Effect of Hematopoietic Stem Cells and Platelet-Rich Plasma on the Healing of Experimental Skin Burned Tissues: A Comparative Study in Adult Male Mice

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Abstract:

Abstract Background: Unfortunately burns are a common problem, leading to scarring or death. Platelet rich plasma (PRP) is a well-known method that could be used as topical application for burn either second or third degree; it harbors many growth factors that can accelerate the healing. This study aimed: to analyze the use of PRP in deep second-degree burn, in comparison with the hematopoietic stem cells (CD34+) in mice. Materials and methods: Seventy male adult mice were divided into four groups (control group, burn only, burn treated with CD34+ cells (injected once intradermal with 0.3–0.4 × 10^6 /kg and burn treated with PRP (1 ml injected once intradermal) at the edge of burn after 24hs from its induction. All burned groups were exposed to thermal burn. On day 9 and 19, the animals were sacrificed and skin biopsies were taken for H&E and Masson's trichrome staining. Assessment of angiogenesis and quantification study for matrix metalloproteinase 13 (MMP13) was done. Results: Wounds treated with PRP revealed fast wound closure in comparison with burned only group. significant decrease in collagen fibers and increase in MMP13 deposition, as well as angiogenic markers (Angio1&2 and VEGF) expression was observed. However CD34+ cells treated group showed highly significant improvement in previously mentioned markers. Histopathological changes of burned skin improved in all treated groups after 19 days particularly in CD34+ cells treated group. Conclusion: These results indicated that CD34+ cells treatment could exert beneficial effects on healing process more than that of PRP in second degree burns.

Keywords:

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