



## In reply: The value of subcostal echocardiographic assessment and directions for future research

Nibras Bughrara, MD, FCCM, FASA · Aliaksei Pustavoitau, MD, MHS, FCCM · Jose L. Diaz-Gomez, MD, FCCM, FASE, NCC (UCNS)

Received: 7 February 2022/Revised: 7 February 2022/Accepted: 11 February 2022/Published online: 24 February 2022  
© Canadian Anesthesiologists' Society 2022

**Keywords** anesthesiology training · echocardiography · hemodynamic instability · perioperative assessment · point-of-care ultrasound

### To the Editor,

We thank Dr. Sanfilippo *et al.*<sup>1</sup> for their interest in our work on comparison of qualitative echocardiographic information obtained using the subcostal-only window and via focused transthoracic echocardiography in patients with hemodynamic instability and/or respiratory failure or to define volume status. Sanfilippo *et al.* published the *Preferred Reporting Items for Critical Care Echocardiography Studies* (PRICES) statement in 2021—an international consensus of experts on methodology for conducting studies (especially prospective investigations) in critical care echocardiography (CCE). The recommendations are the result of a systematic review of the literature by the expert panel, which was endorsed by the European Society of Intensive Care Medicine.<sup>2</sup> The PRICES panel identified four areas of CCE research: the assessment of left ventricular systolic function, left

ventricular diastolic function, right ventricular systolic function, and fluid management. We recognize and fully support an organized approach to reporting of echocardiography studies using the PRICES framework. Nonetheless, by the time, Sanfilippo *et al.* published the PRICES statement, we had already concluded our work. Despite that, our training reporting, patient demographics, and indications follow the PRICES statement recommendations.

Our investigation compared the echocardiographic qualitative information obtained through the subcostal window with focused transthoracic echocardiography. Investigations similar to ours can explore the utility and time efficiency of screening using point-of-care ultrasonography. In contrast, the PRICES framework is more appropriate for formalizing prospective quantitative CCE studies. Of note, besides evaluation of biventricular systolic function and volume status, we assessed for pericardial effusion and interventricular septal motion. Our findings support the echocardiography assessment with a subcostal-only window (EASy) approach as an entry point to CCE. Therefore, a standardized curriculum including supervised exams, clear indications (e.g., cardiac arrest),<sup>3</sup> and a structured approach to image interpretations (i.e., phenotypes based on pattern recognition) are required and were described in our manuscript.<sup>4</sup> Echocardiography assessment with subcostal-only window phenotypes represent cardiac function patterns to assess pre-existing heart disease and facilitate risk stratification of patients in the perioperative period or immediate assessment of patients with sepsis.<sup>5</sup> Nevertheless, the concept of phenotypes requires further validation, and we are currently evaluating the EASy phenotypes on perioperative patients with undifferentiated

---

N. Bughrara, MD, FCCM, FASA (✉) ·  
Department of Anesthesiology, Albany Medical Center, 47 New  
Scotland Avenue, Albany, NY MC-131, USA  
e-mail: bughran@amc.edu

A. Pustavoitau, MD, MHS, FCCM  
Department of Anesthesiology, Johns Hopkins Hospital,  
Baltimore, MD, USA

J. L. Diaz-Gomez, MD, FCCM, FASE, NCC (UCNS)  
Division of Cardiovascular Anesthesia and Critical Care  
Medicine, Baylor College of Medicine, Texas Heart Institute,  
Houston, TX, USA

arterial hypotension.<sup>6</sup> Overall, we view the potential of EASy for rapid expansion into clinical practice, particularly when blending image acquisition and interpretation by clinicians with tools developed through machine learning and artificial intelligence.

In summary, we underscore the importance of the PRICES statement for further prospective quantitative CCE research, but we emphasize that our investigation intended to compare two diagnostic qualitative approaches in the initial assessment of hemodynamic instability and/or respiratory distress or to define volume status in the perioperative setting.

**Disclosures** None.

**Funding statement** None.

**Editorial responsibility** This submission was handled by Dr. Philip M. Jones, Deputy Editor-in-Chief, *Canadian Journal of Anesthesia/Journal canadien d'anesthésie*.

## References

1. Sanfilippo F, la Via L, Flower L, Madhivathanan P, Astuto M. The value of subcostal echocardiographic assessment, and directions for future research. *Can J Anesth* 2022; DOI: <https://doi.org/10.1007/s12630-022-02225-0>.
2. Sanfilippo F, Huang S, Herpain A, et al. The PRICES statement: an ESICM expert consensus on methodology for conducting and reporting critical care echocardiography research studies. *Intensive Care Med* 2021; 47: 1-13.
3. Bughrara N, Herrick SL, Leimer E, Sirigaddi K, Roberts K, Pustavoitau A. Focused cardiac ultrasound and the periresuscitative period: a case series of resident-performed echocardiographic assessment using subcostal-only view in advanced life support. *A A Pract* 2020; DOI: <https://doi.org/10.1213/XAA.0000000000001278>.
4. Bughrara N, Renew JR, Alabre K, et al. Comparison of qualitative information obtained with the echocardiographic assessment using subcostal-only view and focused transthoracic echocardiography examinations: a prospective observational study. *Can J Anesth* 2022; 69: 196-204.
5. Bughrara N, Diaz-Gomez JL, Pustavoitau A. Perioperative management of patients with sepsis and septic shock, part II: ultrasound support for resuscitation. *Anesthesiol Clin* 2020; 38: 123-34.
6. Hoenig B, Burmistrova M, King D, et al. 1518: Cardiovascular phenotypes in 104 hypotensive perioperative patients using the subcostal view (EASY). *Crit Care Med* 2022; DOI: <https://doi.org/10.1097/01.ccm.0000812396.09224.bc>.

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