

Summary

Surgical therapy of deep burns – dermoepidermal autotransplantation combined with local transplantation of the autologous platelet concentrate

Introduction: Necrectomy followed by skin grafting is the only causal therapy of 3rd degree burns and non-healing deep-dermal burns. In burn medicine, effective methods for stimulation of healing of skin grafted and donor areas have been searched for a long time. Efficacy of the autologous platelet concentrate (APC) to improve wound healing was verified in clinical studies in many range surgical disciplines. Its use seems to be promising in burn medicine as well. Verification of the APC efficacy in burn treatment is highly desirable.

Aims: 1. The analysis of speed and quality of healing process in skin grafted areas with topical transplantation of the APC compared to the healing following the skin grafting only. 2. The monitoring of changes and development of subsequent scarring, detection of potential systemic response in relation to the topical transplantation of the APC.

Methods: The speed and quality of the healing in skin grafted areas and the extent of skin graft failure were monitored in two groups of patients post-operatively. The healing of donor areas was evaluated to determine the potential systemic effect of the topically applied APC. The clinical evaluation of scarring was performed by means of the Vancouver Scar Scale (VSS) and objectified by cutometrical measuring of the scar viscoelasticity. Digital photographs were taken pre- and post-operatively. The blood count, coagulation, liver enzymes and CRP were examined pre-operatively, on the 7th and 14th days after surgery with the aim to detect a possible systemic response in the patients treated with the APC. The laboratory analysis of the APC samples was performed in order to verify its quality. Samples of dermoepidermal skin autografts with the APC were histologically examined to confirm the presence of viable platelets and platelet growth factors PDGF and VEGF. The laser doppler monitoring of perfusion in areas with skin grafts and the APC was performed post-operatively in order to map the course of healing in relation to the development of perfusion, to detect the intensity and early decline of the inflammatory phase of healing and to assess the possibility of predicting the course of healing and scarring. The analgesic effect of the APC was self-evaluated by patients using the Visual Analogue Scale, which was subsequently objectified by analysis of the actually administered analgesic therapy.

Results: The treatment with the APC was associated with improved quality and faster healing of skin grafted areas. The uncomplicated healing of skin grafts was reflected in the levels of CRP and leucocytes. Scars exhibited faster dynamics of maturation, earlier transition to the regression phase and a significantly improved quality in terms of pliability, height and the total VSS score. A more rapid return of scar viscoelasticity to the values of healthy skin was objectively demonstrated by means of cutometry. Local application of the APC was not associated with any systemic response in blood coagulation and liver enzymes and donor areas healed similarly in both groups of patients. These facts seem to indicate only a local effect of the topically applied APC.

Conclusion: The study confirmed the efficacy of the APC in accelerating the healing of skin grafted areas and improving its quality, especially in terms of smaller range of skin graft failure. The fast and largely uncomplicated course of healing in patients treated with the APC corresponded with a significantly improved course of scarring. Any systemic response following the topical transplantation of the APC was not detected in the laboratory or clinically.

Key words: autologous platelet concentrate, dermoepidermal autotransplantation, speed and quality of healing, course of scarring, cutometry, laser doppler perfusion monitoring, systemic response