

Long-COVID: Aberrant connectivity of salience network in critically-ill patients

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Introduction

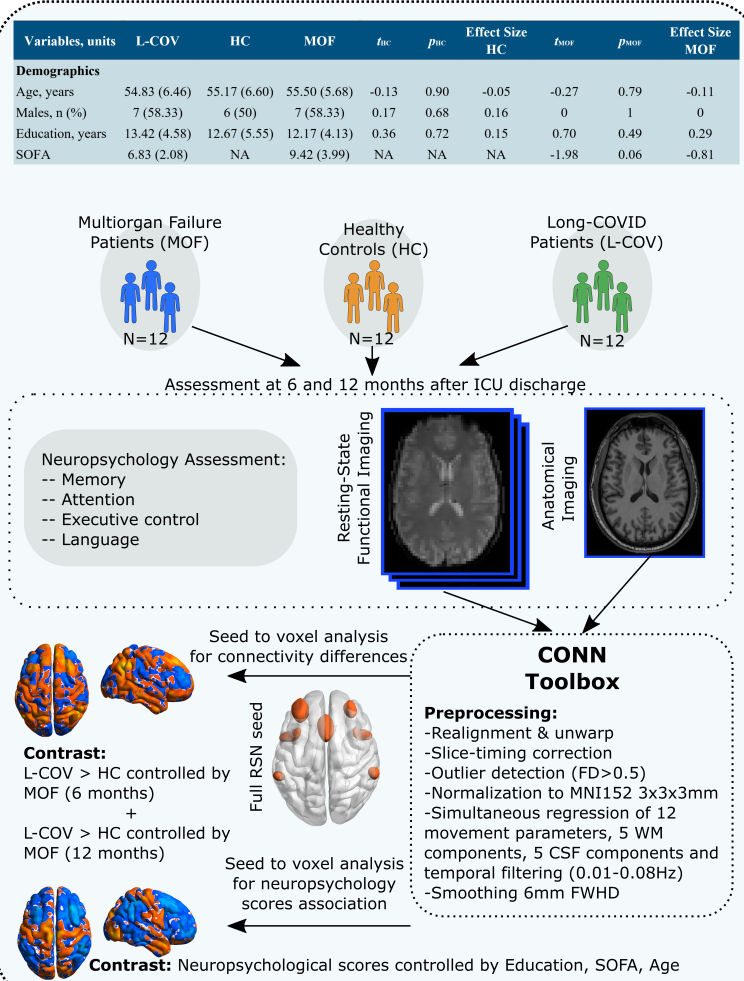
The term "Long-COVID" describes the presence of symptoms weeks or months after acquiring SARS-COV-2 infection irrespective of the viral status. It can be continuous or relapsing and even new symptoms might appear over time. During Long-COVID most of the patients have negative PCR as well as no biochemical or radiological abnormalities, so in this sense Long-COVID encompasses a transitory condition from microbiological recovery to clinical recovery.

Multiorgan-Failure (MOF) is a clinical syndrome in which two or more systemic or organ dysfunctions occur following acute damage, either simultaneously or sequentially. MOF can appear after infection, surgery, severe trauma, extensive burns or metabolic diseases. Patients with COVID-19 can develop MOF with high rates of severe illness and mortality.

