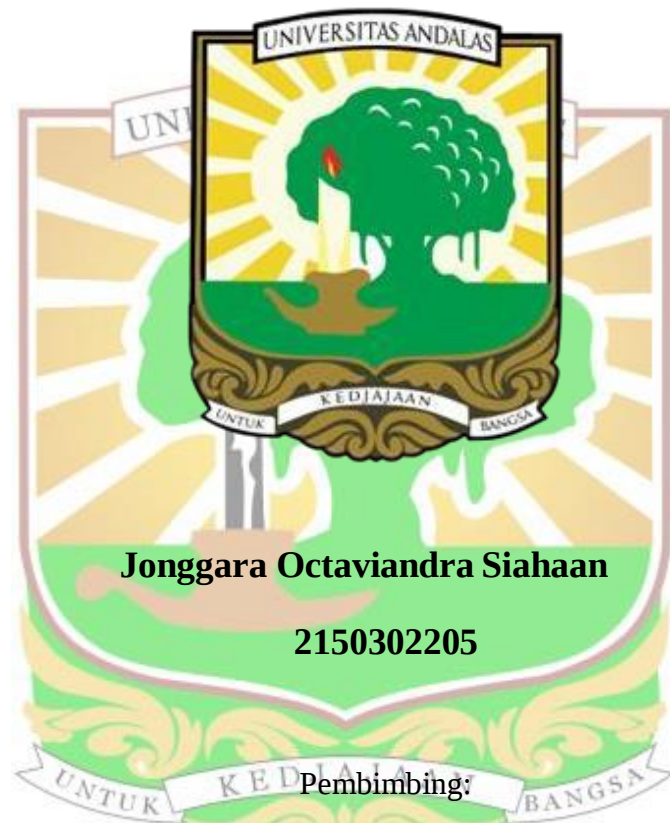


**KORELASI KADAR *TUMOR NECROSIS FACTOR ALPHA*,
INTERLEUKIN-1 DAN *INTERLEUKIN-6* DENGAN KADAR
RECEPTOR ACTIVATOR OF NUCLEAR FACTOR $\kappa\beta$ DAN
RECEPTOR ACTIVATOR OF NUCLEAR FACTOR $\kappa\beta$ *LIGAND* PADA
PROSES REMODELING TULANG PASIEN ARTRITIS
REUMATOID**



Jonggara Octaviandra Siahaan

2150302205

Pembimbing:

Dr dr. Najirman, Sp.PD.,K-R, FINASIM.

dr. Eka Kurniawan, Sp.PD-KR

**PROGRAM STUDI PENYAKIT DALAM PROGRAM SPESIALIS
DEPARTEMEN ILMU PENYAKIT DALAM
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ABSTRAK

Korelasi Kadar Tumor Necrosis Factor Alpha, Interleukin -1 dan Interleukin-6 Serum dengan Kadar Receptor Activator of Nuclear Factor- κ B (RANK) dan Receptor Activator of Nuclear Factor- κ B Ligand (RANKL) pada proses Remodelling Tulang pada Pasien Arthritis Reumatoid

Jonggara Octaviandra Siahaan¹, Najirman², Eka Kurniawan³

Division of Rheumatology, Department of Internal Medicine, Faculty of Medicine, Andalas University / Dr. M. Djamil General Hospital, Padang, Indonesia,

Latar Belakang: Arthritis reumatoid (AR) merupakan penyakit autoimun kronik yang ditandai dengan peradangan sinovium dan destruksi sendi. Sitokin seperti tumor necrosis factor-alpha (TNF- α), interleukin-1 (IL-1), dan interleukin-6 (IL-6) berperan penting dalam proses remodeling tulang melalui regulasi receptor activator of nuclear factor- κ B (RANK) dan ligannya (receptor activator of nuclear factor- κ B ligand, RANKL). Penelitian ini bertujuan untuk menganalisis hubungan antara kadar TNF- α , IL-1, dan IL-6 dengan RANK dan RANKL pada pasien AR.

Metode: Penelitian ini merupakan studi analitik dengan desain potong lintang yang dilakukan di RSUP Dr. M. Djamil Padang pada bulan Desember 2024 hingga Juni 2025. Sebanyak 33 pasien yang didiagnosis AR berdasarkan kriteria ACR/EULAR 2010 diikutsertakan menggunakan metode consecutive sampling. Kadar serum TNF- α , IL-1, IL-6, RANK, dan RANKL diukur menggunakan metode ELISA. Analisis data dilakukan dengan uji korelasi Pearson atau Spearman sesuai distribusi data. Penelitian ini telah memperoleh persetujuan etik dari Komite Etik Penelitian Fakultas Kedokteran Universitas Andalas.

