Spectrum of Hemodynamic Responses in the First 60 Seconds after Active Standing Up

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Letters to the Editor

Spectrum of Hemodynamic Responses in the First 60 Seconds after Active Standing Up: Importance of Time Course of Blood Pressure Changes and Definitions

To the Editor:

The study by Doyle et al[1] corroborates earlier findings in The Irish Longitudinal Study on Ageing (TILDA) cohort[2] that a delayed recovery of blood pressure (BP) in the first 60 seconds after active standing up is associated with injurious falls in community-dwelling older people. Given the serious outcome associated with injurious falls (especially hip fractures), identification of delayed recovery of BP after standing up as a potentially modifiable risk factor is important and highly relevant. In the assessment of falls and syncope in older people, continuous noninvasive monitoring of finger arterial pressures in the first 60 seconds after active standing up has emerged as an important clinical tool.[3–6] To compare the important findings in the present study and future work standardization of terminology to classify the spectrum of orthostatic responses in the first 60 seconds after the onset of active standing up is pertinent.[3,5] The Consensus of the American Autonomic Society[7] defines classical orthostatic hypotension as a sustained reduction of systolic BP of at least 20 mm Hg and/or diastolic BP of 10 mm Hg within 3 minutes of standing or head-up tilt 60°. In 2011, the American Autonomic Society Consensus statement was expanded to include initial orthostatic hypotension [ie, a transient BP decrease (≥40 mm Hg systolic BP and/or ≥20 mm Hg diastolic BP within 15 seconds of active standing)]. In the TILDA population studies, it became clear that delayed recovery of BP often occurs in older individuals.[5,8,9] To classify these responses, a delayed BP recovery pattern was defined as a fall in systolic BP ≥20 mm Hg at 30–40 seconds after standing up, but not meeting the criteria of classical orthostatic hypotension with sustained hypotension (fall in systolic BP ≥20 mm Hg after 1–3 minutes standing).[2,3,5,8] In clinical practice, usually only the systolic BP cut-off is used to diagnose classical orthostatic hypotension or initial orthostatic hypotension.

In the present study, a drop in systolic BP ≥20 mm Hg at 30, 60, and 90 seconds is used to characterize delayed recovery. From our perspective, this "redefinition" is confusing because it differs from the 30- to 40-second time point that was used in previous studies in the TILDA population[2,8] and advised in the recent practical guide to monitor and analyze finger arterial pressure tracings on active standing.[5] In addition, the representation of delayed responses given in the "schematic" of the present paper seems not in agreement with the orthostatic hemodynamic patterns in the TILDA cohort itself.[9] In patients with classical orthostatic hypotension, BP does not recover to near baseline values after 60 - seconds standing as indicated in the "schematic." The fall in BP is sustained.[3,5–7]

A clinical classification of the spectrum of normal and abnormal hemodynamic responses in the first 60 seconds after active up has been proposed in the literature.[3–5] Examples are the illustrated in Figure 1.

In conclusion, standardization of terminology and consistent analysis is pertinent to classify the spectrum of orthostatic responses in the first 60 seconds after the onset of active standing up pertinent.[5] Important to note also that this concerns continuous BP recordings. Time will tell whether fast and successive oscillometric BP measurements[10] are a reliable alternative for continuous noninvasive monitoring of finger arterial pressure to identify delayed recovery of BP after standing up as a potentially modifiable risk factor for hip fractures.

