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.

Clinical Imaging 80 (2021) 148–149

Contents lists available at ScienceDirect

Clinical Imaging

journal homepage: www.elsevier.com/locate/clinimag

Neuroradiology

A little consideration for "Rare presentations of COVID-19: PRES-like leukoencephalopathy and carotid thrombosis"

Dongren Sun, Hengshu Chen, Yeqing Xiao, Weiye Xu, Fan Liu, Shihang Luo, Fafa Tian *

Department of Neurology, Xiangya Hospital, Central South University, 87 Xiangya Road, Changsha 410008, China

ARTICLE INFO

Keywords:
PRES
COVID-19
Tocilizumab
Acute kidney injury

Dear Editor:

We are grateful to Doo FX et al. for their research, which greatly helped us understand clinical manifestations of posterior reversible encephalopathy syndrome (PRES), a rare neurological disease in the COVID-19 patient.[1] However, in this letter, we want to put forward a different view on the pathogenic mechanism of PRES in the patient.

On the one hand, previous studies have concluded that transient acute kidney injury creates an environment of cerebral hyperperfusion, which may be involved in formation of PRES. At the same time, the posterior part of the cerebral hemisphere is more susceptible to high blood perfusion to form vasogenic edema because the sympathetic nervous system of the vertebrobasilar artery is weaker than that of the internal carotid artery system. The posterior circulation is more prone to vasodilation than the anterior circulation.[2–3] It is consistent with the symmetrical parieto-occipital white matter hyperintensity found in the magnetic resonance imaging (MRI) of the PRES patient.

On the other hand, immunomodulatory drugs can cause vascular endothelial dysfunction, which may trigger the occurrence of PRES.[2] The patient was given two doses of tocilizumab due to his serious illness. With the use of these drugs, the vascular endothelium was destroyed by the presence of exogenous toxins, making the presence of the vasoconstrictor substance in the vascular endothelium released, and then vasospasm occurs, which destroys the stability of the blood-brain barrier and creates conditions for the emergence of PRES.[2–3]

It is worth noting that both acute kidney injury and the use of tocilizumab before epilepsy symptoms associated with PRES. Judging from the order of time, this seems to support the two mediation of formation of PRES. More interestingly, there are also several similar cases reported in the COVID-19 pandemic. Some patients with SARS-CoV-2 infection, who have suffered acute kidney injury or have used interleukin inhibitors such as anakinra and tocilizumab, were finally confirmed to have typical vasogenic edema by brain MRI, which is consistent with PRES.[4–6] This suggests that the two may be potential risk factors for the development of PRES.

Therefore, we believe that combined effects of three factors including acute kidney injury, use of immunomodulatory drugs such as tocilizumab, and invasion of COVID-19 co-created the environment for the arrival of PRES, rather than simply caused by the direct effects of SARS-CoV-2 infection in the case.

Declaration of competing interest

The authors declare that they have no competing interests.

Acknowledgements

This study was supported by Natural Science Foundation of China (81571276).

Statistical analysis

No statistical analysis.

Authors' contribution statements

FT designed and supervised the overall research. DS wrote the first

* Corresponding author.
E-mail address: tianff40w@163.com (F. Tian).

https://doi.org/10.1016/j.clinimag.2021.06.038
Received 21 June 2021; Accepted 29 June 2021
Available online 24 July 2021

draft of manuscript. All authors contributed to manuscript revision, read and approved the submitted version.

References

1. Doo FX, Kassim G, Lefton DR, Patterson S, Pham H, Belani P. Rare presentations of COVID-19: PRES-like leukoencephalopathy and carotid thrombosis. Clin Imaging 2021;69:94–101. https://doi.org/10.1016/j.clinimag.2020.07.007.
2. Fischer M, Schmutzhard E. Posterior reversible encephalopathy syndrome. J Neurol 2017;264(8):1608–16. https://doi.org/10.1007/s00415-016-8377-8.
3. Tetsuka S, Ogawa T. Posterior reversible encephalopathy syndrome: a review with emphasis on neuroimaging characteristics. J Neurol Sci 2019;404:72–9. https://doi.org/10.1016/j.jns.2019.07.018.
4. Parauda SC, Gao V, Gewirtz AN, et al. Posterior reversible encephalopathy syndrome in patients with COVID-19. J Neurol Sci 2020;416:117019. https://doi.org/10.1016/j.jns.2020.117019.
5. Llansó L, Urra X. Posterior reversible encephalopathy syndrome in COVID-19 disease: a case-report [published online ahead of print, 2020 Aug 26]. SN Compr Clin Med 2020:1–3. https://doi.org/10.1007/s42399-020-00470-2.
6. Conte G, Avignone S, Carbonara M, et al. COVID-19-associated PRES-like encephalopathy with perivascular gadolinium enhancement. AJNR Am J Neuroradiol 2020;41(12):2206–8. https://doi.org/10.3174/ajnr.A6762.