

**HUBUNGAN ANTARA KADAR *INTERLEUKIN-6* DAN *NEUTROPHIL TO LYMPHOCYTE RATIO* DENGAN HORMON *FREE TRIIODOTHYRONINE* PADA PASIEN SEPSIS**

**ABSTRAK**

**Latar Belakang:** Sepsis merupakan kondisi disfungsi organ pengancam jiwa akibat respons inflamasi sistemik terhadap infeksi dan masih menjadi penyebab utama mortalitas. Respons inflamasi berlebihan pada sepsis berperan dalam terjadinya gangguan regulasi sistem endokrin, metabolisme hormon tiroid yang dikenal sebagai *non thyroidal illness syndrome* (NTIS), yang ditandai dengan penurunan kadar hormon free triiodothyronine (fT3). *Interleukin-6* (IL-6) sebagai sitokin proinflamasi utama dan *neutrophil to lymphocyte ratio* (NLR) sebagai indikator inflamasi sistemik diduga berperan dalam perubahan kadar fT3 pada pasien sepsis.

**Tujuan:** Menganalisis hubungan antara kadar IL-6 dan nilai NLR dengan kadar hormon fT3 pada pasien sepsis.

**Metode:** Penelitian merupakan studi observasional analitik dengan desain *cross-sectional* melibatkan **75 pasien sepsis** dirawat di RSUP Dr. Kariadi Semarang dan memenuhi kriteria inklusi serta eksklusi. Pemeriksaan kadar IL-6 dan fT3 dilakukan menggunakan metode *enzyme-linked immunosorbent assay* (ELISA), nilai NLR dihitung dengan membagi jumlah neutrofil absolut dengan limfosit absolut yang diperiksa dengan metode *flow cytometry* menggunakan alat *hematoanalyzer*. Analisis hubungan antarvariabel dilakukan menggunakan uji korelasi Spearman dengan tingkat kemaknaan statistik  $p < 0,05$ .

**Hasil:** Median kadar IL-6 pada pasien sepsis adalah 15,25 pg/mL (1,31-66,80), median nilai NLR adalah 9,30 (0,30-49,80), dan median kadar fT3 adalah 2,40 pg/mL (0,10-6,70). Uji korelasi Spearman antara kadar IL-6 dan kadar fT3 ( $r = -0,295$  ;  $p = 0,01$ ). Uji korelasi Spearman antara nilai NLR dan kadar fT3 ( $r = -0,235$ ;  $p = 0,042$ ).

**Simpulan:** Terdapat hubungan negatif lemah antara kadar IL-6 dan NLR dengan kadar hormon fT3 pada pasien sepsis sebagai bagian dari mekanisme NTIS.

**Kata kunci:** Sepsis, *Interleukin-6*, *Neutrophil to Lymphocyte Ratio*, *Free Triiodothyronine*, NTIS.

# CORRELATION BETWEEN INTERLEUKIN-6 LEVELS, NEUTROPHIL TO LYMPHOCYTE RATIO, AND FREE TRIIODOTHYRONINE IN SEPSIS

## ABSTRACT

**Background:** Sepsis is a life-threatening organ dysfunction caused by a dysregulated systemic inflammatory response to infection and remains a major cause of mortality. Excessive inflammatory responses in sepsis contribute to endocrine dysregulation, particularly alterations in thyroid hormone metabolism known as non thyroidal illness syndrome (NTIS), which is characterized by decreased free triiodothyronine (fT3) levels. Interleukin-6 (IL-6), a major pro-inflammatory cytokine, and the neutrophil-to-lymphocyte ratio (NLR), a marker of systemic inflammation, are suspected to be involved in fT3 alterations in septic patients.

**Objective:** To analyze the correlation between IL-6 levels and NLR with fT3 levels in patients with sepsis.

**Methods:** This observational analytic study with a cross-sectional design included 75 sepsis treated at Dr. Kariadi General Hospital who met the inclusion and exclusion criteria. Serum IL-6 and fT3 levels were measured using enzyme-linked immunosorbent assay (ELISA). NLR was calculated by dividing the absolute neutrophil count by the absolute lymphocyte count, obtained through flow cytometry using a hematology analyzer. Correlation analysis was performed using Spearman's rank test, with statistical significance set at  $p < 0.05$ .

**Results:** The median IL-6 level was 15.25 pg/mL (1.31-66.80) the median NLR was 9.30 (0.30-49.80), and the median fT3 level was 2.40 pg/mL (0.10-6.70). Spearman correlation analysis showed a correlation between IL-6 and fT3 levels ( $r = -0.295$ ;  $p = 0.01$ ) and between NLR and fT3 levels ( $r = -0.235$ ;  $p = 0.042$ ).

**Conclusion:** There is a weak negative correlation between IL-6 levels and fT3 levels as well as between NLR and fT3 levels, in patients with sepsis as part of the NTIS mechanism.

**Keywords:** Sepsis, Interleukin-6, Neutrophil-to-Lymphocyte Ratio, Free Triiodothyronine, NTIS.