Blood Biomarkers of Brain Damage in Transient Ischemic Attack: The role of plasma NfL and GFAP

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Objectives: Despite its transient clinical presentation, transient ischemic attack (TIA) is associated with increased long-term mortality and cognitive decline [1][2]. We investigated whether plasma NfL and GFAP were elevated in patients with clinical TIA and negative MRI compared to healthy controls.

Materials and Method: Retrospective single center analysis of patients with TIA, age and sex matched with healthy controls (HC) in a 1:2 ratio.
All TIA patients required a negative-MRI and blood sampling within 24h from admission on Simoa SR-X.

Results: This study enrolled 108 demographically balanced patients, 36 consecutive TIA patients and 72 HC **[Table 1]**.
NfL and GFAP levels were significantly elevated in TIA vs HC **[Figure 1]**.
The threshold with optimal sensitivity and specificity tradeoff was 16.83 pg/ml for NfL and 179.23 pg/ml for GFAP. Their diagnostic performance are summarized in **Table 2 and Figure 2**.
The highest discrimination was reached when considering a combined assessment (at least one biomarker above threshold).

Table 1.	HC (n = 72)	TIA (n = 36)	p-value
Mean Age (years)	66.92 y ± 13.24	66.61 y ± 5.18	0.982
Sex n, (F%)	30 (41.67)	15 (41.67)	1.000
HPN n, (%)	25 (35.2)	26 (72.2)	<0.001
Diabetes n, (%)	8 (11.3)	4 (11.1)	0.981
Dyslipidemia n, (%)	25 (35.2)	19 (52.8)	0.081
Smoke n, (%)	29 (40.8)	10 (41.7)	0.944
Mean NfL (ng/ml) [min – max]	10.44 [3.1 – 21.26]	27.22 [4.94– 196.62]	<0.001
Mean GFAP (pg/ml) [min – max]	131.65 [51.803 – 460.696]	301.99 [78.779– 805.728]	<0.001

Figure 1.

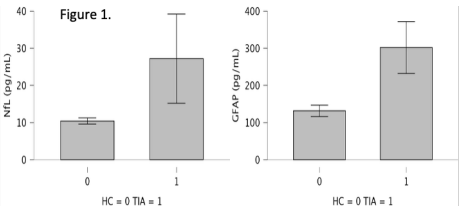
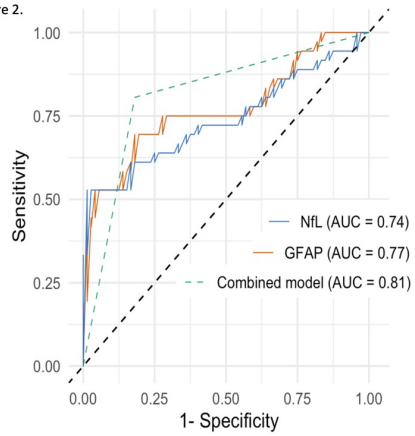


Table 2.	Sensitivity	Specificity
NfL	52.8%	98.6%
GFAP	69.4%	81.9%
At least one positive biomarker	80.5%	81.9%

Figure 2.



Discussion and Conclusion: TIA patients had significantly elevated plasma NfL and GFAP levels compared to controls. Our findings are hypothesis-generating, suggesting subtle neuronal and astroglial injury below MRI resolution. Together, they may support diagnosis in MRI-negative patients, possibly helping clinicians in rouling out TIA mimics.

Bibliography:
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[2] Del Bene VA , Howard G, Gropen TI, et al. Cognitive Decline After First-Time Transient Ischemic Attack. JAMA Neurol. 2025;82(4):323–332. doi:10.1001/jamaneurol.2024.5082