

AKURASI NILAI *APPARENT DIFFUSION COEFFICIENT* PADA EDEMA PERITUMORAL DALAM MENENTUKAN DERAJAT KEGANASAN ASTROSITOMA

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INTISARI

Latar Belakang dan Tujuan. Astrositoma adalah tumor otak dari sel glial yang merupakan tumor otak kedua terbanyak dengan mortalitas tinggi. Astrositoma terdiri dari tiga bagian yaitu keseluruhan bagian tumor, bagian padat tumor dan edema peritumoral. Pengukuran akurasi nilai *Apparent Diffusion Coefficient* (ADC) peritumoral dapat menentukan derajat astrositoma. Tujuan penelitian ini untuk mengevaluasi akurasi diagnostik nilai ADC peritumoral dalam menentukan derajat keganasan astrositoma.

Bahan dan Metode. Penelitian observasional analitik retrospektif ini menggunakan data sekunder *Magnetic Resonance Imaging* (MRI) kepala sekuen ADC dengan data histopatologi astrositoma. Nilai ADC diambil dengan menempatkan *Region of Interest* teknik (ROI) *free hand* pada gambar ADC pada area edema peritumoral. Akurasi diagnostik nilai ADC peritumoral untuk menentukan derajat astrositoma menggunakan analisis *Receiver Operating Characteristic* (ROC).

Hasil. Didapatkan 25 pasien astrositoma derajat tinggi dan 11 pasien astrositoma derajat rendah. Berdasarkan analisis ROC, pengukuran area edema peritumoral dari nilai ADC peritumoral menghasilkan *cutoff value* $1,356 \times 10^{-3} \text{ mm}^2/\text{s}$, dengan sensitifitas 84% dan spesifisitas 72,7% untuk membedakan astrositoma derajat tinggi dan rendah.

Kesimpulan. Pengukuran nilai ADC area edema peritumoral pada astrositoma menghasilkan nilai diagnostik tinggi dalam menentukan derajat keganasan astrositoma.

Kata Kunci: *Apparent Diffusion Coefficient*, derajat astrositoma, akurasi diagnostik.

THE ACCURACY OF APPARENT DIFFUSION COEFFICIENT VALUE ON PERITUMORAL EDEMA IN DETERMINING THE DEGREE OF ASTROCYTOMA MALIGNANCY

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ABSTRACT

Background and Purpose. Astrocytoma is a brain tumor that originates from glial cells, which is the second-largest brain tumor with high mortality rates. Astrocytoma consists of three parts, namely the entire tumor, the substantial part of the tumor and peritumoral edema. The accurate measurement of the peritumoral Apparent Diffusion Coefficient (ADC) value can determine the degree of astrocytoma. The purpose of this study was to evaluate the diagnostic accuracy of peritumoral ADC value in assessing the degree of astrocytoma malignancy (*the degree of astrocytoma malignancy).

Material and Method. This retrospective analytic observational study used secondary data from the ADC of head Magnetic Resonance Imaging (MRI) sequence and compared it to their histopathological findings. The ADC value was taken by placing the freehand Region of Interest (ROI) technique around the peritumoral edema area. The Receiver Operating Characteristic (ROC) analysis was used to estimate the diagnostic accuracy of peritumoral ADC values in determining the degree of astrocytoma.

Results. There were 25 high-grade astrocytoma patients and 11 low-grade astrocytoma patients. Based on the ROC analysis, the estimation of the peritumoral edema area by measuring the peritumoral ADC values resulted in a cutoff value of $1.356 \times 10^{-3} \text{ mm}^2/\text{s}$, with a sensitivity of 84% and a specificity of 72.7% to distinguish high and low-grade astrocytomas.

Conclusion. Measurement of the ADC value of peritumoral edema areas in astrocytomas produces a high diagnostic value in determining the degree of astrocytoma malignancy.

Keywords : Apparent Diffusion Coefficient, degree of astrocytoma malignancy, diagnostic accuracy.