LETTER TO THE EDITOR

In Response to: Is the Carotid Artery a Window to the Left Ventricle?

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Abstract

We think correlation of Doppler ultrasound derived CA-VTI and echocardiography derived SV needs further exploration in a larger sample and in various models of hypovolemia and shock under ideal measurement conditions before concluding whether carotid artery can be considered a true window to the left ventricle.

Keywords: Cardiac output, Carotid artery velocity time integral, Passive leg raising.

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Dear Editor

We must thank Dr Jon-Emile S Kenny for his constructive review of our paper.[1] The discrepancies highlighted by Dr Kenny could be due to several reasons. Most important factor was small sample size in our study. We had recruited a total of 60 patients with only 20 patients in each group (nonseptic control, sepsis, and septic shock). Moreover, carotid artery velocity time integral (CA-VTI) and left ventricular VTI/stroke volume (SV) were not measured in same cardiac cycle. In addition, we regressed absolute changes in CA-VTI against SV as displayed in correlation figures explaining the discordance. It is also important to mention that we have checked only linear correlation and other higher order correlations were not assessed.

In contrast to our study, two recent studies showed good correlation between ΔCA-VTI and ΔLVOT-VTI or ΔSV as mentioned by Dr Kenny. However, one of them evaluated the outcome of interest during respiratory cycle and not in response to passive leg raising (PLR).[2] In another study, Dr Kenny et al. evaluated ΔSV by noninvasive pulse contour analysis rather than transthoracic echocardiography by using a wearable ultrasonography (USG) device in healthy human volunteers.[3] While the number of observations was large, the pathophysiological state of septic shock involving concurrent hypovolemia and arterial vasodilatation may not be the same as in healthy volunteers with simulated hypovolemia. In contrast, in another study in critically ill patients, Girotto et al. observed that Doppler USG-derived carotid artery blood flow was not reliable when compared to cardiac output assessed by PiCCO technique.[4]

Therefore, we think correlation of Doppler ultrasound–derived CA-VTI and echocardiography-derived SV needs further exploration in a larger sample and various models of hypovolemia and shock under ideal measurement conditions before concluding whether carotid artery can be considered a true window to the left ventricle.

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References

1. Chowhan G, Kundu R, Maitra S, Arora MK, Batra RK, Subramaniam R, et al. Efficacy of left ventricular outflow tract and carotid artery velocity time integral as predictors of fluid responsiveness in patients with sepsis and septic shock. Indian J Crit Care Med 2021;25(3):310. DOI: 10.5005/jp-journals-10071-23764.
2. Pace R, Lassola S, Miori S, Cammarota G, Barbariol F, Vetrugno L. Carotid vs aortic velocity time integral and peak velocity to predict fluid responsiveness in mechanically ventilated patients. A comparative study. Minerva Anestesiol 2021. DOI: 10.23736/S0375-9393.21.160353.
3. Kenny J-ÉS, Barjaktarevic I, Mackenzie DC, Elfarnawany M, Yang Z, Eibl AM, et al. Carotid Doppler ultrasonography correlates with stroke volume in a human model of hypovolaemia and resuscitation: analysis of 48570 cardiac cycles. Br J Anaesth 2021;127(2):e60–e63. DOI: 10.1016/j.bja.2021.05.007.
4. Girotto V, Teboul JL, Beurton A, Galarza L, Guedj T, Richarfd C, et al. Carotid and femoral Doppler do not allow the assessment of passive leg raising effects. Ann Intensive Care 2018;8:67. DOI: 10.1186/s13613-018-0413-7.