, TGF β ,FGF) levels of supernatant were compared between Group C and D using the enzyme- linked immunosorbent assay method

Results:In group D there was more grafted fat retained 3 months later. The loss of graft mass was more significant in group A . The number of capillary structures and intact adipocytes were significantly higher in group D.Less cyst formation and fibrosis was obtained in group D. Group C and D transplants exhibited the histological structure of normal fat tissue.The level of growth factors were significantly higher group D.

Conclusion:The combined use of adipose derived stem cells and platelet rich plasma synergistically increase revascularization and fat graft survival.

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