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Incertitude Pathophysiology and Management During the First Phase of the COVID-19 Pandemic



TO THE EDITOR: The case report described by Fukuhara and colleagues¹ renders some considerations. First, the variability of the host immune response plays a crucial role in coronavirus disease 2019 (COVID-19) severity. During the COVID-19 illness, CD3⁺, CD4⁺, and CD8⁺ lymphocyte counts are reduced based on disease stage,² while the cytokine storm heralds adverse outcomes, which occur in patients with severe disease due to tumor necrosis factor- α and interleukins (IL) such as IL-6, IL-8, and IL-10.^{2,3} We recently reported that proinflammatory cytokines IL-6, IL-8, and tumor necrosis factor- α reach maximum levels 2 to 4 hours after cardiopulmonary bypass (CPB) and decrease to nearly normal levels within 24 hours.

Nonetheless, CPB, by interfering with coagulation, favors the expression of G protein-coupled receptors, which cause platelet and leukocyte activation. Factor Xa induces the expression of cytokines and adhesion molecules in leukocytes. Hence, coagulation is linked to inflammation. We also found that the proinflammatory cytokine burden correlates with worse postoperative outcomes.⁴ The patient described by the authors had a proinflammatory CPB response synergistically worsened by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection.

Second, it is important to note that in countries affected by the pandemic during the initial phase of the propagation of SARS-CoV2 infection, no advisory committee for hospitalization practices had issued recommendations that identified guidelines for the prevention of COVID-19 in patients in which hospitalization was necessary. This vacancy in the predefined guidelines raised doubts about the timing in which patients acquired the COVID-19 disease, favoring the suspicion that the infection had occurred in the preoperative period, which was therefore not negligible.

For many patients who were hospitalized in critical condition requiring an immediate surgical procedure, SARS-CoV-2 was sometimes not even considered at presentation. The dysfunction was evident not only in smaller hospitals but also in tertiary referral centers. Many were limited by the number of available real-time polymerase chain reaction tests, and the relatively long processing times were not conducive to emergency interventions.

Finally, although we are better equipped to deal with SARS-CoV-2, some aspects linked to diagnostic management remain uncertain. Viral and serologic testing for acute SARS-CoV-2 infection is now recommended for surgical decision making. Nevertheless, there remains a

concern in patients with mild SARS-CoV-2 infection or asymptomatic patients who require emergency interventions but remain undetected by current screening procedures.

Francesco Nappi, MD

Department of Cardiac Surgery
Centre Cardiologique du Nord de Saint-Denis
36 Rue des Moulins Gémeaux
93200, Saint-Denis, France
email: francesconappi2@gmail.com

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COVID-19 and Cardiac Surgery: Still Many Questions and Much Work to Do



REPLY TO THE EDITOR: Dr Nappi¹ provides insightful comments and suggestions regarding the pathophysiology of coronavirus disease 2019 (COVID-19) and its likely compounding inflammatory effects with cardiopulmonary bypass on our patient's surgical outcome,² which we previously discussed in response to Manenti and colleagues.³ During the 10 weeks since our reply, the status of the pandemic has evolved. In the United States, while the total number of deaths has now surpassed half a million, the daily number of new cases and deaths has decreased dramatically, likely a reflection of the vaccination campaign that has begun here and despite fears of new viral variants.

Recently, new data have emerged about the impact of COVID-19 on cardiac surgery in the United States. During the 57th Annual Meeting of The Society of Thoracic Surgeons (STS), Nguyen and associates⁴ presented results of an analysis of The STS Adult Cardiac Surgery Database that showed a 53% decrease nationwide in the average monthly cardiac surgery volume compared with 2019, with 65% fewer elective and 40% fewer nonelective cases, regardless of procedure type. Not only is there a clear increased risk of morbidity and mortality with cardiac procedures during the pandemic,⁴ but our colleagues in New York have discovered that patients with COVID-19 requiring any kind of emergent surgical operation suffer greater perioperative morbidity and mortality overall.⁵ The current study by Nguyen and