Abstract:

Damage control is essential in first aid of burn lesions. The aim of the present study was to investigate whether systemic erythropoietin (EPO) administration could prevent secondary burn progression in an experimental model. The burn comb model creates four rectangular burn surfaces intercalated by three unburned zones prone to progression. Twenty-one Wistar rats were randomized to a control group or to receive intraperitoneal EPO (500 units per kg) once a day for 5 days starting 45 min (EPO45min) or 6 h (EPO6h) after burn injury. Histological analyses assessing burn depth, inflammation and neoangiogenesis, planimetric evaluation of burn progression, and laser Doppler flowmetry to assess perfusion were performed after 1, 4 and 7 days. Final scarring time and contracture rate were assessed once a week. Burn progression was decreased significantly with EPO45min but not EPO6h: progression of burn depth stopped in the intermediate dermis (mean(s.e.m.) burn depth score 3·3(0·6) for EPO45min versus 4·7(0·3) and 5·0(0·0) for EPO6h and control respectively on day 7; P = 0·026) and the surface extension was significantly reduced (45(8), 65(4) and 78(4) respectively on day 7; P = 0·017). This was paralleled by faster re-establishment of perfusion with EPO45min (114(5) per cent on day 4 versus 85(6) and 91(3) per cent for EPO6h and control respectively; P = 0·096). The reduction in progression resulted in a decreased healing time.
(7·3(0·7) weeks for EPO45min versus 11·5(1·0) and 10·8(0·5) weeks for EPO6h and control; P = 0·020) and contracture rate (P = 0·024). Early EPO prevented burn progression, mainly by improved vascular perfusion.