

Research Support

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Competing Interests

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References

1. Roth JV: Defining hypotension during anesthesia: Comment. *ANESTHESIOLOGY* 2020; 133:461
2. Gross JB: Defining hypotension during anesthesia: Comment. *ANESTHESIOLOGY* 2020; 133:461
3. Brady KM, Hudson A, Hood R, DeCaria B, Lewis C, Hogue CW: Personalizing the definition of hypotension to protect the brain. *ANESTHESIOLOGY* 2020; 132:170–9
4. Drummond JC: A beach chair, comfortably positioned atop an iceberg. *Anesth Analg* 2013; 116:1204–6

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Preventing Infection of Patients and Healthcare Workers Should Be the New Normal in the Era of Novel Coronavirus Epidemics: Comment

To the Editor:

We read with great interest the editorial by Bowdle *et al.*¹ We wish to describe what Spanish

anesthesiologists and healthcare professionals are experiencing with the first pandemic of the twenty-first century, caused by a new coronavirus. The disease is highly contagious and has therefore spread faster than previous coronavirus infections. The disease has surpassed the capacity of even the most solvent healthcare systems. The natural tendency is to collapse, making it inevitable to ration health resources. The situation in our country, Spain, which currently presents the steepest infection curve, is particularly striking. All Spanish governments to date have boasted about the excellence of the national health service, considering it the “jewel in the crown.” And rightly so, given the high standard of clinical results and quality of care, even in times of budget constraints. This has largely been achieved at the cost of substandard working conditions (understaffing, extended shifts, and poor pay) and cutbacks on resources to protect staff from occupational risks. Unfortunately, it has taken a coronavirus to reveal the extent of these shortcomings, and it comes as no surprise that 12,300 Spanish health professionals have so far been infected, with 2,000 infections registered today. This represents 15% of total infections, a far higher percentage than countries such as Italy (8.67%), China (4.12%), or the United States (1.42%). Our patients have been protected—a source of pride for all—but our healthcare professionals, the foundation of our system, have been sorely neglected. This has an enormous impact. Our colleagues are “falling like flies,” reducing the number of healthcare workers on duty and our capacity to treat our patients, and producing further infections in patients and colleagues. Staff numbers are severely depleted, and we are now reduced to recalling retired doctors and recruiting trainees and even medical students. There are two reasons for this: (1) personal protective equipment, which was scarce even at the start of the outbreak, is now entirely lacking, and (2) symptomatic healthcare workers cannot be polymerase chain reaction–tested, so the authorities have to allow them to continue working.

At the start of the outbreak, hospital departments went to great lengths to draw up local protocols to ensure the highest quality of care for patients with coronavirus disease 2019 (COVID-19). However, many of these protocols are infeasible due to lack of material resources.

Anesthesiologists perform high-risk procedures such as endotracheal intubation, with the consequent risk of contamination from secretions, blood, droplets, and aerosols.^{2,3} These procedures warrant special measures and should be performed using appropriate personal protective equipment for airborne precautions.^{1,2} However, we have no appropriate masks, hazmat suits, goggles, or face shields. The safety of healthcare workers and the enforcement of stringent precautions to control infection should be our highest priority. But our day-to-day reality is far removed from these laudable principles.

Competing Interests

The authors declare no competing interests.

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References

1. Bowdle A, Munoz-Price LS: Preventing infection of patients and healthcare workers should be the new normal in the era of novel coronavirus epidemics. *ANESTHESIOLOGY* 2020; 132:1292–5
2. Zuo MZ, Huang YG, Ma WH, Xue ZG, Zhang JQ, Gong YH, Che L, Management CSoATFoA: Expert recommendations for tracheal intubation in critically ill patients with novel coronavirus disease 2019. *Chin Med Sci J* 2020 Feb 27 [Epub ahead of print]
3. Chen X, Liu Y, Gong Y, Guo X, Zuo M, Li J, Shi W, Li H, Xu X, Mi W, Huang Y; Chinese Society of Anesthesiology, Chinese Association of Anesthesiologists: Perioperative management of patients infected with the novel coronavirus: Recommendation from the Joint Task Force of the Chinese Society of Anesthesiology and the Chinese Association of Anesthesiologists. *ANESTHESIOLOGY* 2020; 132:1307–16

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Preventing Infection of Patients and Healthcare Workers Should Be the New Normal in the Era of Novel Coronavirus Epidemics: Reply

In Reply:

We read the letter from our colleagues in Spain with tears in our eyes.¹ When we submitted our editorial² to *ANESTHESIOLOGY* on February 29, 2020, there was

much that was not known about this virus. We were uncertain about how dire the shortage of personal protective equipment would be, although we believed there would be a shortage.

We now know that airborne spread is likely during aerosol-generating procedures, and that the shortage of personal protective equipment has been a major problem around the world. Ironically, the equipment we need the most to protect patients and ourselves, ordinary surgical masks, respirator masks (such as N95), eye protection, and hand gel, are very inexpensive to produce, but the world's capacity to manufacture these materials in a short time is limited, and overly centralized.

