COMPARATIVE STUDY BETWEEN METFORMIN AND INSULIN USE ON COGNITIVE STATUS IN TYPE 2 DIABETIC EGYPTIAN PATIENTS

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### **INTRODUCTION**

Diabetes mellitus is a serious, long-term disease with a global prevalence 10.5% in 2021. Type 2 diabetes and insulin resistance remained one of the most adjustable risk factors for the development of dementia and AD, with a twofold increased risk of accelerated cognitive decline, dementia and cognitive impairment. Brain Derived Neurotrophic Factor (BDNF) is a key molecule posing survival and growth promoting actions on a variety of neurons, including hippocampal and cortical neurons, involved in plastic changes related to learning and memory. It plays a major role in synaptic plasticity, neuronal differentiation and survival, neuroprotection, and neuronal resilience and restoration against broad range of cellular insults. In addition, it has a key role in regulating axonal and dendritic growth and guidance, long-term potentiation (LTP) and participation in neurotransmitter release

# **AIM OF THE WORK**

The present study aimed of comparing metformin and insulin use on cognitive status manifested by Mild cognitive impairment (MCI) using mini mental status examination (MMSE) and its relation to serum BDNF.

## **SUBJECTS AND METHODS**

a cross sectional –observational study carried on 200 patient with type 2 DM (T2DM) (100 T2DM metformin treated patients and 100 T2DM insulin treated patients). After full informed consent was taken from the patients and approval of the ethical committee of faculty of Medicine, Alexandria University was fulfilled. The prevalence of MCI was estimated using Mini Mental State Examination (MMSE) Test Score. Normal cognitive functions; MMSE test score was equal or above 26, but below 26 considered MCI.

#### **RESULTS**

the overall prevalence of MCI in type 2 diabetic Egyptian patient was 38% (n=200), with mean value  $24.5 \pm 4.84$ . The mean of MMSE Score was significantly higher in Metformin treated cases than in Insulin treated cases (figure-1) ( $P < 0.001^*$ ). This could be partially explained by effect of drugs on serum BDNF level as the present study revealed that serum concentration of BDNF in Metformin treated group was significantly high compared to serum concentration of BDNF in Insulin treated group (figure-2&3). (P<0.001\*)







Figure (2): Relation between the insulin and metformin treated cases according to **sBDNF** 



taking in consideration the above mentioned results. In addition, that measurement of MMSE score closely linked to serum BDNF assay (a strong positive significant correlation). The findings could shed the light on the potential benefit of BDNF as a marker of mild cognitive impairment. Finally, the observed neuroprotective effect of metformin on cognitive impairment in T2DM might be due to its positive effect on serum BDNF level. Making it a favorable anti-diabetic drug to be used in AD-like dementia. The most common anterior segment abnormalities in the current study were: corneal opacity, deep anterior chamber, variable iris pattern an aphakia. The sclera and conjunctiva did not show significant abnormalities in the current study.

The most common posterior segment abnormalities in the present study were optic atrophy and an atrophic background retina.

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