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The authors have disclosed that they do not have any potential conflicts of interest.

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Cardiopulmonary Resuscitation in Coronavirus Disease 2019: Far from Futile

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To the Editor:

We read with interest the article published in a recent issue of *Critical Care Medicine* by Shah et al (1). The authors describe a cohort of 63 patients with coronavirus disease 2019 (COVID-19) who suffered in-hospital cardiac arrest (IHCA), representing an important addition to the literature during this pandemic. However, we have concerns about the authors' suggestion that IHCA resuscitation in patients with COVID-19 is futile. Nihilism surrounding outcomes from IHCA in this population may lead to early termination of resuscitative efforts and premature withdrawal of life-sustaining measures: a self-fulfilling prophecy.

Since early in the pandemic, concerns have been raised about low survival rates after IHCA in patients with COVID-19. First, a study from Wuhan demonstrated very low survival in a cohort of 136 patients with COVID-19 who suffered IHCA (2). However, in this cohort, greater than 90% of patients presented with asystole—raising the question of delayed recognition of IHCA in a hospital overrun with the first surge of COVID-19. The study by Shah et al (1) and several other small single-center cohorts with similarly low survival led to discussions of blanket do-not-resuscitate orders in both the medical literature and the lay press. However, recent multicenter publications, including one by our own study group, suggest that IHCA from COVID-19 is far from futile. Our retrospective cohort study of IHCA across 11 hospitals demonstrated an overall return of spontaneous circulation (ROSC) rate of 22.3% and 11.9% survival to hospital discharge, with marked variation between centers (3). Hayek et al (4), in another multicenter study, reported rates of ROSC of 33.8% and 12% survival to hospital discharge in patients admitted to the ICU.

IHCA strikes approximately 300,000 patients every year in the United States; approximately 25% survive to hospital discharge (5). However, survival varies widely between centers due to differences in patient characteristics, resuscitation practices, and postarrest care implementation (5). The COVID-19 pandemic combined with local practice decisions has the potential to dramatically affect the continuum of IHCA care, including the prompt

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recognition of cardiac arrest, administration of high-quality cardiopulmonary resuscitation, and decisions to continue postarrest care versus transition to comfort measures.

With respect to futility, the Society of Critical Care Medicine along with four other critical care organizations have taken the position that ICU interventions should generally be considered inappropriate when there is no reasonable expectation that the patient will improve sufficiently to survive outside the acute care setting or when there is no reasonable expectation that the patient's neurologic function will improve sufficiently to allow the patient to perceive the benefits of treatment. Rather than validating previously published single-center studies suggesting very poor outcomes after IHCA in COVID-19, we suggest that the marked variation in survival between hospitals observed in multicenter studies may explain the authors' findings. Given the significant variation in reported patient outcomes, current evidence suggests that survival is possible after IHCA in COVID-19; further research into care variations is required.

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The authors reply:

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Ayodeji Olarewaju, MD[3]

We would like start by emphasizing that our recently published article (1) in *Critical Care Medicine* does not suggest that cardiopulmonary resuscitation is futile in hospitalized coronavirus disease 2019 (COVID-19) patients suffering from cardiac arrest. We sought to use our experience to generate robust debate and encourage further research into a very important question that has a large impact on resource allocation.

Nowhere in our article did we suggest early termination of resuscitative efforts and premature withdrawal of life-sustaining measures. We agree that every effort must be made to guard against therapeutic nihilism in any clinical endeavor. At the time of submission of our article, there was no data in the United States about the survival to discharge in COVID-19 patients suffering in-hospital cardiac arrest, and our study added to the rapidly evolving body of evidence at a time when little was known about COVID-19.

Since the publication of our article, there have been more recent data, including the authors' article (3) showing that cardiopulmonary resuscitation in COVID-19 patients with in-hospital cardiac arrest is certainly not futile. We believe that single-center studies such as ours helped spur more studies that

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