

Elevated pTau-217 Levels in Long COVID Patients Compared to Recovered COVID and COVID-negative controls

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- Ptau-217 levels were significantly higher in Long COVID subjects, particularly among those with brain fog, compared to Recovered -COVID and COVID-negative controls.
- Significantly higher pTau217 levels were detected in COVID patients clinically diagnosed with MCI-AD following NACC/NIA-AD guidelines

INTRODUCTION

Brain fog and cognitive impairment have been recognized as major symptoms of Long COVID (LC). We recently found increased incidence of mild cognitive impairment (MCI), and specifically Alzheimer’s type MCI (MCI-AD) in LC patients compared to recovered COVID and COVID-negative controls. We aimed to evaluate serum pTau-217 levels, a robust AD-pathology biomarker, in these groups.

METHODS

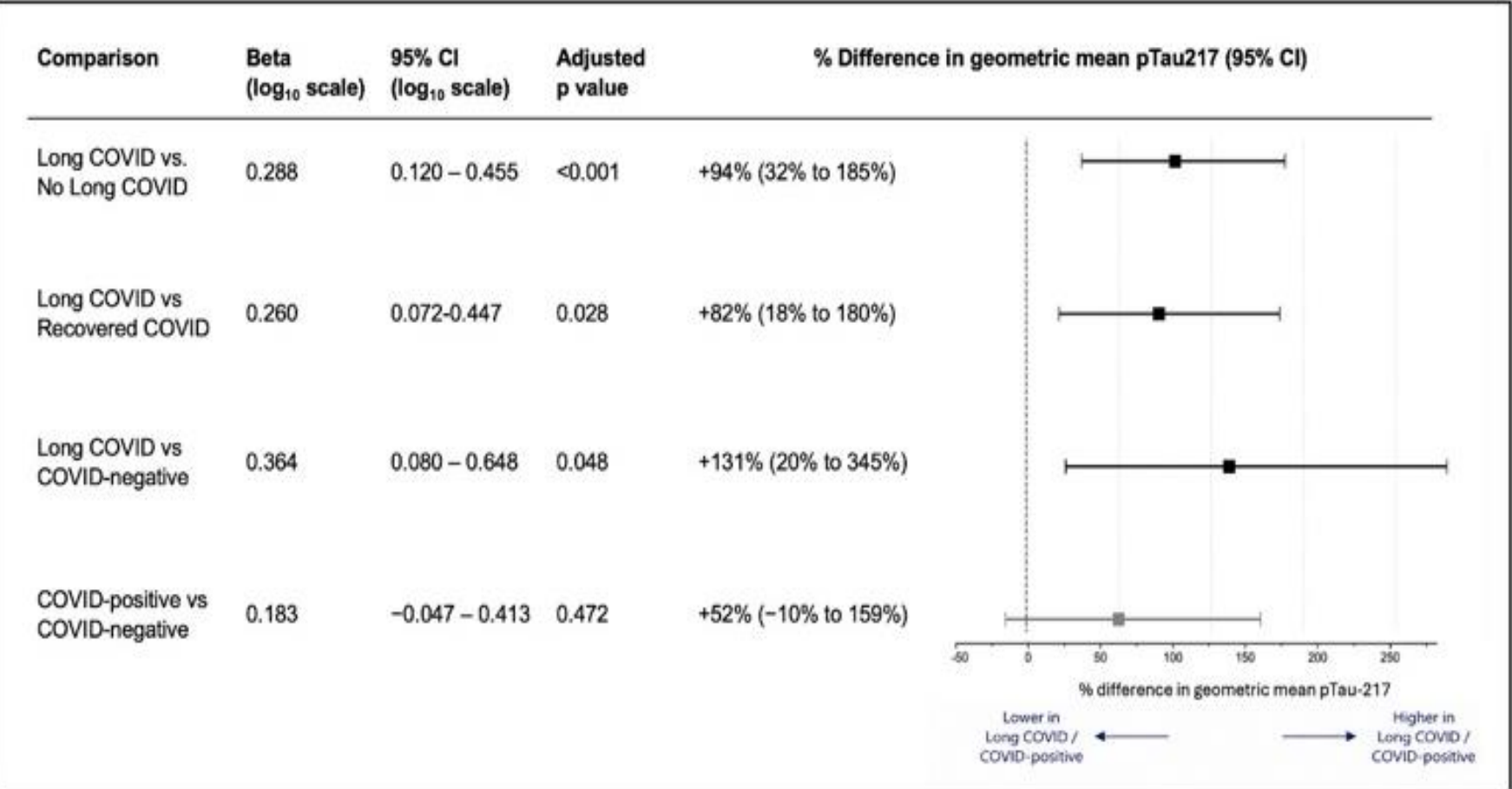
Plasma pTau-217 levels were measured using Lumipulse technology in:

- LC (persistent or new symptoms lasting ≥3-months post-SARS-CoV-2 infection),
- Recovered-COVID (no history of any LC symptom),
- COVID-negative controls (no clinical or laboratory SARS-CoV-2 infection and negative nucleocapsid antibodies).

