Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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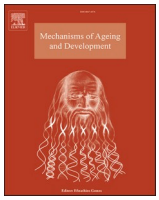

Inflammaging: The lesson of COVID-19 pandemic

In the falling of 2019, the outbreak of a new communicable disease caused by SARS-cov2 coronavirus soon showed up as a still ongoing worldwide pandemic. The severe form of the disease is a by-lateral patchy pneumonia with diffuse thrombus burden in pulmonary capillaries, whose fatal outcome is harbingered by the onset of a severe systemic cytokine storm, named as COVID-19 syndrome. Across different countries, the rate of hospitalization and death turned out to be hundreds of times higher in individuals aged above 65 years compared to young people, underpinning the tenet that the pathogenesis of the disease is tightly linked to the basic mechanisms of aging.

Moreover, owing to the observation that the triggering of uncontrolled systemic inflammation is a crucial step of COVID-19 pathogenesis, the scientific community envisaged that the tight link among mechanisms of inflammation and aging, aka inflamm-aging, may play a key role in COVID-19 syndrome severity and outcome (Franceschi et al., 2000; Bonafè et al., 2020).

After two years of pandemics, studies on COVID-19 have taught many notions to those scientists that study inflammaging. The disproportion of deaths in old men compared to women observed throughout the early phases of the pandemic can be interpreted under the light of a gender-related unbalance between the pro-inflammatory response (which prevails in old men) versus the capability of women to preserve the interferon I related response throughout life (likely related to the better functioning of plasmacytoid dendritic cells). Probably, the latter has a genetic component that has been found to impact on COVID-19 evolution, even in young people.

The tight association between COVID-related inflammation and hyper-coagulation at clinical level, the observation of vascular obstruction, and pulmonary microvascular thrombosis identified on autopsy carried the phenomenon of thrombo-flammation to a wide audience (Ahmad et al., 2021). The basic mechanisms of the endothelial damage are closely linked to aging, as witnessed by the tight association between severe COVID-19 and the pre-existence of endothelial dysfunction in aged people affected by age-related diseases and risk factors, such as hypertension and diabetes (Canzano et al., 2021). In this case, inflammaging is both cause and consequence of the diseases and can be tightly linked to the phenomenon called coagul-aging.

All in all, the pandemic pushed a tremendous impulse in investigating the changes of immune system during aging, a phenomenon called immunosenescence, and their relationship with inflammaging.

The two review articles published in this special issue focused on inflammaging and the biomarkers of inflammaging in elderly patients affected by COVID-19. Witkowski and co-authors focused on inflammaging and immunosenescence as key mechanisms involved in COVID-19 pathogenesis, highlighting that these to conditions may aggravate, but also may be aggravated by SARS-CoV-2 infection. Sabbatinelli and co-authors focused on the most relevant circulating biomarkers related to imflammaging as potential biomarkers of COVID-19 severe outcomes in elderly patients. Since the reduction of mortality risk of COVID-19 older patients is a priority, innovative, minimally invasive molecular biomarkers are needed to improve the prediction of mortality risk and better customize patient management. Following this reasoning, Olivieri and coauthors analyzed the performance of selected routine laboratory biomarkers in improving the prediction of in-hospital mortality in COVID-19 geriatric patients, showing that high neutrophil %, neutrophil/lymphocyte ratio (NLR), derived NLR (dNLR), platelet-to-lymphocyte ratio (PLR), and low lymphocyte count, eosinophil %, and lymphocyte-to-monocyte ratio (LMR) were significant predictors of in-hospital mortality, independently from age, gender, and other potential confounders.

Giuliani and co-authors aimed at identifying innovative circulating biomarkers, i.e. microRNAs, with prognostic relevance in hospitalized geriatric COVID-19 patients. To reach this goal serum samples of COVID-19 patients were analyzed by small RNA-seq and the findings validated in an independent cohort of COVID-19 patients by qRT-PCR. MiR-320b and miR-483–5p were identified as significantly hyper-expressed in deceased patients compared to survived ones. Patients with the 20% highest miR-320b and miR-483–5p serum levels at hospital admission had three-fold increased risk to die during in-hospital stay for COVID-19.

Finally, Galluzzo and co-authors analyzed the association of vitamin D status and physical performance in COVID-19 survivors, suggesting that vitamin D deficiency is associated with increased cardiometabolic risk factors, COVID-19 severity and with poor physical performance.

As a final statement, as sars-cov2 bumped into the human health landscape, a wealth of studies has confirmed that inflammation and aging are tightly linked phenomena, thus underpinning the importance of put forth inflammaging as a basic mechanism of disease in aged people.

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