

ABSTRACT

The Relationship between Cognitive Ability and Amyloid β Peptide 40 Plasma Level in Patients with Type 2 Diabetes Mellitus at RSUP dr. Sardjito Yogyakarta

Background: Diabetes mellitus (DM) is a chronic disease that occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. There is an increased prevalence of diabetes mellitus in Indonesia and almost all over the world. Diabetes mellitus can cause various complications, one of which is cognitive decline. Amyloid β peptide plasma is a noninvasive biomarker for predicting the presence of cognitive impairment.

Objective: To determine A β 40 plasma level, cognitive abilities as well as the correlation between A β 40 plasma level with cognitive abilities in subjects with type 2 diabetes mellitus.

Methods: The study design was a cross sectional analytic study of subjects with type 2 DM at Endocrinology Polyclinic dr. Sardjito Hospital, Yogyakarta. Amyloid β peptide 40 plasma level (A β 40) was measured by enzyme-linked immunosorbent assay (ELISA) method while cognitive ability examination by using Mini Mental State Examination (MMSE).

Results: Subjects were analyzed totaled 29. Median A β 40 plasma level in subjects with type 2 diabetes mellitus is 550,70 (11,69-690,66) pg/mL with mean of 492,89 \pm 195,51 pg/mL. Subjects with cognitive abilities under normal value as much as 10,3%. There is a very weak positive correlation between A β 40 plasma level and cognitive abilities but not statistically significant ($r=0,109$; $p>0,05$).

Conclusion: Median A β 40 plasma level in subjects with type 2 diabetes mellitus is 550,70 (11,69-690,66) pg/mL. Cognitive ability in subjects with type 2 diabetes mellitus mostly normal but there is a decrease in the domain of language, recall, attention & calculation, and orientation. There is no correlation between amyloid β peptide 40 plasma level and cognitive ability in type 2 diabetes mellitus.

Keywords: Diabetes mellitus, amyloid β peptide 40 plasma, cognitive ability, cognitive decline, Mini Mental State Examination.

INTISARI

Hubungan antara Kemampuan Kognitif dan Kadar *Amyloid β Peptide 40 Plasma* pada Penderita Diabetes Mellitus Tipe 2 di RSUP dr. Sardjito Yogyakarta

Latar Belakang: Diabetes mellitus (DM) adalah penyakit kronis yang terjadi ketika pankreas tidak cukup memproduksi insulin atau ketika tubuh tidak dapat menggunakan insulin yang diproduksi secara efektif. Terdapat peningkatan prevalensi diabetes mellitus di Indonesia bahkan hampir di seluruh dunia. Diabetes mellitus dapat menimbulkan berbagai komplikasi, salah satunya yaitu penurunan kemampuan kognitif. *Amyloid β peptide 40 plasma* merupakan biomarker noninvasif untuk memprediksi adanya gangguan kognitif.

Tujuan: Untuk mengetahui kadar $A\beta_{40}$ plasma, kemampuan kognitif serta korelasi antara kadar $A\beta_{40}$ plasma dengan kemampuan kognitif pada penderita DM tipe 2.

Metode: Desain penelitian berjenis analitik *cross sectional* pada subjek penderita DM tipe 2 di Poliklinik Endokrinologi RSUP dr. Sardjito, Yogyakarta. Pemeriksaan $A\beta_{40}$ plasma diukur dengan metode *Enzyme-linked Immunosorbent Assay* (ELISA) sedangkan pemeriksaan kemampuan kognitif dengan menggunakan *Mini Mental State Examination* (MMSE).

Hasil Penelitian: Subjek yang dianalisis berjumlah 29. Median kadar $A\beta_{40}$ plasma pada penderita DM tipe 2 yaitu 550,70 (11,69-690,66) pg/mL dengan rerata sebesar $492,89 \pm 195,51$ pg/mL. Subjek dengan kemampuan kognitif di bawah nilai normal sebanyak 10,3%. Terdapat korelasi yang positif antara kadar $A\beta_{40}$ plasma dan kemampuan kognitif subjek dengan kekuatan yang sangat lemah dan tidak bermakna secara statistik (nilai $r=0,109$; $p>0,05$).

Kesimpulan: Median kadar $A\beta_{40}$ plasma pada penderita DM tipe 2 yaitu 550,70 (11,69-690,66) pg/mL. Kemampuan kognitif pada penderita DM tipe 2 sebagian besar normal tetapi terdapat penurunan pada domain bahasa, *recall*, atensi & kalkulasi, dan orientasi. Tidak terdapat korelasi antara kadar *amyloid β peptide 40 plasma* dengan kemampuan kognitif pada penderita DM tipe 2.

Kata Kunci: Diabetes mellitus, *amyloid β peptide 40 plasma*, kemampuan kognitif, penurunan kemampuan kognitif, *Mini Mental State Examination*.