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International Conference On Medical  
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as

**ORAL PRESENTER**

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**The Association of Brain Derived Neurotrophic  
Factor and Malondialdehyde level with  
Depression in Patient Post-Stroke**

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## **The Association of Brain Derived Neurotrophic Factor and Malondialdehyde level with Depression in Patient Post-Stroke**

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## **Outline**

- Introduction
- Methods
- Results
- Discussion
- Conclusion
- Recommendations



## Introduction

- Post-stroke depression (PSD) is a serious and very disturbing stroke recovery process
- Incidence : 20% - 50%
- The pathogenesis of PSD is very complex
- One of them is Neurogenesis factor
- BDNF has several functions : axonal regulation, dendritic growth, neurotransmitter release, and long-term potentiation (LTP).
- BDNF has a role as the main regulator of synaptic plasticity <sup>(5)</sup>.



cont

- Clinical studies : serum BDNF levels and decreased of hippocampal volume is correlate with memory disorders and neuropsychiatric disorders.
- It has been proven that free radicals also play a role in the pathophysiology of depression
- MDA is one of endproduct from peroxidation of lipid





cont

- Recently : MDA was found elevated in patients who had been diagnosed with major depression <sup>(9)</sup>.
- Stefanescu et al, found a higher MDA concentration in patients with recurrent episodes of depression <sup>(10)</sup>.
- Increased levels of MDA was also found in depression patients with another disease, such as chronic heart failure (11).



cont

- We wants to conduct a research to see the relationship between BDNF and MDA serum level in the **acute phase of stroke with post-stroke depression after 1-month of onset.**



## Methods

- Observational study, a case control design was conduct in 72 post ischemic stroke patient :
  - 36 post-stroke patient with depression
  - 36 patient without depressionat DR M Djamil Hospital, Jan - Sept 2018.
- Inclusion Criteria :
  - onset <72 hours
  - age <70 years old



cont

- no history of depression before onset of stroke
- symptoms of depression was persist for > 2 weeks
- not suffering from the other neurodegenerative diseases like Alzheimer and Parkinson.
- The examination of depression using Hamilton Depression Rating Scale in 1 month after onset of stroke



cont

- based on Hamilton test result, the patient was divided into two groups which is post-stroke groups with depression and group without depression.
- Levels of BDNF and MDA was examined using Elisa method in 72 hours onset



cont

#### Statistical analysis

- The differences of mean levels of this two groups were tested by t-test and Mann-Whitney test
- The differences of basic characteristic of this two groups were tested by chi-square tes



## Results

Table 1. The basic characteristic of those two groups can be seen below

	Post Ischemic Stroke		P
	With Depression	Without Depression	
Age	59,67 ± 9,7	59,64 ± 11,2	0,85 <sup>a</sup>
Sex: Male/Female	18/18	19/17	0,814 <sup>a</sup>
Education Level : Low/High	18/18	12/24	0,151 <sup>a</sup>
Marriage status:			
Married/unmarried	32/4	31/5	0,722 <sup>a</sup>
Hemiparesis: right/ left	11/25	19/17	0,056 <sup>a</sup>

<sup>a</sup> Chi-square

basic characteristic of this two groups (with and without depression ) was statistically equivalent ( $p > 0,05$ ).



## cont

Table 2. Vascular Risk Factor and It's Relationship with The incident of Post-Stroke Depression

Variable	Post-stroke Depression		Total	OR	p value
	Yes	No			
Hypertension, n(%)					
• Yes	25 (46,3)	29 (53,7)	54	0,549	0,276 <sup>a</sup>
• No	11 (61,1)	7 (38,9)	18		
Diabetes Mellitus, n(%)					
• Yes	14 (70,0)	6 (30,0)	20	3,182	0,035 <sup>a</sup>
• No	22 (42,3)	30(57,7)	52		
Smoking, n(%)					
• Yes	15 (50,0)	15 (50,0)	30	1,000	1,000 <sup>a</sup>
• No	21 (50,0)	21 (50,0)	42		
Total	37	37	74		





cont

Table 3. The Differences in mean Serum Level of Brain Derived Neurotrophic Factor (BDNF) and Malonylaldehyd (MDA) in those two group

Variable	Post Ischemic Stroke		P
	With Depression	Without Depression	
BDNF Level	6442,50 ± 1747,48	7522,33 ± 1638,45	0,009 <sup>a</sup>
MDA Level	110,06 ± 33,27	99,98 ± 54,76	0,024 <sup>b</sup>

<sup>a</sup> t test

<sup>b</sup> mann-whitney test



## Discussion

- The basic data between case groups (stroke with depression) and control (post-stroke without depression) were statistically equivalent.
- low serum BDNF levels were found on patients with post-stroke depression compared to the post-stroke patients without depression



cont

- BDNF have a beneficial effect on stroke recovery through several mechanisms:
  - protection against acute ischemic injury
  - increased angiogenesis and neurogenesis
  - improved brain repair
  - increased synaptic plasticity



cont

- MDA levels is higher in post-stroke depression compared to post-stroke without depression and this difference was statistically significant.
- MDA is the final product of PUFA and arachidonic acid (AA) peroxidation. MDA inhibits serotonin receptor ligand binding and therefore affects serotonin metabolism.



## Recommendation

- This study has several weaknesses, including not analyzing the effect of vascular risk factors on BDNF and MDA levels, and also did not include other risk factors such as dyslipidemia and heart disease.



## Conclusion

- This study shows the association of lower level of BDNF serum and higher level of MDA in the acute phase with the incidence of post-stroke depression.



Thank you