

CORRELATION BETWEEN ENTORHINAL CORTEX VOLUME AND WHITE MATTER HYPERINTENSITY SCALE ON BRAIN VOLUMETRIC MRI OF DEMENTIA PATIENTS

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ABSTRACT

Background: Dementia is a progressive brain disorder characterized by a decline in cognitive functions such as memory, thinking, and the ability to perform activities. The condition is caused by a variety of factors, with Alzheimer's disease being the most common cause. The role of Radiology is very important in diagnosing dementia. Imaging techniques such as MRI and CT scans are used to measure brain atrophy, changes in brain structure, and the presence of white matter hyperintensity (WMH). Brain atrophy, especially in the hippocampus and entorhinal cortex, is an early marker of Alzheimer's disease. WMH, on the other hand, is often associated with vascular dementia.

Objective: This study aimed to determine the correlation between the volume of the Entorhinal cortex and the White Matter Hyperintensity scale in the volumetric MRI of the brain of dementia patients.

Methods: The design of this study is cross-latitude using secondary data from the medical records of dr. Sardjito Yogyakarta Hospital. The subjects of the study were dementia patients who underwent brain volumetric MRI examinations from January 2022 to January 2024 with a total sampling technique.

Results: The study subjects were 34 people with an average age of 67.65 ± 1.424 years. Based on gender groups, the majority are male (55.9%), and with a body mass index of not obese (82.4%). The results of the Spearman correlation test between the volume of the Entorhinal cortex and the Fazekas scale were obtained $p=0.001$ with $r=-0.535$.

Conclusion: There was a significant correlation between the volume of the Entorhinal cortex and the Fazekas scale in dementia patients. Dementia is found in the majority of men and with a normal body mass index. A decrease in the volume of the Entorhinal cortex is moderately correlated with an increase in the scale of the Fazekas.

Keywords: Entorhinal atrophy, white matter hyperintensity, dementia, cerebral volumetric MRI.

KORELASI ANTARA VOLUME KORTEKS *ENTORHINAL* DENGAN *WHITE MATTER HYPERINTENSITY SCALE* PADA MRI VOLUMETRIK OTAK PASIEN DEMENSIA

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INTISARI

Latar Belakang: Demensia adalah gangguan otak progresif yang ditandai dengan penurunan fungsi kognitif seperti memori, berpikir, dan kemampuan untuk melakukan aktivitas. Kondisi ini disebabkan oleh berbagai faktor, dengan penyakit Alzheimer sebagai penyebab paling umum. Peran radiologi sangat penting dalam mendiagnosis demensia. Teknik pencitraan seperti MRI dan CT scan digunakan untuk mengukur atrofi otak, perubahan struktur otak, dan keberadaan white matter hyperintensity (WMH). Atrofi otak, terutama pada hippocampus dan korteks *entorhinal*, merupakan penanda awal penyakit *Alzheimer*. WMH, di sisi lain, sering dikaitkan dengan demensia vaskular.

Tujuan: Penelitian ini bertujuan untuk mengetahui korelasi volume korteks Entorhinal dengan skala *White Matter Hyperintensity* pada MRI volumetrik otak pasien demensia.

Metode: Desain penelitian ini adalah potong lintang menggunakan data sekunder dari rekam medis RSUP dr. Sardjito Yogyakarta. Subjek penelitian adalah pasien demensia yang menjalani pemeriksaan MRI volumetrik otak pada Januari 2022 hingga Januari 2024 dengan teknik *total sampling*.

Hasil: Subjek penelitian berjumlah 34 orang dengan rerata usia $67,65 \pm 1,424$ tahun. Berdasarkan kelompok jenis kelamin mayoritas adalah laki laki (55,9%), dan dengan indeks massa tubuh tidak obesitas (82,4%). Hasil uji korelasi Spearman antara volume korteks *Entorhinal* dengan skala *Fazekas* didapat $p=0,001$ dengan $r=-0,535$.

Kesimpulan: Didapatkan adanya korelasi signifikan antara volume korteks *Entorhinal* dengan skala *Fazekas* pada pasien demensia. Demensia dijumpai secara mayoritas pada laki-laki dan dengan indeks massa tubuh normal. Penurunan volume korteks *Entorhinal* berkorelasi sedang dengan peningkatan skala *Fazekas*.

Kata Kunci: *Entorhinal atrophy*, *white matter hyperintensity*, demensia, MRI volumetrik otak.