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Prognosticating COVID-19: A need for Africa-specific laboratory predictors

Geoffrey Omuse

Janet Maranga

Abubakar Abdillah

Daniel Maina

Prognosticating COVID-19: A need for Africa-specific laboratory predictors

To the Editor: The rapid spread of SARS-CoV-2 throughout the world has resulted in significant morbidity and mortality globally.[1] As of 18 April 2020, there were over 20 000 COVID-19 infections and over 1 000 deaths in Africa, with more cases being diagnosed as testing is slowly ramped up.[2] In view of increasing mortality and scarce critical care resources, there is a need to evaluate the role of routine laboratory tests in determining which COVID-19 patients will require critical care and who is likely to survive.

A systematic review by Lippi and Plebani[3] reported that the common derangements in laboratory tests seen in COVID-19 patients include increased white blood cells, neutrophils, lactate dehydrogenase (LDH), alanine aminotransferase (ALT), aspartate aminotransferase (AST), total bilirubin, creatinine, cardiac troponin, D-dimer, prothrombin time, procalcitonin and C-reactive protein (CRP), as well as a decrease in lymphocytes and albumin. None of the included studies was from Africa.

Wang *et al.*[4] examined the baseline laboratory parameters on the day of admission in 138 Chinese patients with COVID-19. Significant differences in median values were noted for several analytes between patients who needed intensive care unit (ICU) admission and those who did not. Specifically, patients admitted to an ICU had higher neutrophils, LDH, ALT, AST, total bilirubin, creatinine, cardiac troponin I, D-dimer and procalcitonin.

There are currently no publications from Africa describing the prognostic significance of laboratory tests in predicting severity of COVID-19, despite evidence that race and ethnicity are known sources of variation in reference intervals.[5] Karita *et al.*[6] carried out a cross-sectional study of healthy adults in Kenya, Uganda, Zambia and Rwanda from December 2004 to October 2006. Compared with the USA, they found that the reference interval lower limits for neutrophils and creatinine were lower in Africans, while upper limits for total bilirubin, LDH, ALT and AST were higher.[6] Genetic deletion of the Duffy antigen receptor for chemokines (DARC-null genotype) is thought to be responsible for the benign neutropenia seen in sub-Saharan Africa.[7] In several African countries, total bilirubin has been found to be almost twice the upper limit of that in Caucasians, while transaminases have also been found to be elevated.[8-10] Chronic inflammation due to infectious or non-infectious causes may explain the elevated CRP and IgG levels in sub-Saharan Africa.

In view of racial and ethnic differences in reference values for some of the laboratory tests thought to play an important role in COVID-19 prognosis as well as the huge burden of infectious diseases such as HIV, tuberculosis and malaria, there is an urgent need for studies that can generate clinical and laboratory data to guide the use of laboratory tests in evaluating and managing COVID-19 patients in Africa.

Geoffrey Omuse
Department of Pathology, Aga Khan University Medical College, Nairobi, Kenya
g_omuse@yahoo.com

Janet Maranga
Department of Pathology, Gertrude's Children's Hospital, Nairobi, Kenya

Abubakar Abdillah, Daniel Maina
Department of Pathology, Aga Khan University Medical College, Nairobi, Kenya

1. World Health Organization. Coronavirus disease 2019 (COVID-19) Situation Report – 76: Highlights. 5 April 2020. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200405-sitrep-76-covid-19.pdf?sfvrsn=6ecf0977_2 (accessed 5 April 2020).
2. Moro C. COVID-19 AFRICA. 2020. http://covid-19-africa.sen.ovh/ (accessed 19 April 2020).
3. Lippi G, Plebani M. Laboratory abnormalities in patients with COVID-2019 infection. Clin Chem Lab Med 2020 (epub 3 March 2020). https://doi.org/10.1515/cclm-2020-0198
4. Wang D, Hu B, Hu C, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. JAMA 2020;323(11):1061-1069. https://doi.org/10.1001/jama.2020.1585
5. Ichihara K, Ozarda Y, Barth JH, et al. A global multicenter study on reference values: 2. Exploration of sources of variation across the countries. Clin Chim Acta 2017;467:83-97. https://doi.org/10.1016/j.cca.2016.09.015
6. Karita E, Ketter N, Price MA, et al. CLSI-derived hematology and biochemistry reference intervals for healthy adults in eastern and southern Africa. PLoS ONE 2009;4(2):e4401. https://doi.org/10.1371/journal.pone.0004401
7. Thobakgale CF, Ndung'u T. Neutrophil counts in persons of African origin. Curr Opin Hematol 2014;21(1):50-57. https://doi.org/10.1097/MOH.0000000000000007
8. Kibaya RS, Bautista CT, Sawe FK, et al. Reference ranges for the clinical laboratory derived from a rural population in Kericho, Kenya. PLoS ONE 2008;3(10):e3327. https://doi.org/10.1371/journal.pone.0003327
9. Saathoff E, Schneider P, Kleinfeldt V, et al. Laboratory reference values for healthy adults from southern Tanzania. Trop Med Int Health 2008;13(5):612-625. https://doi.org/10.1111/j.1365-3156.2008.02047.x
10. Segolodi TM, Henderson FL, Rose CE, et al. Normal laboratory reference intervals among healthy adults screened for a HIV pre-exposure prophylaxis clinical trial in Botswana. PLoS ONE 2014;9(4):e93034. https://doi.org/10.1371/journal.pone.0093034

S Afr Med J 2020;110(6):435. https://doi.org/10.7196/SAMJ.2020.v110i6.14833