

## Association of Biochemical Markers with Postoperative Delirium and Cognitive Dysfunction in Elderly Orthopedic Patients

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### INTRODUCTION

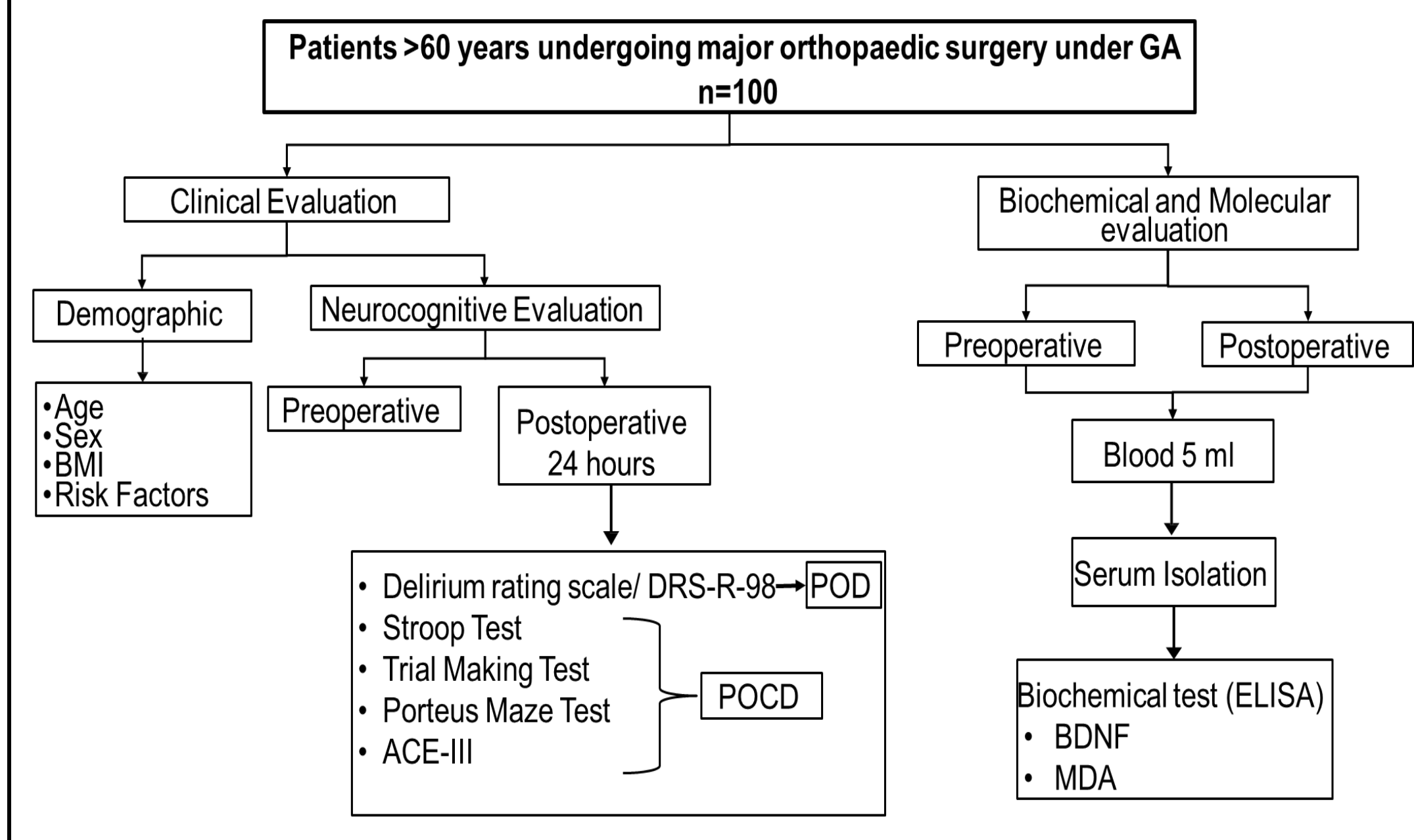
- Rising life expectancy has increased the number of elderly patients undergoing major surgeries.
- This group is at higher risk of postoperative neurocognitive complications such as delirium (POD) and cognitive dysfunction (POCD)<sup>1</sup>.
- POD occurs in 14–60% of older adults within 72 hours of surgery, while POCD develops in nearly 30–50% of elderly patients<sup>1</sup>.
- Neuroinflammation, oxidative stress, and neuronal dysfunction are key contributing mechanisms<sup>2</sup>.
- Early detection and better understanding of these complications are essential to improve outcomes and quality of life.
- **Hypothesis:** Postoperative cognitive decline in elderly patients is associated with alterations in serum BDNF and MDA levels.

