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BACKGROUND

Blood-based biomarkers (BBM) and visual atrophy scales (VAS) derived from magnetic resonance imaging (MRI) are contemporary tools for dementia diagnosis. Establishing their correlation is essential to optimize clinical practice, especially in low-and middle-income countries, where access to plasma markers is limited. We aimed to evaluate the correlation between BBM and multiple VAS.

METHODS

This is a cross-sectional study, using data from the Cog-Aging cohort (2019-2024). Participants (n=28) underwent a comprehensive clinical, neuropsychological and neuroimaging assessment, and had plasma collected within 6 months of MRI. BBM (pTau-217, Aβ42, Aβ40, GFAP, and NfL) were quantified using single-molecule array technology (Simoa®). MRIs were assessed by two independent physicians, using the Entorhinal Cortical Atrophy (ERICA) scale, the Medial Temporal Lobe Atrophy (MTA) scale, the Posterior Atrophy Scale (Koedam) and the White Matter Lesion Scale (Fazekas). Spearman's correlation was used to associate each VAS final score, BBM levels, age and creatinine clearance. Those with significant correlations were further assessed using a Generalized Linear Model (GLM).



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MRI visual atrophy scales correlated with BBM, particularly GFAP and pTau-217

RESULTS

Table 1. Generalized Linear Models

Model Summary

Model	Deviance	AIC	BIC	df	X²	p
Association between MTA and NFL						
H ₀	6.712	212.500	215.200	27.000		
H ₁	4.318	203.800	209.100	25.000	2.393	0.005
Association between MTA and GFAP						
H ₀	10.050	340.300	343.000	27.000		
H ₁	6.009	329.300	334.600	25.000	4.042	0.002
Association between ERICA and TAU						
H ₀	11.892	20.420	23.080	27.000		
H ₁	9.525	15.820	19.810	26.000	2.367	0.022
Association between ERICA and NFL						
H ₀	6.712	212.500	215.200	27.000		
H ₁	4.513	205.000	210.400	25.000	2.198	0.009
Association between ERICA and GFAP						
H ₀	10.050	340.300	343.000	27.000		
H ₁	6.272	328.500	332.500	26.000	3.778	< .001
Association between KOEDAM and TAU						
H ₀	11.892	20.420	23.080	27.000		
H ₁	8.513	12.500	16.500	26.000	3.379	0.003
Association between KOEDAM and GFAP						
H ₀	10.050	340.300	343.000	27.000		
H ₁	8.736	338.200	342.200	26.000	1.315	0.114