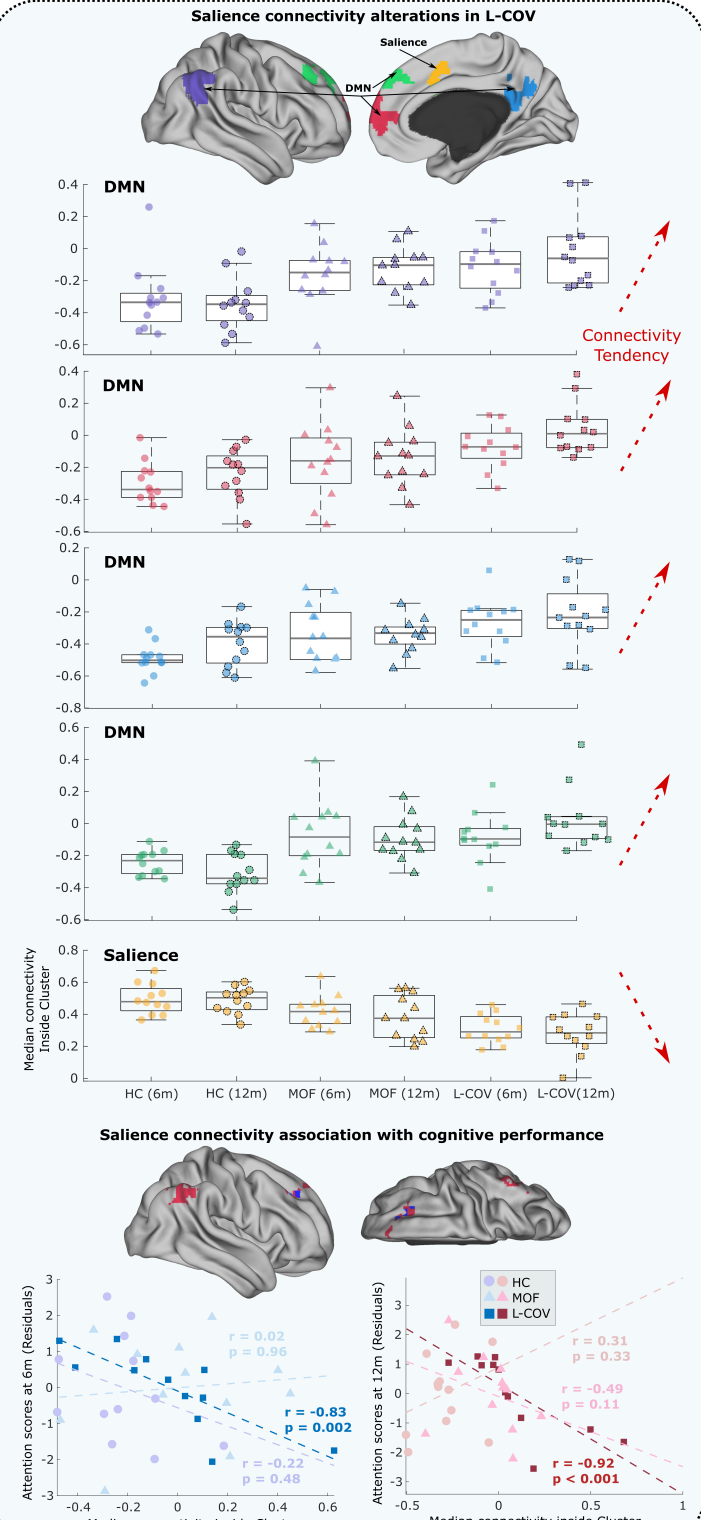
In patients with COVID-19, MOF is due to three factors: 1) Inflammatory cytokine storm, in which interleukin IL6 plays a major role; 2) Oxidative stress with reactive oxygen and nitrogen species; 3) Disseminated Intravascular Coagulopathy (DIC).

MOF affects functional connectivity [1]. Therefore, to study the alteration of functional connectivity in critical patients with Long-COVID, it is necessary to control for alterations specific in MOF and that are not COVID-19, which is the aim of this study.

Materials & methods



Results



Conclusions

1. Significant group differences HC vs L-COV (controlled by MOF) only appears in Salience Network, revealing:

- * Positive hypo-connectivity in salience
- * Negative hypo-connectivity in DMN

2. The association in L-COV patients between neuropsychological functioning and salience connectivity maps reveals:

- * Significance in attention domain after 6 months ($p = 0.002$)
- * Significance in attention domain after 12 months ($p < 0.001$)

References

[1] Jimenez-Marin A, Rivera D, Boado V, Diez I, Labayen F, Garrido I, Ramos-Usuga D, Benito-Sánchez I, Rasero J, Cabrera-Zubizarreta A, Gabilondo I, Stramaglia S, Arango-Lasprilla JC, Cortes JM (2020): Brain connectivity and cognitive functioning in individuals six months after multiorgan failure. *Neuroimage Clin.* 25:102137.



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