PERBEDAAN NILAI *RELATIVE CEREBRAL BLOOD FLOW* PADA *MAGNETIC RESONANCE PERFUSION IMAGING* TERHADAP PASIEN *HIGH GRADE* DAN *LOW GRADE* GLIOMA

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ABSTRAK

Latar Belakang: Glioma merupakan tumor intrakranial yang berasal dari sel glia dan dapat dibedakan menjadi *low grade* glioma (LGG) dan *high grade* glioma (HGG). Penentuan *grade* penting untuk prognosis dan perencanaan terapi. Pemeriksaan MRI perfusi memungkinkan penilaian hemodinamik tumor secara non-invasif. *Relative cerebral blood flow* (rCBF) merupakan salah satu parameter penting yang dapat mencerminkan neovaskularisasi tumor dan menentukan *grade* glioma.

Metode: Penelitian ini merupakan studi observasional analitik dengan desain potong lintang yang dilakukan di RSUP Dr. Kariadi Semarang pada Juli 2023–Januari 2025. Total 91 subjek yang memenuhi kriteria inklusi dan eksklusi menjalani pemeriksaan MRI perfusi dan konfirmasi histopatologi. Data dianalisis menggunakan uji Mann-Whitney, ROC, dan uji diagnostik.

Hasil: Dari 91 pasien, 57 (62,6%) merupakan HGG dan 34 (37,4%) LGG. Nilai rCBF rata-rata pada HGG adalah 4,03 ± 1,22, sementara pada LGG sebesar 2,56 ± 1,70 (p=0,001). *Cut-off* rCBF sebesar 2,77 diperoleh dari kurva ROC (AUC = 0,864) dengan sensitivitas 91,2%, spesifisitas 82,4%, nilai prediksi positif (PPV) 90,2%, dan nilai prediksi negatif (NPV) 93,3%. Beberapa pasien LGG seperti pilocytic astrocytoma dan oligodendroglioma menunjukkan nilai rCBF tinggi melebihi *cut-off*.

Kesimpulan: Terdapat perbedaan signifikan nilai rCBF antara LGG dan HGG dengan nilai rCBF yang lebih tinggi ditemukan pada HGG. Nilai rCBF dapat digunakan sebagai biomarker non-invasif untuk membedakan kedua jenis glioma dengan *cut-off* optimal pada 2,77.

Kata kunci: glioma, MRI perfusi, rCBF, *high grade* glioma, *low grade* glioma

DIFFERENCE IN RELATIVE CEREBRAL BLOOD FLOW VALUES ON MAGNETIC RESONANCE PERFUSION IMAGING IN HIGH GRADE AND LOW GRADE GLIOMA PATIENTS

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ABSTRACT

Background: Glioma is an intracranial tumor originating from glial cells and can be classified into low grade glioma (LGG) and high grade glioma (HGG). Grade determination is important for prognosis and treatment planning. Perfusion MRI allows for non-invasive assessment of tumor hemodynamics. Relative cerebral blood flow (rCBF) is one of the key parameters that can reflect tumor neovascularization and determine glioma grade.

Methods: This was an analytical observational study with a cross-sectional design conducted at Dr. Kariadi General Hospital Semarang from July 2023 to January 2025. A total of 91 subjects who met the inclusion and exclusion criteria underwent perfusion MRI and histopathological confirmation. Data were analyzed using the Mann-Whitney test, ROC curve, and diagnostic test analysis.

Results: Of the 91 patients, 57 (62.6%) were HGG and 34 (37.4%) were LGG. The mean rCBF value in HGG was 4.03 ± 1.22, while in LGG it was 2.56 ± 1.70 (p=0.001). An rCBF cut-off of 2.77 was obtained from the ROC curve (AUC = 0.864) with a sensitivity of 91.2%, specificity of 82.4%, positive predictive value (PPV) of 90.2%, and negative predictive value (NPV) of 93.3%. Several LGG cases such as pilocytic astrocytoma and oligodendroglioma showed high rCBF values exceeding the cut-off.

Conclusion: There is a significant difference in rCBF values between LGG and HGG, with higher rCBF found in HGG. rCBF can be used as a non-invasive biomarker to differentiate between the two types of glioma, with an optimal cut-off value at 2.77.

Keywords: glioma, perfusion MRI, rCBF, high grade glioma, low grade glioma