Efek administrasi erythropoetin pada penyembuhan luka bakar eksperimental : studi pada hewan coba = The Effect of erythropoietin administration in experimental burns wound healing : an animal study

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Abstrak

[ABSTRAK
LATAR BELAKANG: Erythropoetin (EPO) sebagai hematopoietic growth factor, menarik perhatian para peneliti akibat efeknya dalam melindungi jaringan. EPO berinteraksi dengan vascular endothelial growth factor (VEGF) dan menstimulasi mitosis dan motilitas sel endotel dalam proses neo-angiogenesis; dan hal ini penting dalam fenomena kompleks penyembuhan luka, Tujuan penelitian ini adalah menyelidiki efek pemberian EPO pada penyembuhan luka bakar eksperimental di hewan coba.
METODE: Lima belas ekor tikus Sprague-Dawley, strain dari Rattus Novergicus dengan berat antara 300-350 gram yang merupakan subjek hewan coba pada penelitian ini dibuat perlakuan eksperimental luka bakar grade 2B (dermis dalam). Lalu hewan coba akan dibagi ke dalam tiga grup secara acak dan mendapatkan terapi injeksi EPO dosis rendah (600 IU/mL), injeksi EPO dosis tinggi (3000 IU/mL) dan tidak mendapatkan perlakuan terapi apapun (grup kontrol). Setelah 14 hari observasi, dilakukan penilaian secara kuantitatif dari proses penyembuhan luka dengan menghitung persentasi epitelialisasi menggunakan perangkat lunak Analyzing Digital Images®. Dilakukan pula penilaian secara kualitatif dengan menghitung skor perubahan histopatologis pada penyembuhan luka.
HASIL: Ukuran luka dan percepatan epitelialisasi dihitung pada hari ke-0, hari ke-5, hari ke-10 dan hari ke-14. Didapatkan bahwa hasil rerata ukuran raw surface (p value: 0.012 pada hari ke-5; 0.009 pada hari ke-10 and 0.000 pada hari ke-14) dan persentase penyembuhan luka (p value: 0.011 pada hari ke-5; 0.016 pada hari ke-10 and 0.010 pada hari ke-14), nilai terbaik dicapai oleh grup injeksi EPO dosis rendah. Evaluasi histopatologis menunjukkan bahwa skor tertinggi untuk re-epitelialisasi, jaringan granulasi dan neo-angiogenesis juga didapatkan pada grup injeksi EPO dosis rendah.
SIMPULAN: Pada studi hewan coba menggunakan tikus Sprague-Dawley ini, didapatkan bahwa injeksi Recombinant Human EPO (rHuEPO) dapat mempercepat proses re-epitelialisasi dan penyembuhan luka yang disebabkan oleh luka bakar grade 2B (dermis dalam). Temuan ini diharapkan akan membuka pengetahuan baru dalam peningkatan kualitas terapi pada penyembuhan luka bakar.
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ABSTRACT
BACKGROUNDS: The hematopoietic growth factor erythropoietin (EPO) attracts attention due to its all-tissue-protective pleiotropic properties. EPO interacts with vascular endothelial growth factor (VEGF) and stimulates endothelial cell mitosis and motility in neo-angiogenesis; thus it may of importance in the complex phenomenon of wound healing. The purpose of this study is to investigate the effect of EPO in experimental burn wounds healing.
METHODS: Fifteen healthy Sprague-Dawley, strain of Rattus Novergicus weighing 300-350 grams, were prepared to achieve deep dermal burns. Animals were randomized to receive either low-dose EPO injection (600 IU/mL), high-dose EPO injection (3000 IU/mL) or nothing (control group). After 14 days of

observations, a quantitative assessment of wound healing was determined by percentage of wound closure and epithelialization using Analyzing Digital Images® Software. And qualitative assessment was done to evaluate the score of histopathological changes in wound healing.
RESULTS: The size of the wound area and re-epithelialization rate percentage was determined on Day-0, Day-5, Day-10 and Day-14. The average of raw surface areas measurement (p value: 0.012 in day-5; 0.009 in day-10 and 0.000 in day-14) and healing percentage of the lesions (p value: 0.011 in day-5; 0.016 in day-10 and 0.010 in day-14) were significantly best in the low- dose EPO group compared to the control group and high-dose EPO group. The histopathology evaluation revealed that the highest score for re-epithelialization, granulation tissue and neo- angiogenesis were achieved by the low-dose EPO injection group than in both control and high- dose EPO injection groups.
CONCLUSIONS: In this animal study using Sprague-Dawley rats, Recombinant Human EPO (rHuEPO) injection administration prompted the evidences of improved re-epithelialization and wound healing process of the skin caused by deep dermal burns. These findings may lead to a new therapeutic approach to improve the clinical outcomes for the management of burns wound healing., BACKGROUNDS: The hematopoietic growth factor erythropoietin (EPO) attracts attention due to its all-tissue-protective pleiotropic properties. EPO interacts with vascular endothelial growth factor (VEGF) and stimulates endothelial cell mitosis and motility in neo-angiogenesis; thus it may of importance in the complex phenomenon of wound healing. The purpose of this study is to investigate the effect of EPO in experimental burn wounds healing.
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