Reply to the letter

Naoyuki Hirata¹ · Michiaki Yamakage¹

Received: 28 September 2020 / Accepted: 3 October 2020 / Published online: 31 October 2020
© Japanese Society of Anesthesiologists 2020

Keywords Cardiovascular surgery · Anesthetic management · COVID-19 pandemic

To the Editor:

We are grateful to Dr. Magoon for the helpful comments on our article [1]. As he pointed out in the letter to the editor, we have not referred to pulmonary-vascular consequences in the patients with COVID-19. Prolonged hypoxia and mechanical ventilation can cause pulmonary hypertension (PH) in patients with COVID-19. PH per se is a significant predictor of adverse cardiopulmonary outcome in surgical patients as reflected by increased postoperative complications in patients with co-existing high-risk clinical and surgical characteristics [2]. Anesthesiologists should provide appropriate anesthesia and analgesia with avoidance of exacerbating factors of PH (e.g., hypoxia, hypercapnia, acidosis, and hypothermia) and with administering intravenous vasodilators (e.g., milrinone, nitroprusside, and nitroglycerine) [2]. While a specific strategy against PH in patients with COVID-19 has not been established, the use of nitric oxide may be a strategy in addition to the above conventional approaches [3].

The letter from Dr. Magoon reminds us of the importance of pulmonary-vascular consequences during the COVID-19 pandemic.

Funding The authors have no financial interests in products related to this article.

References

1. Hirata N, Yamakage M. Cardiovascular considerations for anesthesiologists during the COVID-19 pandemic. *J Anesth*. 2020. <https://doi.org/10.1007/s00540-020-02852-1> ((Online ahead of print)).
2. Minai OA, Yared JP, Kaw R, Subramaniam K, Hill NS. Perioperative risk and management in patients with pulmonary hypertension. *Chest*. 2013;144:329–40.
3. Moron BA, Gladwin MT, Bonnet S, Perez VDJ, Perman SM, Yu PB, Ichinose F. Perspectives on cardiopulmonary critical care for patients with COVID-19: From members of the American heart association council on cardiopulmonary, critical care, perioperative and resuscitation. *J Am Heart Assoc*. 2020;9:e017111.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This reply refers to the comment available online at <https://doi.org/10.1007/s00540-020-02869-6>.

✉ Naoyuki Hirata
naohirata@mac.com

¹ Department of Anesthesiology, Sapporo Medical University
School of Medicine, South 1, West 16, Chuo-ku, Sapporo,
Hokkaido 060-8543, Japan