PERBANDINGAN NILAI *APPARENT DIFFUSION COEFFICIENT*
ANTARA GLIOBLASTOMA DAN METASTASIS OTAK

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INTISARI

Latar Belakang dan Tujuan. Tumor otak dapat mengakibatkan terjadinya perubahan status mental, defisit neurologis, serta menciptakan beban sosial yang besar. Tumor otak primer dan metastasis secara signifikan menyebabkan morbiditas dan mortalitas. Pengukuran nilai *Apparent Diffusion Coefficient* (ADC) dapat menentukan karakterisasi tumor otak dan diferensiasi antara tumor otak dan lesi lainnya. Tujuan penelitian ini untuk mengetahui perbandingan rerata nilai ADC antara glioblastoma dan metastasis otak.

Bahan dan Metode. Penelitian *cross sectional* retrospektif dengan menggunakan data sekunder *Magnetic Resonance Imaging* (MRI) kepala sekuen ADC dengan histopatologi glioblastoma dan metastasis otak. Nilai ADC diambil dengan menempatkan *Region of Interest* teknik (ROI) *free hand* pada intratumoral (area solid dan kistik) dan peritumoral dengan bantuan sekuens DWI, T2-WI, dan T1+Gd. Pengukuran ROI menggunakan perangkat lunak RADIANT.

Hasil. Median nilai ADCmean intratumoral 2, ADCmin intratumoral 2 dan ADCmax intratumoral 2 pada kelompok glioblastoma lebih tinggi daripada kelompok metastasis ($p=0.002$, 0.001 dan 0.002). Rerata nilai ADCmax intratumoral 1 lebih rendah pada glioblastoma ($p=0.037$). Rerata nilai ADCmean intratumoral 1, ADCmin intratumoral 1, dan ADC peritumoral tidak bermakna secara statistik ($p > 0.005$) pada kelompok glioblastoma dan metastasis.

Kesimpulan. Nilai ADCmax area solid dan ADC (*mean, max, min*) area nekrotik mampu menjadi prediktor glioblastoma dengan nilai *cutoff* ADCmean pada area nekrotik 2.703 mm^2/ detik, disertai edema ringan dan pola penyangatan heterogen (sensitivitas 88,6% dan spesifisitas 71,4%).

Kata Kunci: *Apparent Diffusion Coefficient,* Glioblastoma, Metastasis Otak

APPARENT DIFFUSION COEFFICIENT VALUE COMPARISON BETWEEN GLIOBLASTOMA AND BRAIN METASTASIS

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ABSTRACT

Background and Purpose. Brain tumors cause changes in mental status, and neurological deficits, and create a large social burden. Primary and metastatic brain tumors cause significant morbidity and mortality. Measuring the accuracy of the Diffusion Weighted Imaging (DWI) and Apparent Diffusion Coefficient (ADC) values can determine the degree of glioma, characterize brain tumors, and differentiate between brain tumors and other lesions. The purpose of this study was to determine the difference in mean ADC values between glioblastoma and brain metastases.

Materials and Methods. A retrospective cross-sectional study using secondary magnetic resonance imaging (MRI) data for ADC head sequences with GBM histopathology. The ADC value was taken by placing the Region of Interest technique (ROI) with a free hand in the intratumoral and peritumoral areas with the help of DWI, T2-WI, and T1+Gd images. ROI measurement using RADIANT software.

Results. the mean values of intratumoral ADCmean 2, intratumoral ADCmin 2, and intratumoral ADCmax 2 in the glioblastoma group were higher than the metastatic group (p=0.002, 0.001 and 0.002). The mean values of intratumoral ADCmean 1, intratumoral ADCmin 1, peritumoral ADCmean and peritumoral ADCmin were not statistically significant (p > 0.005) in the glioblastoma and metastatic group.

Conclusion. Intratumoral and peritumoral ADC values were lower in glioblastoma compared to metastases. The value of intratumoral ADC can be a predictor of glioblastoma (sensitivity 88.6% and specificity 71.4%).

Keywords: Diffusion-Weighted Imaging, *Apparent Diffusion Coefficient*, Glioblastoma, Brain Metastasis