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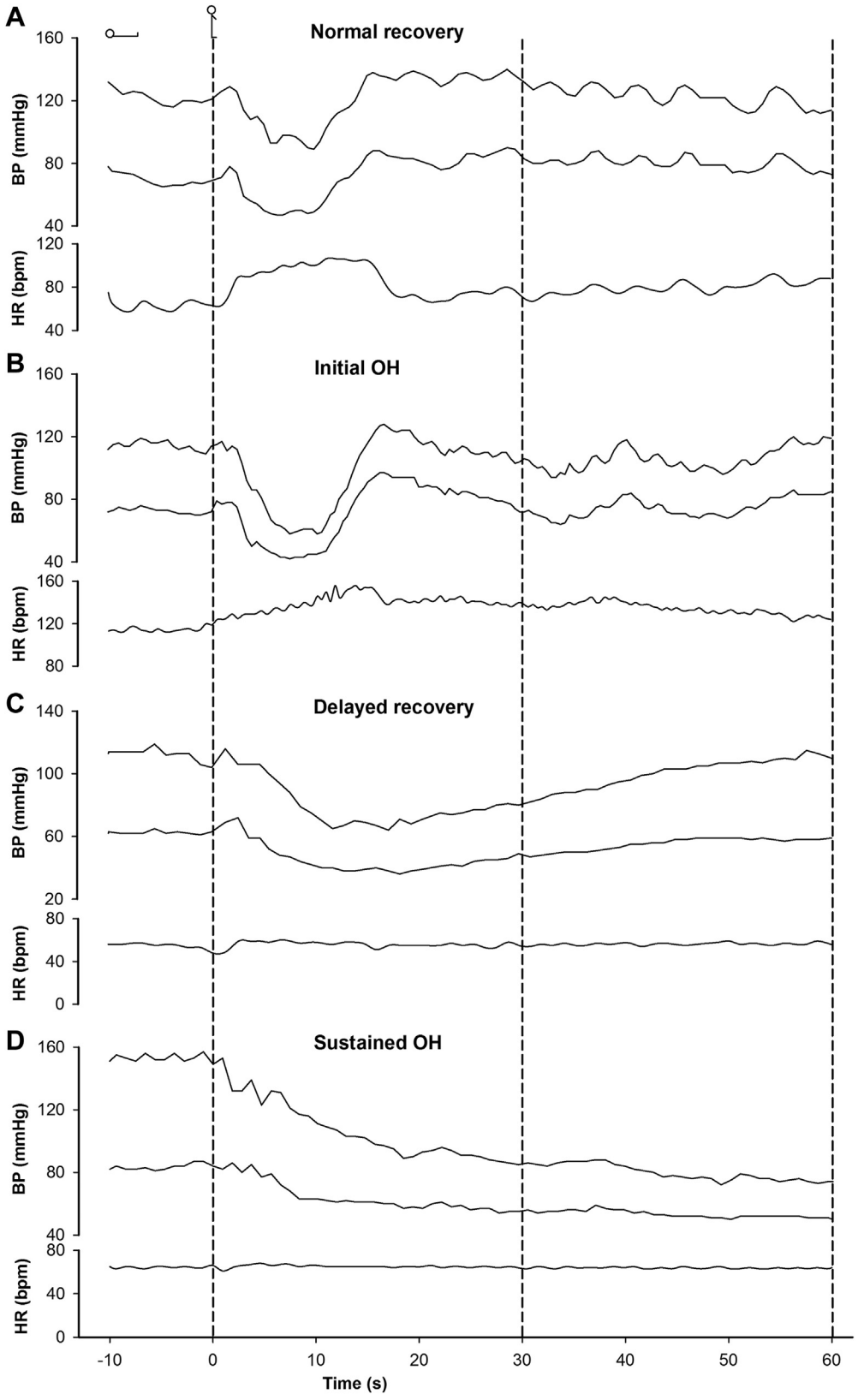

Fig. 1. Spectrum of normal and abnormal BP and heart rate responses during the first 60 seconds after active standing. (A) Normal orthostatic BP recovery in a 26-year-old healthy female individual. (B) Initial orthostatic hypotension (*IOH*) in a 14-year old healthy male individual (systolic BP decrease >40 mm Hg within 15 seconds of standing, with recovery to baseline within 30 seconds). (C) Delayed BP recovery in a 76-year-old man with a history of hypertension on 3 vasoactive drugs (systolic BP fall of >20 mm Hg at 30 seconds of standing but not meeting the criteria of classical orthostatic hypotension). (D) Classical orthostatic hypotension (*OH*) in a 76-year-old man with primary autonomic failure (sustained fall in systolic BP of ≥20 mm Hg between 60 and 180 seconds of standing). Revised after Harms et al 2021 with permission.

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True Effect of Nintendo Wii: Training Effect or Motivating Effect?

To the Editor:

We read with great interest the article by Marques-Sule et al who reported the results of a randomized controlled trial to determine whether adding the Nintendo Wii program to conventional physical therapy would be better than only conventional physical therapy for chronic stroke patients as an interventional rehabilitation for balance and daily activity.[1] This study included 29 patients with a history of stroke. From this well-designed study, the authors concluded that adding the Nintendo Wii program could improve patients' balance and daily activity.

We have some concern about the effect of the Nintendo Wii program. We interpreted that the improvement of balance and daily activity in the intervention group is not primarily a training effect of Nintendo Wii but a motivating effect. In short, we consider that Nintendo Wii motivated patients to train harder during conventional physical therapy. Let us give an example. In the field of education, it is already known that students who have many upcoming examinations will study more. Following this logic, we consider that in this intervention design, the Nintendo Wii itself is the "examination," and the physical therapy is the "study." An additional concern that we have is the sample selection methodology. When the authors registered at www.clinicaltrials.gov (NCT04144556), the inclusion criteria were patients who had had a stroke within the past 6 months. However, the actual study included patients who had had a stroke within the past year. This may have resulted in the inclusion of patients with less motivation for conventional physical therapy than originally planned.

To address these concerns, the authors could add subgroup analysis dividing patients into 2 groups: those with the onset of stroke within 6 months and those with the onset of stroke after 6 months but less than 1 year. The authors also might have been able to measure the participant's motivation between 2 groups to evaluate the Nintendo Wii's effect on the motivation. Another approach to addressing these concerns is to conduct another randomized controlled trial comparing a group of people who only use the Nintendo Wii program with a group that used only conventional physical therapy group. Indeed, a meta-analysis supports our concern showing that the effectiveness of the group using only the Nintendo Wii program was slight compared with the group with only conventional physical therapy.[2]

Despite our concerns, the authors demonstrated the Nintendo Wii's rehabilitative additive effect in a well-designed randomized controlled trial. Once again, we commend the authors for their dedicated efforts in this research.

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