

**AKURASI NILAI PUNCAK SINYAL *LACTATE*
DAN *N-ACETYLASPARTATE MAGNETIC RESONANCE SPECTROSCOPY*
MULTI-VOXEL DALAM MENENTUKAN KEGANASAN PADA EDEMA
PERITUMORAL TUMOR OTAK PRIMER**

Siti Fatima Azzahra¹, Yana Supriatna², Evi Artsini²

¹Residen Bagian Radiologi Fakultas Kedokteran, Kesehatan Masyarakat dan Keperawatan

²Staf Pengajar Bagian Radiologi Fakultas Kedokteran, Kesehatan Masyarakat dan Keperawatan
Universitas Gadjah Mada

ABSTRAK

Latar belakang dan Tujuan. Tumor intrakranial merupakan salah satu penyakit yang kejadiannya makin hari makin meningkat. Pengukuran nilai metabolit dengan menggunakan sekuen *Magnetic Resonance Spectroscopy* pada inti tumor dan edema peritumoral dapat berguna untuk menentukan derajat keganasan tumor otak primer. Tujuan penelitian ini untuk mengevaluasi nilai diagnostik nilai lactate dan rasio lactate/NAA pada edema peritumoral tumor otak primer dalam menentukan derajat keganasan tumor otak primer.

Bahan dan Metode. Penelitian observasional analitik retrospektif ini menggunakan data sekunder citra *Magnetic Resonance Imaging* kepala sekuen MRS dengan histopatologi tumor otak primer. Nilai puncak kurva metabolit lactate dan NAA diambil pada voxel di edema peritumoral dari tumor otak primer tersebut. Nilai diagnostik nilai puncak lactate dan rasio lactate/NAA pada edema peritumoral untuk menentukan derajat keganasan tumor otak primer menggunakan analisis *Receiver Operating Characteristic* (ROC).

Hasil. Didapatkan 23 pasien tumor otak primer derajat rendah dan 13 pasien tumor otak primer derajat tinggi. Berdasarkan analisis ROC, pengukuran pada area peritumoral tumor dari nilai lactate dan rasio lactate/NAA masing-masing menghasilkan *cutoff value* pada 5,3 dan 0,42, dengan sensitifitas 38,46% dan 53,85%, dan spesifisitas 91,3% dan 52,17% dengan nilai AUC yang mendekati kurva untuk membedakan derajat keganasan tumor otak derajat rendah dan tinggi.

Kesimpulan. Kombinasi pengukuran nilai lactate dan rasio lactate/NAA pada edema peritumoral tumor otak primer tidak memberikan nilai diagnostik tinggi yang signifikan dalam menentukan derajat keganasan tumor otak

Kata Kunci: *Magnetic Resonance Imaging, Magnetic Resonance Spectroscopy, derajat tumor otak primer, nilai diagnostik*

DIAGNOSTIC VALUE OF *LACTATE* AND *N-ACETYLASPARTATE* SIGNAL IN PERITUMORAL EDEMA ON *MULTI-VOXEL MAGNETIC RESONANCE SPECTROSCOPY* TO DETERMINE GRADE OF PRIMARY BRAIN TUMOR

Siti Fatima Azzahra¹, Yana Supriatna², Evi Artsini²

¹Student of the Postgraduate Study Program of Clinical Medical Science, Faculty of Medicine,

²Teaching Staff of Radiology Department of the Faculty of Medicine, Public Health and Nursing,
Universitas Gadjah Mada

ABSTRACT

Background and Purpose. Primary brain tumor is one of the diseases which occurrence is increasing every day. Measurement of metabolite values by using Magnetic Resonance Spectroscopy sequences in core tumors and peritumoral edema can be useful to determine malignancy degree of primary brain tumors. The purpose of this study was to evaluate the diagnostic value of lactate and lactate/NAA ratios in peritumoral edema of primary brain tumors in determining the degree of primary brain tumors malignancy.

Materials and Methods. This retrospective observational analytic study uses secondary data from MRS sequences of brain Magnetic Resonance Imaging with primary brain tumors as histopathological diagnosis. Lactate and NAA peak values that were taken in peritumoral edema voxels of the tumor. Diagnostic value of lactate peak and lactate/NAA ratio to determine grade of primary brain tumor using Receiver Operating Characteristic (ROC) analysis.

Result. There were 23 patients with low grade primary brain tumor and 13 patients with high grade primary brain tumor. According to ROC analysis, measurement on peritumoral edema area of the tumor from lactate peak value and lactate/NAA ratio respectively obtained cutoff value at 5,3 and 0,42, with sensitivity 38,46%, 53,85%, dan specificity 91,3%, 52,17% with area under the curve which approaching the curve itself to distinguish low-grade and high-grade primary brain tumor.

Conclusion. The combination of measuring lactate peak value and lactate/NAA ratio in the peritumoral edema of brain tumor failed to obtain a significant high diagnostic value to determine grade of primary brain tumors.

Keywords: *Magnetic Resonance Imaging, Magnetic Resonance Spectroscopy, primary brain tumor, diagnostic value*