

BIOMARKERS LEVELS INDICATE COVID-19 SEVERITY AND FATALITY

Sergii Nasheda^{ID}, Alla Navolokina^{ID}, Ivanna Hrytsan^{ID}

European School of Medicine, International European University, Kyiv, Ukraine

KEY WORDS: D-dimer; biomarker; COVID-19; SARS-CoV-2; severity; outcome

Disaster Emerg Med J 2023; 8(2): 122–123

To the Editor,

we read with great interest the article by Kilic and Dalkilinc Hokenek concerning to association between D-dimer levels and COVID-19 patients' mortality [1]. Since December 2019, a new coronavirus known as SARS-CoV-2 has produced a global outbreak of respiratory sickness known as coronavirus disease 2019 (COVID-19), which is still spreading rapidly. By the end of January 2023, there will have been over 668.8 million verified COVID-19 patients globally.

Understanding the fluctuation and profile of various biomarkers as a function of different COVID-19 outcomes would assist in the creation of a risk-stratified strategy for the management of individuals with this condition [2, 3]. One area of scientific interest is the thrombosis reported with this rare viral pneumonia. Unlike patients with community-acquired pneumonia, the COVID-19 patient appears to have an increased thrombotic reaction to the virus. The presence and severity of microthrombosis in these individuals have been linked to worse outcomes [4, 5]. D-dimer, a fibrin breakdown product, is well established as an indirect measure of thrombotic activity in venous thromboembolism (VTE) population risk assessment. Furthermore, D-dimer has been demonstrated to be raised in various hypercoagulable situations such as cancer, sepsis, pregnancy, and the postoperative period. D-dimer has been recognized as a helpful prognostic marker in this patient group, with the suspicion of thrombo-

sis in COVID-19 patients adding to disease severity and as a driving element of the respiratory illnesses observed in this disease process.

Elevated D-dimer levels have been found to be one of the most prevalent test results in COVID-19 patients requiring hospitalization. Kilic and Dalkilinc Hokenek indicate that patients with high D-dimer levels had higher in-hospital mortality rates. It is worth emphasizing here that [1] Zhang et al. [6] showed that D-dimer levels larger than 2.0 g/mL on admission (a fourfold rise) might successfully predict in-hospital mortality in COVID-19 patients, indicating that D-dimer could be an early and useful marker to enhance COVID-19 patient care.

With the global increase in COVID-19 cases due to its highly infectious nature, various research has reported on also other predictors of illness severity in COVID-19 patients.

According to studies, severe or fatal cases of COVID-19 disease are linked to an increased white cell count, creatinine, interleukin-6 (IL-6), C reactive protein (CRP), lactate dehydrogenase, blood urea nitrogen, markers of liver and kidney function as well as albumin levels, when compared to milder cases where survival is the outcome [7–10]. These studies provided an early insight into the impact of SARS-CoV-2 infection, although the conclusions cannot be generalized in many situations due to geographical limits, single-center experience, and small cohorts.

ADDRESS FOR CORRESPONDENCE:

Alla Navolokina, European School of Medicine, International European University, Akademika Hlushkova Ave, 42B, Kyiv, Ukraine
phone: +380673772377, e-mail: allanavolokina@ieu.edu.pl

Received: 23.01.2023 Accepted: 30.01.2023 Early publication date: 7.03.2023

This article is available in open access under Creative Commons Attribution-Non-Commercial-No Derivatives 4.0 International (CC BY-NC-ND 4.0) license, allowing to download articles and share them with others as long as they credit the authors and the publisher, but without permission to change them in any way or use them commercially.

In view of the above, it was critical to establish a worldwide database on the clinical parameters of COVID-19 patients, from which multivariate data analyses could be done.

Conflict of interest

The authors declared no conflict of interest.