Patients with pre-existing cognitive impairment were excluded. Multivariable linear regression models were constructed to evaluate the relationship of log₁₀-transformed pTau217 levels with COVID status adjusting for relevant confounders. A subset of patients underwent formal neuropsychological testing and clinician interview following ADRC protocols.

	COVID negative	Recovered COVID	Long COVID	P
N	30	59	120	
Age, median (IQR)	75 (69-79)	72 (67-77)	60 (44-71)	<0.001
Sex (female), N (%)	21/30 (70%)	39/59 (66%)	67/120 (56%)	0.223
Education (years), median (IQR)	18 (16-18)	18 (16-18)	17 (16-18)	0.956
BMI, median (IQR)	28 (25-31)	25 (22-29)	27 (24-32)	0.013
Race, N (%)				
White	19/30 (63%)	37/59 (63%)	92/119 (77%)	0.077
Black	10/30 (33%)	21/59 (36%)	25/119 (21%)	0.080
Asian	1/30 (3%)	1/59 (2%)	2/119 (2%)	0.831
GFR <60, N (%)	1/29 (3%)	4/57 (7%)	7/117 (6%)	0.801
APOE4 heterozygous	19/26 (27%)	17/50 (34%)	7/32 (22%)	0.483
APOE4 homozygous	1/26 (4%)	4/50 (8%)	1/32 (3%)	0.584
Hospitalized for acute COVID-19, N (%)	---	1/59 (2%)	22/120 (18%)	<0.001

Figure 3. Forest plots of log₁₀-transformed pTau-217 levels compared across Long COVID (n=120), Recovered COVID (n=59) and COVID negative (n=30) groups demonstrating significantly higher % difference among Long COVID patients adjusting for age, BMI, race, time from index SARS-CoV-2 to measurement, and hospitalization for acute COVID



RESULTS

Figure 1. Raw, unadjusted plasma pTau-217 levels were significantly higher in LC and brain fog patients

