The Study of Association between Serum Brain Derived Neurotrophic Factor Protein and Dyslipidemia on Memory Performance in Thai Alzheimer's Disease Patients

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Introduction

It is well known that BDNF protein has many important functions in neuronal survival, synaptic plasticity, and neurogenesis in rat hippocampus including learning and memory. The lower BDNF protein level results in a decrease in synaptic transmission leading to neuronal damage in hippocampus and neurodegenerative diseases in ageing. Moreover, BDNF protein also promotes neurites outgrowth.

Objective

To investigate the association between Serum Brain Derived Neurotrophic Factor (BDNF) Protein and dyslipidemia on memory performance in Thai Alzheimer's Disease (AD) patients.

Methods

After this research project has been certified by human ethic committee of Srinakharinwirot University, we recruited volunteer male and female subjects with aged 45 or more. Before all subjects began to participate in this research, they had to perform Thai Mini Mental State Examination (TMMSE). Then thirty healthy subjects were enrolled as control group whereas fifteen AD patients were participated as experimental group. Later they were withdrawn 10 milliliters of venous blood samples from left antecubital vein. Blood samples were left at room temperature (25°C) until they become clotted. They were centrifuged to separate supernatant for BDNF protein assay by Enzyme Linked Immunosorbent Assay (ELISA) (Milliplex assay kit, Merck Millipore, Germany). Additionally, supernatant was used to analyze lipid profile including triglycerides (TG), total cholesterol (TC), low density lipoprotein (LDL) and high density lipoprotein (HDL) by colorimetric method.

Results

Serum BDNF protein in AD patients was lower and significant different from that in control group at $p<0.05$. However, triglycerides, total cholesterol, low density lipoprotein and high density lipoprotein in AD had no significant difference compared with control group. Furthermore, TMMSE scores in AD is significantly lower than that in control group at $p<0.001$.

Discussion

Serum BDNF protein in Thai AD patients has declined in the same manner of TMMSE scores which represent their memory performance. However, memory performance in Thai AD patients has changed significantly compared with that of serum BDNF protein.

Conclusion

We can conclude that the significant difference level of serum BDNF protein in Thai AD patients at $p<0.05$ may cause the lower scores of TMMSE leading to a significant reduction in memory performance in Thai AD patients.

References

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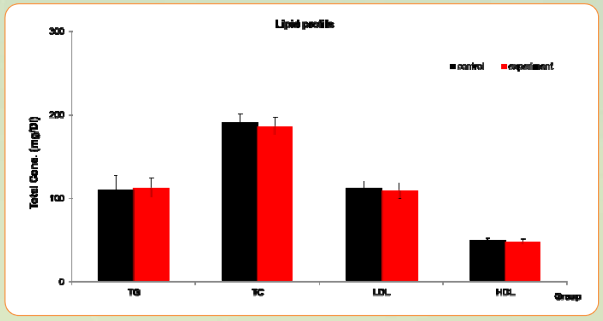


Figure 1. Bar graphs represent serum lipid profile: TG, TC, LDL, HDL in control and experiment groups are (110.16 ± 17.60, 190.90 ± 10.23, 112.02 ± 8.30, 50.36 ± 2.09 mg/Dl) and 112.92 ± 10.60, 186.55 ± 10.93, 108.91 ± 9.27, 48.04 ± 3.39 mg/Dl). Data are means ± SEM.

No significant difference of lipid profile in control group compared with experimental group (AD patients).

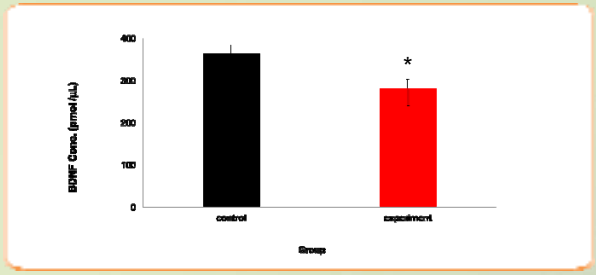


Figure 2. Bar graphs represent serum BDNF in control and experiment groups are 363.60 ± 21.66 and 282.17 ± 42.07 pmol/µL. Data are means ± SEM.

* Significant difference of serum BDNF in control group compared with experimental group (AD patients) at $p<0.05$.

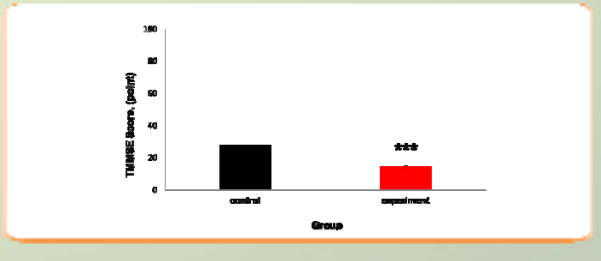


Figure 3. Bar graphs represent TMMSE scores in control and experiment groups are 27.62 ± 0.36 and 14.73 ± 1.90. Data are means ± SEM.

*** Significant difference of TMMSE score in control group compared with experimental group (AD patients) at $p<0.001$.

Acknowledgements

This research was granted in 2015 by the Office of the Higher Education Commission, Ministry of Education, THAILAND.