LETTER TO THE EDITOR

Diagnosis of cardiovascular autonomic neuropathy in diabetes: as simple as possible, but not simpler?

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Sir,

We have read with care the recent study by Bellavere et al. [1] on the reliability of the cardiovascular reflex tests (CARTs) most commonly used in the diagnosis of cardiovascular autonomic neuropathy (CAN) in diabetes mellitus. In an attempt at simplification of the procedure, three CARTs (deep breathing test, lying to standing, and Valsalva manoeuvre) were compared with a value of postural hypotension > 15 mmHg, the latter being considered as a reliable marker of CAN [1]. The authors suggested that the Valsalva manoeuvre should be applied for screening of possible CAN. A combination of the latter with lying to standing was proposed to improve diagnostic accuracy [1].

In a similar attempt to simplify the diagnostic procedure, we compared the results of each single CART (out of the five originally established by Ewing and called "Ewing's battery": deep breathing test, lying to standing, Valsalva manoeuvre, orthostatic hypotension, and handgrip) and their combinations with Ewing's battery [2]. In our study, lying to standing was associated with a very high sensitivity (96%) and negative predictive value (94%), practically meaning that this could serve as the best single diagnostic test to exclude CAN. Conversely, its specificity was only moderate (65%). The corresponding values for the Valsalva

manoeuvre were 62%, 85% and 92%. Thus, we also suggested that combination of these two CARTs is expected to increase diagnostic accuracy [2]. The clinical significance of these recent attempts is further enhanced by the study of May et al. [3] highlighting the independent predictive effect of lying to standing and Valsalva manoeuvre on long-term mortality.

Other attempts have also been made to simplify CAN diagnosis. Indeed, in 2013, Stranieri et al. [4] proposed that deep breathing test could serve as the best single test for CAN screening, but suggested that a better accuracy is achieved after determining the optimal sequence of tests for each individual.

These studies concur in attempting to reduce the time needed for clinical examination of CAN [1]. Indeed, the original Ewing's battery included the five aforementioned CARTs [1, 2]. For decades, this was considered as the gold standard for CAN assessment [1, 2]. More recent evidence has confirmed the reduced diagnostic utility of the handgrip test, and so, the latter is now being abolished by expert groups [5]. One step forward, an even more simplified diagnostic protocol displaying high diagnostic accuracy is expected to enable wider CAN screening [2].

In conclusion, we agree that diagnosis of CAN is, indeed, challenging and time demanding in everyday clinical practise [1, 2]. We firmly believe that additional evidence on the diagnostic value of each CART is required to enable wider screening for this insidious complication. Clearly, the endeavour to simplify the diagnostic procedure merits further study and will enrich the progress hitherto achieved in CAN.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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