

Stiffness or Reflection? A Critical Appraisal of Energy Drink–Induced Vascular Changes

To the Editor,

I read with great interest the article by Yaşar et al,¹ entitled “Evaluating the Acute Effects of Energy Drink Consumption on Arterial Stiffness in Healthy Young Adults,” recently published in the *Anatolian Journal of Cardiology*.¹ While the study addresses a clinically relevant topic, I would like to highlight some methodological and interpretive concerns.

First, the distinction between the Augmentation Index (Alx) and arterial stiffness is critical. Augmentation Index is a composite parameter influenced by peripheral vascular resistance, wave reflection, and heart rate, rather than a direct measure of wall stiffness.² The fact that the gold-standard measure, pulse wave velocity (PWV), remained unchanged throughout the study strongly suggests that the observed changes in Alx reflect transient hemodynamic modulations in wave reflection and vascular tone rather than an actual increase in arterial stiffness.³

Second, the absence of a control group is a significant limitation. Without a placebo or a water-intake arm, it is difficult to determine whether the observed effects were specifically caused by the energy drink ingredients or were merely a physiological response to fluid ingestion, caffeine’s known acute effects, or even a “white-coat” effect related to the measurement environment.

Third, the 2-hour post-consumption data present a physiological contradiction. The authors reported a significant decrease in total vascular resistance and diastolic blood pressure at the 2-hour mark. This suggests a transient adrenergic surge followed by a compensatory vasodilator rebound, which is inconsistent with a sustained increase in arterial stiffness.^{4,5}

In conclusion, given the stable PWV and the complex nature of Alx, I believe that characterizing the findings as an increase in “arterial stiffness” may be misleading. I suggest that the results would be more accurately described as acute modulations of wave reflection dynamics. Therefore, I believe that the results should be reinterpreted as acute hemodynamic modulations of wave reflection dynamics.

Declaration of Interests: The author has no conflicts of interest to declare.

Funding: The author declare that this study received no financial support.

REFERENCES

1. Yaşar S, Genç M, Eravcı Ö, et al. Evaluating the acute effects of energy drink consumption on arterial stiffness in healthy young adults. *Anatol J Cardiol*. 2025;29(10):564–570. [CrossRef]
2. Heusinkveld MHG, Delhaas T, Lumens J, et al. Augmentation index is not a proxy for wave reflection magnitude: mechanistic analysis using a computational model. *J Appl Physiol* (1985). 2019;127(2):491–500. [CrossRef]
3. Wilenius M, Tikkaoski AJ, Tahvanainen AM, et al. Central wave reflection is associated with peripheral arterial resistance in addition to arterial stiffness in subjects without antihypertensive medication. *BMC Cardiovasc Disord*. 2016;16:131. [CrossRef]



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LETTER TO THE EDITOR

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Available Online Date: May 20, 2026

Cite this article as: Karaman K. Stiffness or reflection? A critical appraisal of energy drink–induced vascular changes. *Anatol J Cardiol*. 2026;30(8):547–548.

DOI: 10.14744/AnatolJCardiol.2026.6379

4. Kaya M, Balasubramanian V, Li JKJ. Inadequacy of augmentation index for monitoring arterial stiffness: comparison with arterial compliance and other hemodynamic variables. *Cardio-vasc Eng Technol.* 2022;13(4):590-602. [\[CrossRef\]](#)
5. Van Bortel LM, Laurent S, Boutouyrie P, et al. Expert consensus document on the measurement of aortic stiffness in daily practice using carotid-femoral pulse wave velocity. *J Hypertens.* 2012;30(3):445-448. [\[CrossRef\]](#)