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Effect of bone marrow (non-hematopoietic stem cells) on random skin flap survival in a rat model: an experimental study

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Random skin flap is one of the most widely used tools to reconstruct tissue defects. Partial flap necrosis is a common problem. Different pharmacological or surgical methods were used to improve skin flap survival. Stem cell therapy has aroused an interest in improving flap survival. The aim of this study was to evaluate effect of bone marrow Non-hematopoietic Stem Cells (BM-MSCs) in improvement of random skin flap survival in a rat model.

Material and methods: It is an experimental study, was done in Medical Research Center at Ain Shams University Hospitals. 88 male albino Wistar rats were used, 40 rats as donor model and 48 rats as flap model. Flap model rats were divided into three groups [A, B& C]. Each group consists of 16 rats. The first group (A): was injected by Normoxic Bone marrow stem cell. The second group (B): was injected by hypoxic Bone marrow stem cell. The third one (C): was a control group, which was injected by the medium only. Each group was subdivided into two subgroups according to the time of injection (1: at time of flap elevation & 2: one week before flap elevation). The flap was assessed clinically, by histology and by ELISA assay for VEGF expression.

Results: The mean survival percentages of the flaps were; 60.9%±2.2 for (subgroup A1), 28.8%±2.1 for (subgroup A2), 73.3%±2.2 for (subgroup B1), 28.6% ±2.4 for (subgroup B2), 28.7%±2.1 for (subgroup C1), 28.5%±2.2 for (subgroup C2). The mean numbers Capillaries/ Field in histological examination were: A1 (18.4±1.9), B1 (24.1±2.0), A2 (7.5±2.1), B2 (8.4±2.1), C1 (7.3±2.2) and C2 (7.4±2.1).

Conclusion: Random skin flap viability could be enhanced through local administration of BM-MSCs simultaneously with flap elevation and the flap viability was maximized when the cells were cultured under hypoxic conditions and injected simultaneously with flap elevation

Biography:

Khaled M Hassan graduated with honors from faculty of medicine Minia university (1989), Egypt. He was awarded governmental scholarship to obtain plastic surgery training and MD degree from the university of Liverpool, UK and plastic surgery center at Whiston hospital, (1996-2003) during which, he gained experience in aesthetic, micro, pediatric, burns, reconstructive and hand surgery. MD thesis was on facial reanimation using free gracilis flap either in one or two stages. He has special interest in regenerative medicine and stem cell therapies. Presented a lecture on nerve regeneration in facial palsy patients in London 2014 (1st international conference on repair, regeneration and reconstruction [R3]). He is regularly invited as speaker in both national and international conferences. He has published articles in Plastic and Reconstructive Surgery (the most prestigious peer review journal in the field), Egyptian Journal of plastic and reconstructive surgery, Polish journal of physiotherapy and other professional journals

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