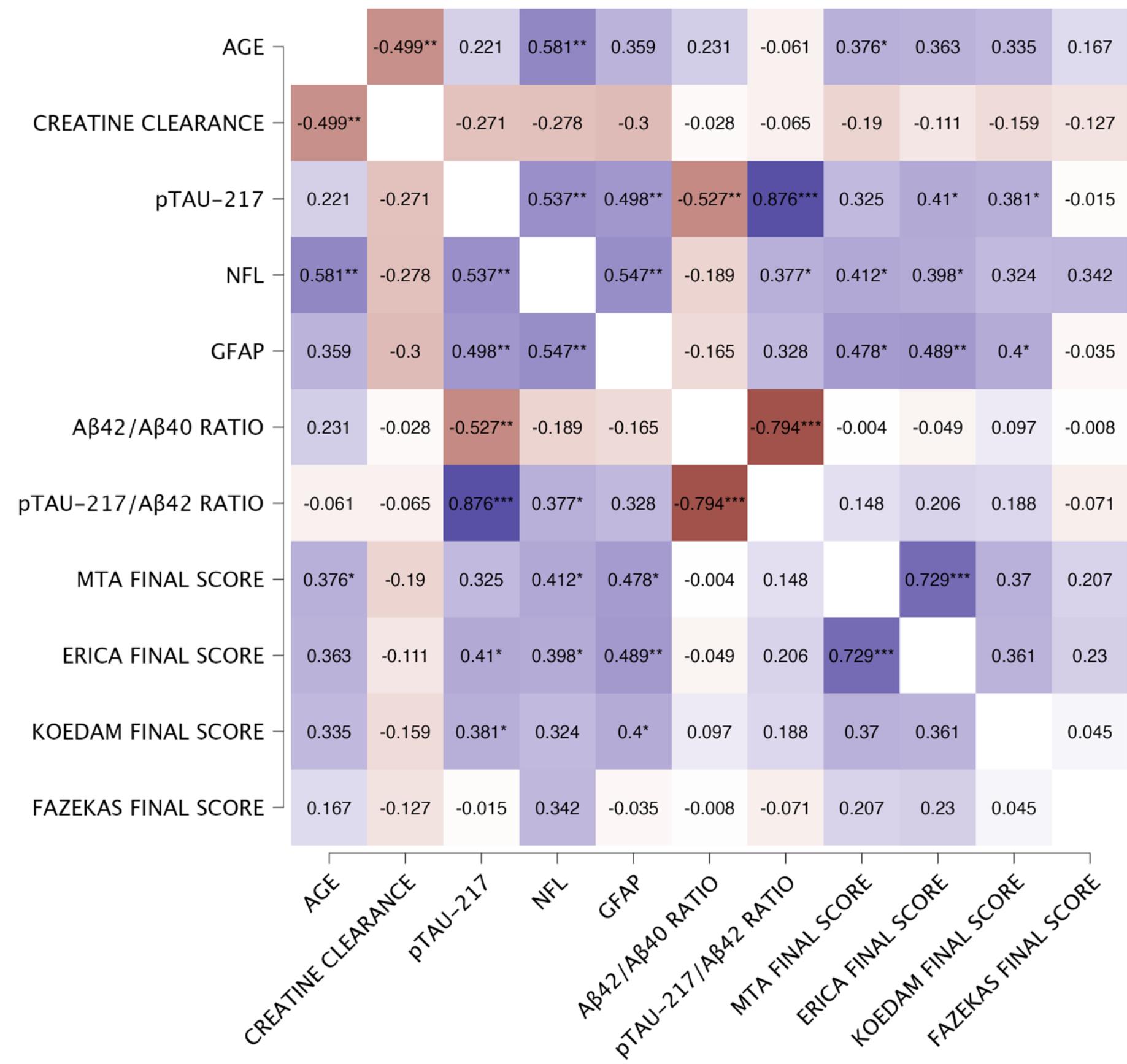
Coefficients

Model	Estimate	Standard Error	t	p
Association between MTA and NFL	(Intercept)	0.483	0.737	0.655
	AGE	0.031	0.010	3.065
	MTA FINAL SCORE	0.143	0.104	1.375
				0.181
Association between MTA and GFAP	(Intercept)	2.837	0.862	3.292
	AGE	0.022	0.012	1.904
	MTA FINAL SCORE	0.341	0.122	2.801
				0.010
Association between ERICA and TAU	(Intercept)	-1.119	0.255	-4.397
				< .001
Association between ERICA and NFL	ERICA FINAL SCORE	0.380	0.154	2.477
				0.020
	(Intercept)	0.618	0.759	0.815
				0.423
Association between ERICA and GFAP	ERICA FINAL SCORE	0.096	0.111	0.860
				0.398
	AGE	0.031	0.010	2.951
				0.007
Association between ERICA and GFAP	(Intercept)	4.580	0.203	22.616
				< .001
Association between KOEDAM and TAU	ERICA FINAL SCORE	0.411	0.122	3.365
				0.002
	(Intercept)	-1.187	0.227	-5.230
				< .001
Association between KOEDAM and GFAP	KOEDAM FINAL SCORE	0.386	0.128	3.013
				0.006
	(Intercept)	4.810	0.286	16.793
				< .001
Association between KOEDAM and GFAP	KOEDAM FINAL SCORE	0.264	0.162	1.637
				0.114

CONCLUSIONS

MRI visual atrophy scales correlated with BBM, particularly GFAP and pTau-217. These findings support a possible complementary use of VAS and BBM to enhance dementia diagnosis. These are preliminary results and more studies are necessary.

Figure 1. Spearman's rho heatmap.



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