U.S. healthcare workers have also needed to adapt to shortages of personal protective equipment. Inequalities, at both the facility and individual levels, are impacting disease and outcomes. Facilities with lower resources, such as nursing homes, are having to deal with lack of supplies, lack of staff, and a population of residents at risk for severe disease and higher mortality. American acute-care hospitals are also experiencing these shortages, forcing us to find innovative ways of developing personal protective equipment, such as manufacturing three-dimensional printed respirators and eye protective equipment. Small businesses and individuals are stepping up to help by repurposing their factories to make masks or by sewing masks in their homes.

All of us must honor our heroic colleagues in Spain and other severely affected places by making sure that we do not rest until we have adequate supplies of personal protective equipment for all healthcare providers. In our opinion, personal protective equipment should be manufactured and stored throughout the world, not simply in a few geographic locations. This would ensure that during times of utmost need, there is a robust reserve and a manufacturing supply chain that does not rely on a single country or even a few countries. This week, the state of California announced that it would spend a billion dollars buying a massive supply of masks and that it would serve as a distribution center for other western states of the United States. This is a good start, but much more needs to be done.

We must not rest until we are sure that in the future we will not have to fight with our bare hands. *Mucha fuerza colegas!*

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References

1. Gómez-Ríos MÁ, Casans-Francés R, Abad-Gurumeta A, Taboada-López E: Preventing infection of patients and healthcare workers should be the new normal in the era of novel coronavirus epidemics: Comment. *ANESTHESIOLOGY* 2020; 133:462–3
2. Bowdle A, Munoz-Price LS: Preventing infection of patients and healthcare workers should be the new normal in the era of novel coronavirus epidemics. *ANESTHESIOLOGY* 2020; 132:1292–5

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Intubation and Ventilation amid COVID-19: Comment

To the Editor:

We read with great interest the manuscript by Meng *et al.*¹ reporting their experience about intubation and ventilation in coronavirus disease 2019 (COVID-19) patients. They reported that prone ventilation was frequently used in Wuhan to improve both lung mechanics and gas exchange. The recent published literature regarding the occurrence of acute respiratory syndrome (ARDS) in COVID-19 patients have mainly focused attention on the role of computed tomography in evaluating the radiological manifestations and temporal progression of the disease,² while few data have been presented regarding the use of lung ultrasonography,³ especially in the evaluation of the disease course. One of the major problems during the ventilation of these patients in the intensive care unit is to decide the correct positive end-expiratory pressure level, which requires in most cases a personalized care approach, and to determine the efficacy of prone positioning. In this regard, lung ultrasound can make a major contribution to meeting this challenge. Indeed, previous investigations have already demonstrated that prone position represents an important therapeutic strategy for ARDS patients, improving their oxygenation and short-term mortality.⁴ Moreover, the serial evaluation of the effectiveness of positive pressure in these subjects remains fundamental. In this regard, chest computed tomography cannot be routinely used in daily clinical practice to monitor aeration improvement,

while lung ultrasonography represents a valid bedside alternative for this purpose.⁵ Indeed, ultrasound could be a viable option to reduce the need to transport patients to the radiology department, reducing the exposure of hospital staff and other subjects to COVID-19 patients. Pan *et al.* have recently highlighted that lung recruitability can be effectively assessed bedside in COVID-19 patients with ARDS.² Similar results were presented by Wang *et al.*, who reported that bedside lung ultrasonography can be adopted to guide response to prone positioning.⁵ It is important to remember that the use of positive pressure cycles remains associated with potential adverse effects such as an increased risk of unintended extubation and/or secondary hemodynamic effects, and the real impact of this strategy in COVID-19 patients with previous cardiac disease remains unknown. For these reasons, the use of lung ultrasound could further implement the use of a personalized approach to the ARDS management and related ventilatory support. In this way, they will be able to rapidly assess the patient's pulmonary aeration in every moment without the need to transport an infectious subject to a radiology ward. The authors did not report data regarding the use of lung ultrasonography for the cited purposes. It would be useful to know if lung ultrasonography has been used in their large clinical experience and if so, how it impacted in the patient's management. Since treatment of severe ARDS from COVID-19 is an ongoing challenge, it is important to learn from the patients who have been treated to gain an understanding of the disease's epidemiology, its biologic mechanisms, and the effects of new pharmacologic interventions. Treatment of ARDS from COVID-19 remains an ongoing challenge. It is important to continuously adapt the treatment strategy to the continuous presented evidence based on biologic mechanisms and clinical strategies using a step-up approach ranging from the high-flow nasal oxygen for those patients with moderately severe hypoxemia to endotracheal intubation and/or prone positioning, neuromuscular blockade, inhaled nitric oxide, and extracorporeal membrane oxygenation in case of refractory hypoxemia. Future data will also clarify if lung ultrasound has a role in early diagnosis and prognostication of COVID-19 infection.

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The authors declare no competing interests.

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