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# Neuroprotection is Possible in the Real Life

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Neuroprotection (NP) is possible? In Medicine NP is a term used in Mass Reports, Medicine, Divulgation, Pharmaceutical Language, and Promotion of diverse contents [1]. The real possibility of NP is incorporated in the brain itself in genes and/or on the level of regulatory neuropeptides.

The focus of NP is to protect the affected group of neurons from various pathologies and ensure their most adequate functioning.

An ideal pharmacological compound that can trigger the protective biological response and maintain it when necessary, using them to protect and maintain the NP and the preservation of functional tissue. Put like this, NP is only seen as a possible measure, limited to basic experimental science for the moment. Nevertheless, Cerebrolysin (CBL) is one compound that was created based on the principles mentioned above [2]. CBL is a neurotrophic drug, made from a mixture of low molecular weight, porcine-derived peptides, and free amino acids. The pharmaceutical preparation includes the peptide fragments: nerve growth factor (NGF), brain-derived neurotrophic factor (BDNF), ciliary neurotrophic factor (CNTF), enkephalins, orexin, and P21.

It is well documented that patients with COVID-19 and respiratory compromise suffer a hypoxemia-induced brain injury, which manifests in cognitive deficits in acute illness and long-term follow-up. COVID-19-associated encephalopathy is multifactorial and includes hypoxic changes, intracranial pressure changes, and viral response in brain tissue [3]. In each of these situations, a potential neuroprotective factor may play a crucial role in preserving neuronal tissue. The current theory of prolonged COVID-19 is that the inflammatory process promoted by SARS-CoV-2 infection could include disruption of the blood-brain barrier in patients with neurological involvement; in conclusion, the fact that proinflammatory cytokine levels do not predict long-term functional outcome suggests that prognosis is more related to neuronal damage than to the acute neuroinflammatory process [4]. CBL therapy has the potential to significantly aid in the treatment of a wide variety of degenerative neurological diseases including ischemic stroke or traumatic

brain injuries [5]. The pharmaceutical preparation includes neuropeptide preparation with neurotrophic factor-like. CBL has demonstrated protective effects against pathological cascades following neurodegenerative injury by mediating the inflammatory response, lowering the accumulation of free radicals, and reducing pro-apoptotic enzymes [6].

In our series of patients, at the time of initiating our study on 384 patients with covid-19 and critical respiratory compromise, in the series of recovered patients we were able to objectify that, 99 % had cognitive deficits measured by the sum of MoCA test, Barthel Index, Beck Depression Inventory-II, Beck Anxiety Inventory Score, Richard Campbell Sleep Questionnaire and Pittsburgh Sleep Quality Index.

We hypothesize that CBL would be able to prevent neuronal injury caused by hypoxia secondary to ARDS, intracranial hypertension, or viral damage. Designed a study to compare the short- and long-term outcome of adding CBL to standard care of hospitalized patients due to respiratory failure secondary to SARS-COV2 infection [7]. Interestingly, we treated a previously healthy population with a viral disease of acute onset, severe respiratory failure, and variable neurological compromise at the time of recovery, from a mild degree with cognitive deficit to severe degrees with a minimally conscious state.

We treat patients with severe ARDS due to covid-19 without previous neurological disease with CBL 24 hours after starting mechanical ventilation (MV) with daily infusion for the first 10 days. Primary efficacy criteria were taken from multiple cognitive batteries and secondary efficacy criteria scales of dementia, quality of sleep, and changes in MRI. In this preliminary report, we analyzed 5 patients treated with CBL 3 in MV and 2 patients with NIMV. Cognitive performance was significant in the treatment group effects at day 90. This was reflected by a Barthel Index (BI) of ≥85 at day 90 in the treatment group vs 35 – 55 % of control patients. Distribution of modified Rankin Scale (mRS) scores at day 90 after extubation, resulted in an equally good outcome in 100 % of patients in the treatment group. Strikingly imaging findings on MRI T2 did not show multifocal lesions and no other involvement. One patient had frontal atrophy presumably prior. The social and labor reintegration was the same as that prior to the illness of the included patients.

In conclusion, CBL alone or in combination with other standard practices was effective and safe, as part of standard treatment during the acute phase and the recovery phase. In our series without adverse events.

This work, preliminary results, opens the door to the concept of neuroprotection in real practice, during the clinical care of acute pathologies. Although in this first preliminary analysis, it is not possible to draw definitive conclusions due to the size of the sample, the results may be promising.

## 1. DECLARATIONS

### 1.1 Conflict of interest statement

The author declare that they have no conflict of interest

### 1.2 Funding

Not applicable

### 1.3 Consent for publication

Written informed consent was obtained from the patients for publication of this study and approval by the ethics committee. A copy of the written consent is available for review by the Editor in Chief of this journal.

### 1.4 Authors' information

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### 1.5 Contributors and sources

Roberto Villa has a particular interest in the provision of public health policies and how they affect the health of the population. This article is the final product of several years of discussion about public health and how the impact of different devastating diseases such as stroke impacts the deterioration of health of the general population.

### 1.6 Contributions

Roberto Villa drafted the manuscript and revised it critically for important intellectual content. Giselle Begue performed with a sharp and affectionate look a deep critique of the text, contributing with important notes.

### 1.7 Acknowledgements

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