Editorial

Correspondence: Importance of the validated serum biochemistry and hemogram parameters for rapid diagnosis and to prevent false negative results during COVID-19 pandemic

COVID-19 pandemic affects millions of lives all over the world as a major public health concern. Elderly patients and people with chronic diseases including hypertension, cardiovascular diseases, cancer, and diabetes have been categorized as risk groups during pandemic [1]. There are no treatments including drugs, vaccines, or targeted therapy approaches have been found until now, therefore after diagnosis quarantine has been applied for infected individuals. Since false negative test results have been encountered and COVID-19 symptoms can be confused with pneumonia, rapid diagnosis and patient isolation are vital to stop the spread of the disease and to cure patients, especially the ones belonging to the risk groups [2]. Diagnostic characteristics and algorithms are required for the rapid clinical diagnosis instead of suspected cases, thus isolation and treatment of patients can start immediately after diagnosis. Additionally, another risk during COVID-19 pandemic is described as the collapsing health systems because of limited capacities worldwide [3].

Bioinformatics techniques such as machine learning have been used for infectious agents including viruses, thus collecting patient data and analyzing them via software programs may help us to find biomarkers to evaluate disease prognosis and progression. These biomarkers should be used with PCR results and computed tomography (CT) images of people infected by COVID-19 for rapid and effective diagnosis [4]. Serum biochemical parameters and hemogram analysis are commonly used, easy to measure, routine and cheaper techniques helping diagnosis and progression of diseases [5]. Lymphopenia (lymphocyte count <1,000), increased lactate dehydrogenase levels, the alanine aminotransferase (ALT)/aspartate aminotransferase (AST) ratio, prothrombin time, creatinine, D-dimer, creatine phosphokinase (CPK), peripheral absolute monocyte count, and absolute neutrophil count levels are tightly associated with COVID-19

progression [6, 7]. Moreover, leukocyte and granulocyte levels are associated with disease progression as well [8].

Artificial intelligence has been used to find biomarkers for the prognosis and evaluation of progression of diseases. Besides, laboratory test ordering, data mining, interpretations of test results, early diagnosis, disease monitoring, personalized treatments, and clinical trials can be achieved by artificial learning. Therefore, we should use machine learning techniques for collecting all biochemistry and hemogram data of COVID-19-infected people worldwide to find biomarkers that can be used in the combination with PCR and CT results. Moreover, people infected by COVID-19 can be tested for hemogram and serum biochemistry parameters daily basis even they do not show severe symptoms, thus progression of the COVID-19 infection can be evaluated easily [9–11].

1. Acknowledgements

2. Conflict of Interest

The authors declare that they have no conflict of interest.

3. References

[1] Aydemir, D., and Ulusu, N. N. (2020) Pathog. Glob. Health 114, 109–110.

[2] Aydemir, D., and Ulusu, N. N. (2020) Travel Med. Infect. Dis. https://doi.org/10.1016/j.tmaid.2020.101697.

[3] Evelyne, B., Guoting, C., and Teresad, F. M. (2020) Swiss Med. Wkly. 150, w20216.

[4] Belmont, J. W., and Shaw, C. A. (2016) Expert Rev. Mol. Diagn 16, 1139–1141.

[5] Chełstowska, B., and Kuźma-Kozakiewicz, M. (2020) Neurol. Sci. 41, 1115–1124.

[6] Singhal, T. (2020) Indian J. Pediatr. 87, 281–286.

[7] Fan, B. E., Chong, V. C. L., Chan, S. S. W., Lim, G. H., Lim, K. G. E., Tan, G. B., Mucheli, S. S., Kuperan, P., and Ong, K. H. (2020) Am. J. Hematol. https://doi.org/10.1002/ajh.25774. [Epub ahead of print]

[8] Zheng, H., Zhang, M., Yang, C., Zhang, N., Wang, X-C., Yang, X-P., Dong, X-Q., and Zheng, Y-T. (2020) Cell Mol. Immunol. 17, 541–543.

[9] Gruson, D., Helleputte, T., Rousseau, P., and Gruson, D. (2019) Clin. Biochem. 69, 1–7.

[10] Sanchez-Pinto, L. N., Luo, Y., and Churpek, M. M. (2018) Chest 154, 1239–1248.

[11] Miller, D. D., and Brow, E. W. (2018) Am. J. Med. 131, 129–133.

Duygu Aydemir and Nuriye Nuray Ulusu*

School of Medicine, Koç University, Istanbul, Turkey and Koç University Research Center for Translational Medicine (KUTTAM), Istanbul, Turkey

*Address for correspondence:
Prof. Dr. Nuriye Nuray Ulusu, School Medicine, Koc University,
Rumelifeneri Yolu, Sariyer, Istanbul 34450, Turkey.
Tel.: +90 (212) 338 11 60; Fax: +90 (212) 338 11 68;
e-mail: nulusu@ku.edu.tr.