Available online at www.sciencedirect.com

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Letter to the Editor

Reply to: Optic nerve sheath diameter measurement in hypoxic ischaemic brain injury after cardiac arrest

Dear Editor,

We would like to thank Dr De Bernardo and co-workers for this insightful comment. We believe the issues raised are mostly applicable in the ophthalmologic ambulatory settings to assess structural fine lesions of the optic nerve.

In comatose patients after cardiac arrest with possible increased intracranial pressure being managed in the intensive care setting, it is not feasible to conduct a "30-degree test" using A-mode ultrasound as suggested since the patients are not alert and neurologically responsive. In addition, these patients undergo routine neuroimaging (for example, computed tomography of the head) at admission, which can reveal whether there is a meningioma or any other anatomical issues of the optic nerve acting as potential confounders in the detection of intracranial hypertension though optic nerve sheath diameter (ONSD) measurements. In our study, prior optic nerve or orbital pathologies confirmed by imaging exams were considered as exclusion criteria.

To fulfil the purpose of our study, the utilization of B-mode ultrasound providing cross-sectional views of the eyes and orbits to visualize the optic nerve sheath and measure its diameter has been shown to be feasible and accurate.[1,2] Nevertheless, the superiority of A-mode ultrasound for ONSD measurement has not been confirmed in the neurocritical care setting. In clinical practice, its application in the detection of intracranial hypertension may prove difficult given the need for an alert and responsive patient to perform the "30-degree test" as indicated by De Bernardo and colleagues. Alternatively, the potential artefacts generated by the B-mode associated with the low sensitivity of this technique may be mitigated by the utilisation of colour Doppler to improve the spatial resolution with rapid imaging rate. It also allows the identification of the retinal artery, which can represent a frequent artefact in the ONSD measurement given the anatomical position of this artery inferiorly to the optic nerve. If not identified correctly, it may appear as a lateral enlargement of the optic nerve scan and result in ONSD overestimation.

Conflict of interest

The authors have disclosed they have no conflicts of interest.

REFERENCES

1. Robba C, Santori G, Czosnyka M, et al. Optic nerve sheath diameter measured sonographically as non-invasive estimator of intracranial pressure: a systematic review and meta-analysis. Intensive Care Med 2018;1284–94.
2. Robba C, Cardim D, Tajsic T, et al. Ultrasound non-invasive measurement of intracranial pressure in neurointensive care: a prospective observational study. PLoS Med 201714:.

Danilo Cardim*
Department of Anesthesiology, Pharmacology and Therapeutics, Vancouver General Hospital, University of British Columbia, Vancouver, BC, Canada

Donald E. Griesdale[a,b,c]
[a]Department of Anesthesiology, Pharmacology and Therapeutics, Vancouver General Hospital, University of British Columbia, Vancouver, BC, Canada

[b]Division of Critical Care Medicine, Department of Medicine, Vancouver General Hospital, University of British Columbia, Vancouver, BC, Canada

[c]Centre for Clinical Epidemiology and Evaluation, Vancouver Coastal Health Research Institute, University of British Columbia, Vancouver, BC, Canada

Philip N. Ainslie
Department of Health and Exercise Sciences, University of British Columbia – Okanagan, Kelowna, BC, Canada

Chiara Robba
Anaesthesia and Intensive Care, IRCCS San Martino, Genova, Italy

Leanne Calviello
Brain Physics Laboratory, Division of Neurosurgery, Department of Clinical Neurosciences, University of Cambridge, UK

Marek Czosnyka[a,b]
[a]Brain Physics Laboratory, Division of Neurosurgery, Department of Clinical Neurosciences, University of Cambridge, UK

[b]Institute of Electronic System, Warsaw University of Technology, Poland

Peter Smielewski
Brain Physics Laboratory, Division of Neurosurgery, Department of Clinical Neurosciences, University of Cambridge, UK

Mypinder S. Sekhon
Division of Critical Care Medicine, Department of Medicine, Vancouver General Hospital, University of British Columbia, Vancouver, BC, Canada

* Corresponding author at: Department of Anesthesiology, Pharmacology and Therapeutics, Vancouver General Hospital, University of British Columbia, Room 2469, Jim Pattison Pavilion, 2nd Floor, 855 West 12th Avenue, Vancouver, BC V5Z 1M9, Canada.
E-mail address: danilo.cardim@gmail.com (D. Cardim).

http://dx.doi.org/10.1016/j.resuscitation.2019.02.046