

INTISARI

Penyembuhan luka bertujuan untuk mengembalikan integritas dan fungsi jaringan melalui remodeling struktur yang rusak. Proses tersebut melibatkan oksigen sebagai sumber energi, *signaling seluler* maupun agen mikrobial. *Reactive oksigen spesies* merupakan bentuk oksigen yang bermanfaat pada penyembuhan luka tetapi ketika jumlahnya berlebih akan memperpanjang fase inflamasi. Terapi *hydrogen rich water* dikembangkan untuk mengendalikan *reactive oksigen spesies*, mempercepat penyembuhan dengan efek antiinflamasi dan antioksidan. Tujuan penelitian ini untuk mengetahui pengaruh pemberian *hydrogen rich water* secara oral terhadap stres oksidatif yang tercermin dari jumlah malondialdehid dan jumlah makrofag pasca eksisi kulit.

Dua puluh empat tikus Wistar dibagi menjadi 4 kelompok: kontrol H+2, kontrol H+5 dan perlakuan H+2, perlakuan H+5. Setiap tikus mendapat perlakuan dua luka eksisi *punch biopsy* pada punggung. Kelompok perlakuan H+2 dan H+5 mendapat intake oral *hydrogen rich water* dengan kadar 0,07 ppm sedangkan kelompok kontrol mendapat air saline. Jaringan luka sebelah kanan diperiksa dengan metode *Thiobarbituric acid reactive substance (TBARs)* untuk mengetahui jumlah malondialdehid. Jaringan luka sebelah kiri dilakukan perawarnaan *Hematoxilin Eosin* untuk mengetahui jumlah makrofag.

Hasil statistik dengan uji *Two away ANOVA* dan *Post Hoc LSD* menunjukkan jumlah malondialdehid pada kelompok perlakuan lebih rendah dibandingkan kelompok kontrol ($p=0,000$), sedangkan jumlah makrofag pada kelompok perlakuan lebih rendah dibandingkan kelompok kontrol ($p=0,000$). Uji Pearson menunjukkan terdapat korelasi antar jumlah makrofag dan jumlah malondialdehid ($p=0,000$; $r=-0,787$). Kesimpulan: *hydrogen rich water* menurunkan jumlah malondialdehid dan menurunkan jumlah makrofag.

Kata kunci: stres oksidatif, *reactive oxygen spesies*, *hydrogen rich water*, malondialdehid, makrofag

ABSTRACT

Wound healing aims to restore tissue integrity and function through remodeling damaged structures. The process involves oxygen as an energy source, cellular signaling and microbial agents. Reactive oxygen species are form of oxygen that useful in wound healing but when the amount was excessive it will prolong the inflammatory phase. Hydrogen rich water therapy was developed to control reactive oxygen species. Hydrogen rich water accelerates healing with anti-inflammatory and antioxidant effects. The purpose of this study was to determine the effect of oral administration of hydrogen rich water on oxidative stress which reflected by the amount of malondialdehyde and the number of macrophages after skin excision.

Twenty-four Wistar were divided into 4 groups: H + 2 control, H + 5 control and H + 2 treatment, H + 5 treatment. Each rat was treated with two punch biopsy excision wounds on the back. The treatment groups H + 2 and H + 5 received oral intake of hydrogen rich water with 0.07 ppm while the control group received saline water. The right wound tissue was examined by the Thiobarbituric acid reactive substance (TBARS) method to determine the amount of malondialdehyde. The left wound tissue was examined by Hematoxilin Eosin staining (HE) to determine the number of macrophages.

Statistical results with the Two Way ANOVA and Post Hoc LSD test showed the amount of malondialdehyde in the treatment group was lower than in the control group ($p=0,000$), whereas the number of macrophages in the treatment group was lower than the control group ($p=0,000$). Pearson test shows there is a correlation between the amount of macrophages and the amount of malondialdehyde ($p = 0,000$; $r = -0.787$). Conclusion: Hydrogen rich water decreases the amount of malondialdehyde and decreases the amount of macrophages.

Keywords: stress oxidative, reactive oxygen species, hydrogen rich water, malondialdehyde, macrophages