Hasil: Rerata usia subjek penelitian adalah $49,6 \pm 10,3$ tahun dengan dominasi perempuan (86,7%). Nilai median kadar serum TNF- α : 35,2 pg/mL, IL-1: 21,7 pg/mL, IL-6: 42,5 pg/mL, RANK: 512,6 pg/mL, dan RANKL: 1.203,4 pg/mL. Terdapat korelasi positif yang bermakna antara TNF- α dan RANK ($r=0,512$; $p<0,05$), TNF- α dan RANKL ($r=0,468$; $p<0,05$), IL-1 dan RANK ($r=0,437$; $p<0,05$), IL-1 dan RANKL ($r=0,459$; $p<0,05$), serta IL-6 dengan RANK ($r=0,528$; $p<0,01$) dan RANKL ($r=0,547$; $p<0,01$).

Kesimpulan: Kadar TNF- α , IL-1, dan IL-6 berhubungan positif dengan kadar RANK dan RANKL, yang menunjukkan keterlibatan sitokin-sitokin tersebut dalam proses remodeling tulang serta peningkatan risiko osteoporosis pada pasien arthritis reumatoid. Sitokin-sitokin ini berpotensi menjadi biomarker untuk deteksi dini kehilangan massa tulang pada pasien AR.

Key words: Rheumatoid arthritis, TNF- α , IL-1, IL-6

ABSTRACT

Correlation of Tumor Necrosis Factor-Alpha, Interleukin-1, and Interleukin-6 with Receptor Activator of Nuclear Factor- κ B and Receptor Activator of Nuclear Factor- κ B Ligand in Bone Remodeling of Rheumatoid Arthritis Patients

Jonggara Octaviandra Siahaan¹, Najirman², Eka Kurniawan³

Division of Rheumatology, Department of Internal Medicine, Faculty of Medicine,
Andalas University / Dr. M. Djamil General Hospital, Padang, Indonesia,



Background: Rheumatoid arthritis (RA) is a chronic autoimmune disease characterized by synovial inflammation and joint destruction. Cytokines such as tumor necrosis factor-alpha (TNF- α), interleukin-1 (IL-1), and interleukin-6 (IL-6) play central roles in bone remodeling through regulation of receptor activator of nuclear factor- κ B (RANK) and its ligand (RANKL). This study aimed to analyze the correlation between TNF- α , IL-1, and IL-6 levels with RANK and RANKL in RA patients.

Methods: This was an analytical cross-sectional study conducted at Dr. M. Djamil General Hospital Padang from december 2024 to June 2025. Thirty patients diagnosed with RA based on ACR/EULAR 2010 criteria were included using consecutive sampling. Serum TNF- α , IL-1, IL-6, RANK, and RANKL were measured using ELISA. Data were analyzed using Pearson or Spearman correlation tests depending on data distribution. Ethical approval was obtained from the Research Ethics Committee of Faculty of Medicine, Andalas University.

Results: The mean age of subjects was 49.6 ± 10.3 years, with female predominance (86.7%). Median serum levels were TNF- α : 35.2 pg/mL, IL-1: 21.7 pg/mL, IL-6: 42.5 pg/mL, RANK: 512.6 pg/mL, and RANKL: 1,203.4 pg/mL. Significant positive correlations were observed between TNF- α and RANK ($r=0.512$, $p<0.05$), TNF- α and RANKL ($r=0.468$, $p<0.05$), IL-1 and RANK ($r=0.437$, $p<0.05$), IL-1 and RANKL ($r=0.459$, $p<0.05$), as well as IL-6 and both RANK ($r=0.528$, $p<0.01$) and RANKL ($r=0.547$, $p<0.01$).

Conclusion: TNF- α , IL-1, and IL-6 levels were positively correlated with RANK and RANKL levels, suggesting their involvement in bone remodeling and osteoporosis risk among RA patients. These cytokines may serve as potential biomarkers for early detection of bone loss in RA.

Key words: Rheumatoid arthritis, TNF- α , IL-1, IL-6

