ABSTRAK

Latar Belakang: *Staphylococcus aureus* merupakan suatu bakteri yang dapat dengan cepat menjadi resisten terhadap banyak antibiotika. Penelitian sebelumnya menunjukkan bahwa pemberian vitamin D3 dapat menurunkan ekspresi gen TNF-α dan IL-6, serta meningkatkan ekspresi gen anti-inflamasi seperti IL-10. Selain itu vitamin E juga dapat menghambat produksi sitokin proinflamasi seperti TNF-α dan IL-6, sehingga berpotensi dalam mengurangi inflamasi dan melindungi jaringan. Tujuan Penelitian: Penelitian ini bertujuan untuk menganalisis pengaruh pemberian kombinasi vitamin D dan vitamin E terhadap kadar TNF-α dan IL-6 pada model tikus yang diinduksi *Staphylococcus aureus*. Metode: Tikus dibagi menjadi tujuh kelompok: Norma, Negatif (diinduksi SA), Positif (Doksisiklin 9 mg/KgBB), Kelompok 4 (Doksisiklin 9 mg/KgBB+Vitamin D 36 IU/KgBB+Vitamin E 250 mg/KgBB), Kelompok 5, 6 dan 7 dengan dosis Vitamin D 36,72 dan144 IU/KgBB+Vitamin E 250 mg/KgBB. Parameter yang dievaluasi meliputi pemeriksaan hematologi, histopatologi paru dan hepar, serta biomarker inflamasi seperti TNF-α, IL-6, dan *procalcitonin*. Analisis biokimia tambahan mencakup pengukuran albumin, SGOT, SGPT, ureum, kreatinin, HbA-1c, KGD, CRP, serta rasio Neutrophil-to-Lymphocyte (NLR) selama 7 hari. Hasil: Hasil dianalisis secara statistik menggunakan ANOVA dan dilanjutkan dengan uji Tukey HSD, Semua nilai ini secara signifikan lebih rendah dibandingkan kelompok kontrol negatif ($P \leq 0{,}0001$). Kombinasi vitamin D dan E terbukti memiliki efek protektif terhadap fungsi hati dan ginjal, ditandai dengan penurunan kadar SGOT, SGPT, kreatinin, dan ureum dibandingkan kelompok kontrol negatif dan dapat memperbaiki struktur jaringan paru dan hati yang mengalami peradangan dan nekrosis akibat infeksi.Kesimpulan : Vitamin D dan E berfungsi sebagai agen terapi dam mampu menurunkan kadar TNF-α, IL-6, procalcitonin (PCT), dan CRP, yang merupakan indikator inflamasi.

Kata Kunci : *Staphylococcus aureus*, Vitamin D, Vitamin E, TNF-α, IL-6

ABSTRACT

Background: Staphylococcus aureus is a bacterium that can rapidly develop resistance to multiple antibiotics. Previous studies have demonstrated that vitamin D3 administration can reduce the expression of pro-inflammatory genes such as TNF-α and IL-6 while enhancing the expression of anti-inflammatory genes like IL-10. Additionally, vitamin E has been reported to inhibit the production of pro-inflammatory cytokines, including TNF-α and IL-6, potentially mitigating inflammation and protecting tissues. Objective: This study aims to evaluate the effects of combined vitamin D and vitamin E administration on TNF-α and IL-6 levels in a rat model induced with Staphylococcus aureus. Methods: Rats were divided into seven groups: Normal control, Negative control (induced with S. aureus), Positive control (treated with doxycycline at 9 mg/kgBW), Group 4 (doxycycline 9 mg/kgBW + vitamin D 36 IU/kgBW + vitamin E 250 mg/kgBW), and Groups 5, 6, and 7, which received vitamin D at 36, 72, and 144 IU/kgBW, respectively, combined with vitamin E at 250 mg/kgBW. The evaluated parameters included hematological assessments, histopathological analysis of lung and liver tissues, and inflammatory biomarkers such as TNF-α, IL-6, and procalcitonin. Additional biochemical analyses measured albumin, SGOT, SGPT, urea, creatinine, HbA1c, blood glucose levels, CRP, and the neutrophil-to-lymphocyte ratio (NLR) over seven days. Results: Statistical analysis using ANOVA followed by Tukey's HSD test revealed that all measured inflammatory markers were significantly lower in the treatment groups compared to the negative control group ($P \leq 0.0001$). The combination of vitamin D and vitamin E exhibited protective effects on liver and kidney function, as evidenced by reduced SGOT, SGPT, creatinine, and urea levels relative to the negative control. Furthermore, histopathological analysis indicated improved structural integrity of lung and liver tissues, with reduced inflammation and necrosis following infection. Conclusion: Vitamin D and E serve as therapeutic agents capable of reducing TNF-α, IL-6, procalcitonin (PCT), and CRP levels, which are key inflammatory indicators, thereby demonstrating potential in mitigating infection-induced inflammation.

Keywords : Staphylococcus aureus, Vitamin D, Vitamin E, TNF-α, IL-6