ABSTRAK

HUBUNGAN ANTARA *NEUTROPHIL-LYMPHOCYTE RATIO* DENGAN KEKAKUAN ARTERI PADA DIABETES MELITUS TIPE-2

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Latar belakang: Diabetes melitus tipe-2 meningkatkan risiko aterosklerosis dan penyakit kardiovaskuler yang merupakan penyebab kematian utama. Inflamasi berperan penting dalam patofisiologi penyakit vaskuler. *Neutrophil–lymphocyte ratio* (NLR) merupakan penanda inflamasi yang mudah tersedia, mudah digunakan dan *reproducible*. *Brachial-ankle pulse wave velocity* (baPWV) merupakan indikator untuk perubahan aterosklerosis dini. Deteksi awal kadar abnormal NLR dapat membantu mencari aterosklerosis subklinis pada pasien DM tipe-2. Kombinasi pemeriksaan NLR dan baPWV dapat melengkapi penilaian risiko kardiovaskuler non-invasif.

Tujuan: Menganalisis hubungan antara *Neutrophil–lymphocyte ratio* dengan kekakuan arteri yang diukur dengan baPWV pada pasien DM tipe-2.

Metode: Penelitian analitik observational dengan desain *cross-sectional* yang dilakukan di Instalasi Rawat Jalan RSUD Dr. Soetomo Surabaya selama 3 bulan. Pemeriksaan NLR dihitung dari pembagian neutrofil dibagi dengan hitung limfosit serta pemeriksaan kekakuan arteri dengan alat *baPWV*. Analisis data korelasi antara NLR dengan kekakuan arteri yang diukur dengan baPWV menggunakan uji *simple linear regression,* dianggap bermakna bila $p < 0,05$.

Hasil: Pada penelitian ini, terdapat 72 subyek dengan rerata umur 54,33 ± 11,34 tahun. dan rerata durasi menderita diabetes selama 7,34 ± 6,80 tahun. Sebagian besar IMT subyek tergolong berat badan lebih dan obesitas. Hanya sepertiga subyek dengan kontrol glikemik baik dengan rerata HbA1c 8,14 ± 1,59%. Rerata nilai NLR pada penelitian ini sebesar 2,69 ± 1,23 dengan nilai NLR tinggi pada 84,7% (61 subyek). Nilai rerata kekakuan arteri yang diukur dengan baPWV 15,19±2,72 m/detik dengan nilai baPWV tinggi pada 75% (54 subyek). Nilai baPWV didapatkan lebih tinggi pada subyek dengan hipertensi sistolik dan diastolik, secara statistik bermakna. Hasil analisa korelasi antara NLR dengan kekakuan arteri yang diukur dengan baPWV didapatkan korelasi bermakna (r 0,235; $p<0,05$).

Kesimpulan: Terdapat korelasi positif antara *neutrophil–lymphocyte ratio* dengan kekakuan arteri yang diukur dengan baPWV. Semakin tinggi nilai *neutrophil–lymphocyte ratio* semakin tinggi kekakuan arteri pada DMT2.

Kata kunci: *neutrophil-lymphocyte ratio, brachial-ankle pulse wave velocity,* kekakuan arteri, Diabetes melitus tipe-2.

ABSTRACT

CORRELATION BETWEEN *NEUTROPHIL-LYMPHOCYTE RATIO* WITH ARTERIAL STIFFNESS IN TYPE-2 DIABETES MELLITUS

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Background: Type 2 diabetes mellitus increases the risk of atherosclerosis and cardiovascular disease which are the major cause of morbidity and mortality. Chronic inflammation in the arterial wall plays a crucial role in the initiation and progression of atherosclerosis. Neutrophil-lymphocyte ratio (NLR) is a biomarker of inflammation that is widely available, easily derived, and reproducible. The brachial-ankle pulse wave velocity (baPWV) is an indicator for early atherosclerotic changes. Early detection of abnormal NLR levels may be helpful for the search of subclinical atherosclerosis in patients with T2DM. Combined assessment of NLR as inflammatory marker and arterial stiffness may improve non-invasive assessment of cardiovascular risk.

Objective: To determine the correlation between the neutrophil-lymphocyte ratio count with arterial stiffness measured by baPWV in patients with T2DM.

Methods: This is observational analytic study with cross sectional design conducted in the Endocrinology and Diabetes outpatient clinic at the Dr. Soetomo Hospital in Surabaya during September until November 2019. Patients who met the inclusion and exclusion criteria were measured their laboratory tests and baPWV measurement. Neutrophil-lymphocyte ratio measured by dividing neutrophil with lymphocyte in complete blood count test and the baPWV by using the V Serra-1000. The results were analyzed using simple linear regression test, significant if $p < 0.05$.

Results: In this study, there were 72 subjects with mean of age was 54,33 ± 11,34 years with duration of diabetes was 7.34 ± 6.80 years. Most patients with overweight and obese. There is only one third subjects with good glycemic control, mean of HbA1c was 8.14 ± 1.59%. The mean of NLR count was 2.69 ± 1.23 and 61 subjects (84.7%) with high count of NLR. The mean of baPWV was 15.19±2.72 m/s and 54 subjects (75%) with high level of baPWV. The level of baPWV found higher in subjects with systolic and diastolic hypertension. There was a positive correlation between NLR count and baPWV level (r 0.235; $p<0.05$).

Conclusion: There was positive correlation between neutrophil–lymphocyte ratio count with arterial stiffness in T2DM.

Keywords: neutrophil-lymphocyte ratio, brachial-ankle pulse wave velocity, arterial stiffness, type-2 diabetes mellitus.