REFERENCES

1. Kilic M, Hokenek UD. Association between D-dimer and mortality in COVID-19 patients: a single center study from a Turkish hospital. *Disaster Emerg Med J*. 2022; 7(4): 225–230, doi: [10.5603/demj.a2022.0039](https://doi.org/10.5603/demj.a2022.0039).
2. Tian W, Jiang W, Yao J, et al. Predictors of mortality in hospitalized COVID-19 patients: A systematic review and meta-analysis. *J Med Virol*. 2020; 92(10): 1875–1883, doi: [10.1002/jmv.26050](https://doi.org/10.1002/jmv.26050), indexed in Pubmed: [32441789](https://pubmed.ncbi.nlm.nih.gov/32441789/).
3. Matuszewski M, Szarpak L, Rafique Z, et al. Prediction value of KREBS von den lungen-6 (KL-6) biomarker in COVID-19 patients: A systematic review and meta-analysis. *J Clin Med*. 2022; 11(21), doi: [10.3390/jcm11216600](https://doi.org/10.3390/jcm11216600), indexed in Pubmed: [36362828](https://pubmed.ncbi.nlm.nih.gov/36362828/).
4. Dubey L, Dorosh O, Dubey N, et al. COVID-19-induced coagulopathy: Experience, achievements, prospects. *Cardiol J*. 2023 [Epub ahead of print], doi: [10.5603/CJ.a2022.0123](https://doi.org/10.5603/CJ.a2022.0123), indexed in Pubmed: [36588310](https://pubmed.ncbi.nlm.nih.gov/36588310/).
5. Restrepo MI, Marin-Corral J, Rodriguez JJ, et al. Cardiovascular complications in coronavirus disease 2019-pathogenesis and management. *Semin Respir Crit Care Med*. 2023; 44(1): 21–34, doi: [10.1055/s-0042-1760096](https://doi.org/10.1055/s-0042-1760096), indexed in Pubmed: [36646083](https://pubmed.ncbi.nlm.nih.gov/36646083/).
6. Zhang L, Yan X, Fan Q, et al. D-dimer levels on admission to predict in-hospital mortality in patients with Covid-19. *J Thromb Haemost*. 2020; 18(6): 1324–1329, doi: [10.1111/jth.14859](https://doi.org/10.1111/jth.14859), indexed in Pubmed: [32306492](https://pubmed.ncbi.nlm.nih.gov/32306492/).
7. Malik P, Patel U, Mehta D, et al. Biomarkers and outcomes of COVID-19 hospitalisations: systematic review and meta-analysis. *BMJ Evid Based Med*. 2021; 26(3): 107–108, doi: [10.1136/bmjebm-2020-111536](https://doi.org/10.1136/bmjebm-2020-111536), indexed in Pubmed: [32934000](https://pubmed.ncbi.nlm.nih.gov/32934000/).
8. Szarpak Ł, Nowak B, Kosior D, et al. Cytokines as predictors of COVID-19 severity: evidence from a meta-analysis. *Pol Arch Intern Med*. 2021; 131(1): 98–99, doi: [10.20452/pamw.15685](https://doi.org/10.20452/pamw.15685), indexed in Pubmed: [33219785](https://pubmed.ncbi.nlm.nih.gov/33219785/).
9. Szarpak L, Ruetzler K, Safiejko K, et al. Lactate dehydrogenase level as a COVID-19 severity marker. *Am J Emerg Med*. 2021; 45: 638–639, doi: [10.1016/j.ajem.2020.11.025](https://doi.org/10.1016/j.ajem.2020.11.025), indexed in Pubmed: [33246860](https://pubmed.ncbi.nlm.nih.gov/33246860/).
10. Zheng Z, Peng F, Xu B, et al. Risk factors of critical & mortal COVID-19 cases: A systematic literature review and meta-analysis. *J Infect*. 2020; 81(2): e16–e25, doi: [10.1016/j.jinf.2020.04.021](https://doi.org/10.1016/j.jinf.2020.04.021), indexed in Pubmed: [32335169](https://pubmed.ncbi.nlm.nih.gov/32335169/).