### OBJECTIVES

- To evaluate postoperative cognitive function in elderly patients undergoing major orthopedic surgery.
- To investigate the association between cognitive changes and serum levels of BDNF and MDA.

### METHOD

#### A Prospective Observational Study CTRI (CTRI/2024/12/077549)



### RESULTS AND DISCUSSION

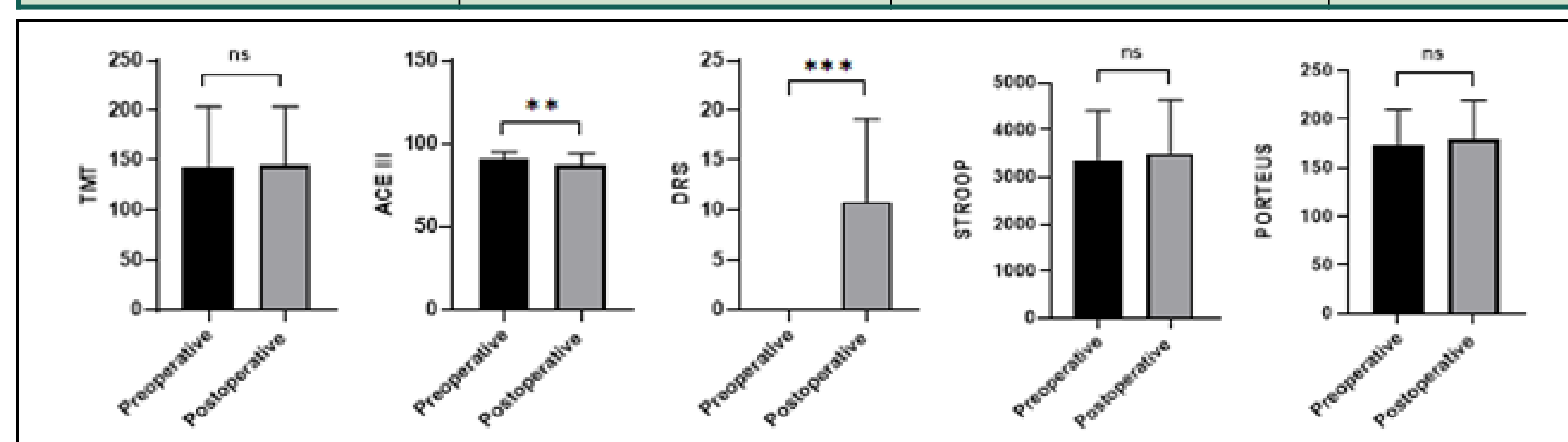
- **Patient characteristics:** Mean age was 67.67 ± 6.2 years (44 males, 36 females) with a mean BMI of 23.08 ± 4.2.
- **Cognitive outcomes:** Significant postoperative decline was observed in **ACE-III** (p = 0.01) and **DRS-R-98** (p = 0.0001) scores.
- **Other cognitive tests:** No significant postoperative changes were noted in **TMT-B**, **Stroop Test**, or **Porteus Maze** scores.
- **Biomarker findings:** **MDA levels** showed a near-significant reduction (885.01 ± 891.26 to 670.35 ± 570.41 nmol/mL; p = 0.07), suggesting a possible postoperative decrease in oxidative stress.

