

# Hubungan asupan asam amino rantai cabang terhadap rasio neutrofil limfosit pada pasien tumor sistem saraf pusat di Rumah Sakit Cipto Mangunkusumo = The relationship between branched-chain amino acid intake and neutrophil lymphocyte ratio in patients with central nervous system tumors in Cipto Mangunkusumo Hospital

Sulistiyanti Dian Rachmawati, author

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## Abstrak

Latar Belakang: Tumor sistem saraf pusat (SSP) meningkatkan tekanan intrakranial dan menyebabkan berbagai gangguan neurologis yang dapat memengaruhi status gizi pasien. Status gizi memengaruhi imunitas bawaan dan adaptif. Pada hampir semua jenis keganasan kadar asam amino rantai cabang (AARC) didapatkan rendah. Asam amino rantai cabang meningkatkan imunitas dengan meningkatkan fagositik neutrofil, proliferasi limfosit, sintesis protein, menjaga jalur pensinyalan yang sensitif terhadap nutrisi. Rasio neutrofil limfosit (RNL) menggambarkan keseimbangan sistem imunitas dengan inflamasi. Peningkatan RNL dihubungkan dengan penurunan respon imun tubuh, terapi, harapan hidup dan prognosis. Penelitian ini dilakukan untuk mengetahui hubungan asupan AARC terhadap RNL pada pasien tumor SSP.

Metode: Penelitian ini merupakan studi potong lintang pada pasien tumor SSP yang dirawat di RSCM.

Karakteristik subjek berupa usia, jenis kelamin, jenis tumor, defisit neurologis, status performa karnofsky, indeks massa tubuh (IMT), status gizi berdasarkan ASPEN, penyakit komorbid, status infeksi, kemoterapi, radiasi, dan atau kemoradiasi, terapi glukokortikoid, asupan energi dan protein, asupan AARC, serta nilai RNL. Dilakukan analisis hubungan antara dua kelompok asupan AARC yang dibagi sesuai median populasi penelitian terhadap RNL.

Hasil: Terdapat 66 subjek penelitian dengan median usia 48 tahun, mayoritas subjek perempuan (56,1%), dengan jenis tumor sekunder sebanyak 38 subjek (57,6%). Defisit neurologis tertinggi berupa nyeri kepala (60,6%), proporsi status performa karnofsky terganggu sedang-berat (60,6%). Proporsi IMT estimasi normal sebanyak 34,8%, rerata IMT  $23,46 \pm 4,95$  kg/m<sup>2</sup>, dengan mayoritas malnutrisi (54,5%) berdasarkan kriteria ASPEN. Mayoritas subjek tidak memiliki komorbid (65,2%), tidak infeksi (80,3%), tidak menjalani kemoterapi, radiasi dan atau kemoradiasi (84,8%), serta tidak mendapat glukokortikoid (71,2%). Rerata asupan energi 1519 kkal, protein 65 g/hari, median AARC 9 g/hari. Terdapat perbedaan bermakna nilai RNL ( $p=0,047$ ) pada kelompok asupan AARC <9 g/hari (median RNL 4,9); pada kelompok asupan AARC 9 g/hari (median RNL 3,1).

.....Background: Central nervous system (CNS) tumors increase intracranial pressure and cause various neurological disorders that can affect the nutritional status of patients. Nutritional status influences both innate and adaptive immunity. In almost all malignancies, low levels of branched-chain amino acids (BCAA) are observed. Branched-chain amino acids enhance immunity by increasing neutrophil phagocytosis, lymphocyte proliferation, protein synthesis, and maintaining nutrient-sensitive signaling pathways. The neutrophil lymphocyte ratio (NLR) reflects the balance of the immune system with inflammation. An elevated NLR is associated with decreased body immune response, therapy outcomes, life expectancy, and prognosis. This study aims to determine the relationship between BCAA intake and NLR in CNS tumor patients.

**Method:** This is a cross-sectional study on CNS tumor patients treated at RSCM. Subject characteristics include age, gender, tumor type, neurological deficits, Karnofsky performance status, body mass index (BMI), nutrition status based on ASPEN, comorbidities, infection status, chemotherapy, radiation, and/or chemoradiation, glucocorticoid therapy, energy, and protein intake, BCAA intake, and NLR values. The analysis examines the relationship between two groups of BCAA intake divided according to the study population's median with NLR.

**Results:** There were 66 study subjects with a median age of 48 years, mostly female subjects (56,1%), with 38 subjects (57,6%) having secondary tumors. The highest neurological deficit was headache (60,6%), and the majority have a moderately to severely impaired Karnofsky performance status (60,6%). The proportion of estimated normal Body Mass Index (BMI) was 34.8%, with a mean BMI of  $23,46 \pm 4,95$  kg/m<sup>2</sup>, and the majority were malnourished (54,5%) based on ASPEN criteria. Most subjects had no comorbidities (65,2%), no infections (80,3%), did not undergo chemotherapy, radiation, and/or chemoradiation (84,8%), and did not receive glucocorticoids (71.2%). The mean energy intake was 1519 kcal, protein intake 65 g/day, and the median BCAA was 9 g/day. There was a significant difference in the NLR values ( $p=0,047$ ) between the group with BCAA intake  $<9$  g/day (median NLR 4,9) and the group with BCAA intake  $\geq 9$  g/day (median NLR 3,1).

**Conclusion:** BCAA intake is related to NLR values in CNS tumor patients. Higher BCAA intake is associated with lower NLR values.