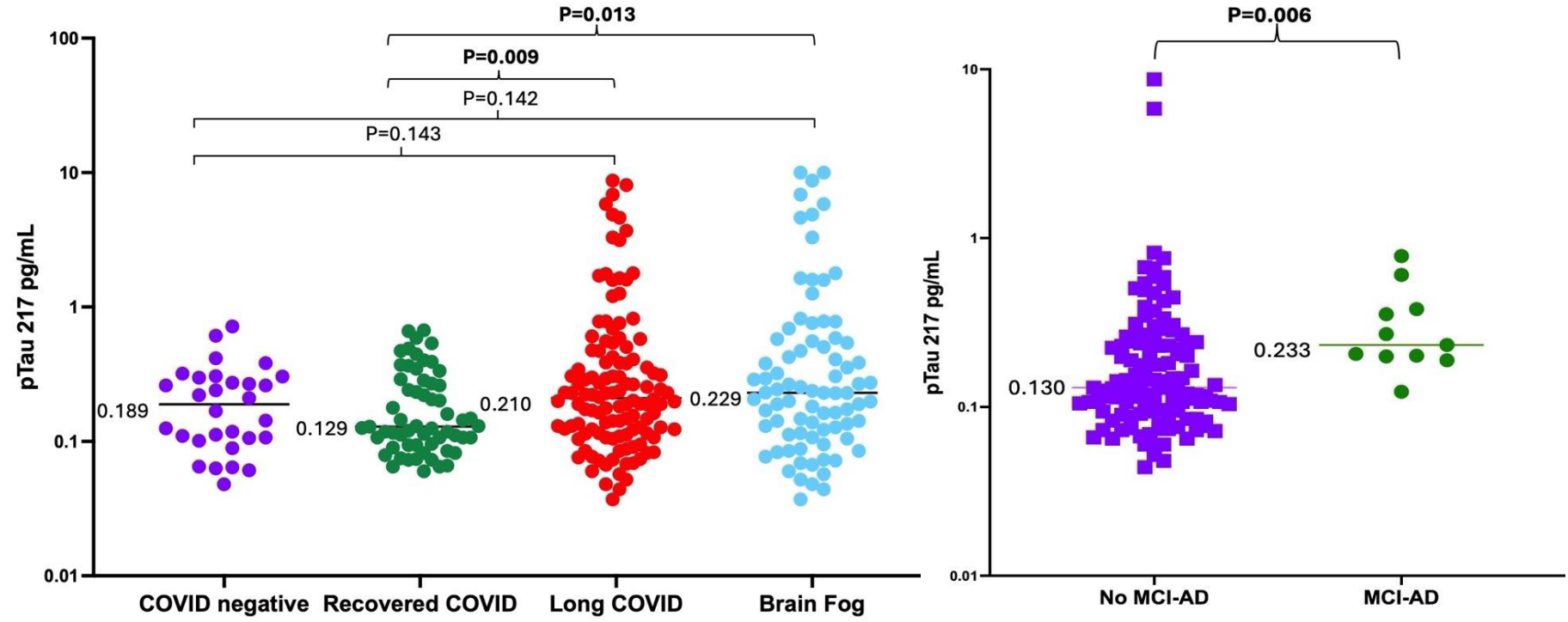
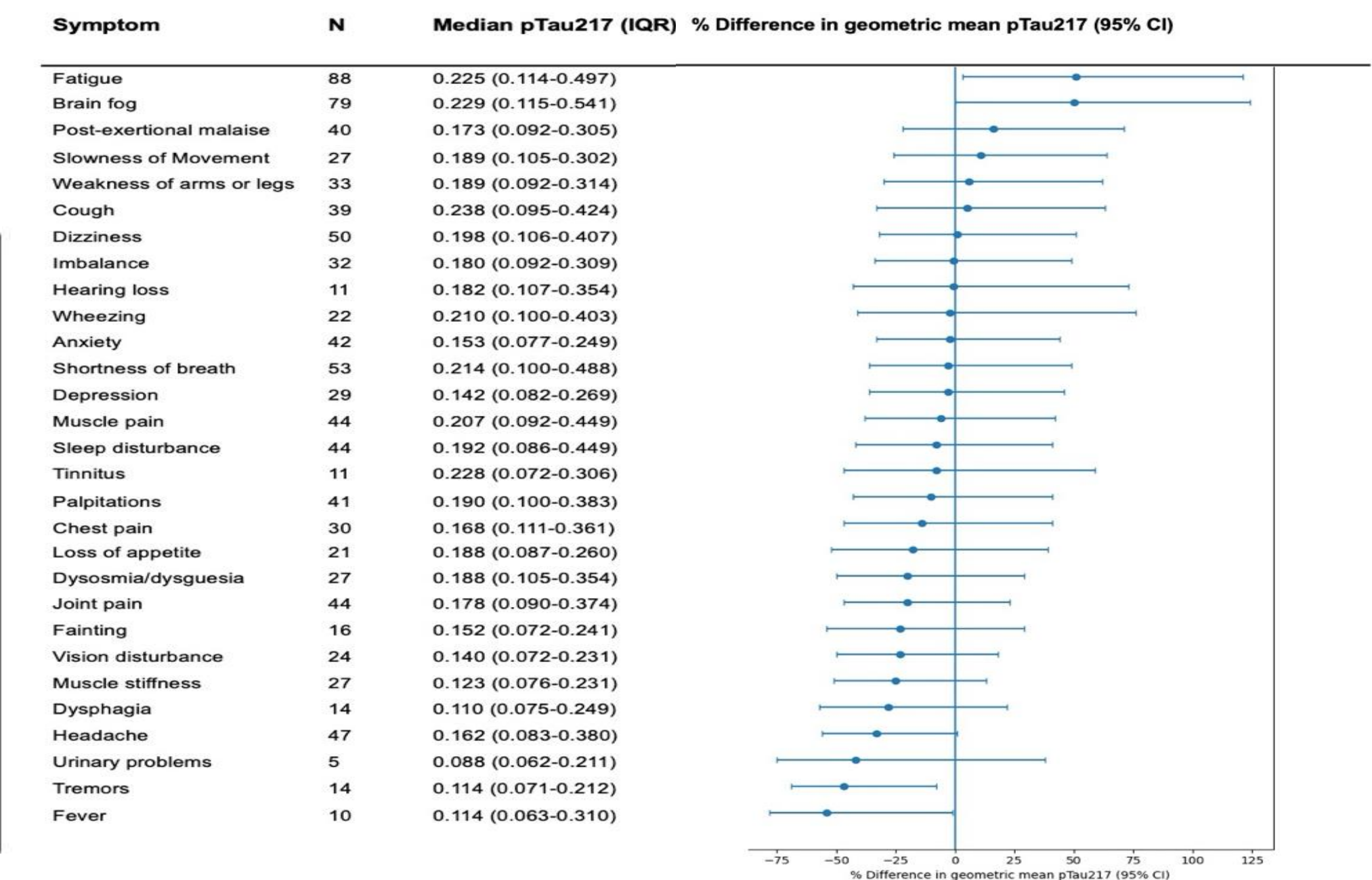


Figure 4. Percent differences in pTau-217 among LC patients with various symptoms (N=120) adjusting for age, race, BMI, hospitalization status, and time from index SARS-CoV-2



CONCLUSIONS

- Ptau-217 levels were significantly higher in LC subjects, particularly among those with brain fog, compared to Recovered-COVID and COVID-negative controls, after accounting for age, race, BMI, time from index infection, and hospitalization for acute COVID.
- Significantly higher pTau217 levels were detected in COVID patients clinically diagnosed with MCI-AD.
- Longitudinal data is needed to understand the prognostic value of pTau-217 in LC brain fog patients

CONTACT

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