**Table 1: Demographic & Clinical Characteristics**

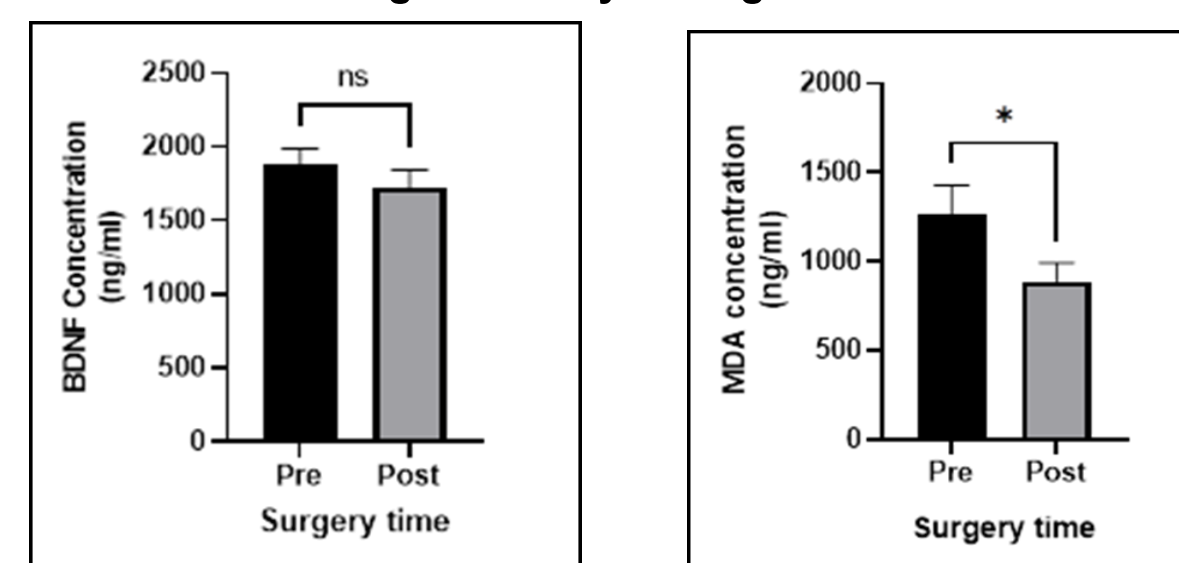
S.No	Variables	Cases
1.	Age	67.67 ± 6.2
2.	Gender: Male Female	44 36
3.	BMI	23.08 ± 4.2
4.	Comorbidities	
5.	ASA Grade I/II	62/18
6.	PONV	18
7.	Glucose	105.72 ± 72.60
8.	TSH	5.3 ± 3.4
9.	Calcium	11.3 ± 12.5
10.	Phosphorous	7.6 ± 19.5
11.	Sodium	130.4 ± 33.7
12.	Potassium	10.1 ± 24.8
13.	Chloride	96.53 ± 25.7

**Table 2: Psychological and biochemical test parameters**

Parameters	Preoperative (Mean ± SD)	Postoperative (Mean ± SD)	P- value
<b>Psychological parameters</b>			
TMT-B	142.79 ± 46.9	141.34 ± 56.9	0.3
ACE-III	92.29 ± 4.5	91.07 ± 7.07	0.01
DRS-98/R	0	5.5 ± 7.9	0.0001
Stroop Test	2.7 ± 2.6	2.5 ± 2.4	0.09
Porteus Maze Test	3.4 ± 0.9	3.4 ± 1.3	0.07
<b>Biochemical parameters</b>			
BDNF ng/mL	1244.26 ± 839.50	1182 ± 796.65	0.63
MDA ng/mL	885.01 ± 891.26	670.35 ± 570.41	0.07



**Figure 1: Psychological Parameters**



**Figure 2: Biochemical Parameters**

### CONCLUSION

- Elderly patients are at high risk for POD and POCD.
- Postoperative cognitive decline was seen in ACE-III and DRS-R-98 scores.
- MDA suggest oxidative stress may influence cognitive outcomes.
- Routine cognitive and biochemical monitoring are recommended.

### REFERENCES

1. Fong TG, Tulebaev SR, Inouye SK. Delirium in elderly adults: diagnosis, prevention and treatment. Nat Rev Neurol 2009
2. Krogseth M, Watne LO, Juliebo V, Skovlund E, Engedal K, Frihagen F, et al : Delirium is a risk factor for further cognitive decline in cognitively impaired hip fracture patients, 2016