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Measuring and defining orthostatic hypotension in the older person

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Estimates of the prevalence of orthostatic hypotension have previously found it to be as high as 6% in the community and 70% in long term care facilities [1, 2]. Despite this high prevalence there remain many unanswered questions regarding the diagnosis, treatment and natural history of OH. The 1996 American Autonomic Society and American Academy of Neurology Consensus criteria were a big step forward in standardising the clinical diagnosis and enabling academic progress; defining OH by sphygmanometric measured drops in systolic blood pressure (SBP) of 20 mm Hg and diastolic blood pressure (DBP) of 10 mm Hg during active standing or head up tilt [3]. Now these consensus criteria have been outgrown in many ways, largely as a result of the widespread use of continuous, beat-to-beat, non-invasive blood pressure monitoring. The 1996 diagnostic criteria appear too rigid for the dynamic profile gained during beat-to-beat monitoring. Commonly arising patterns for which the diagnostic criteria are unhelpful include brief but significant drops in BP and sustained BP drops that do not meet the diagnostic threshold. In an attempt to address these questions an update to the Consensus definition of OH was published in 2011 [2]. The specific changes include a definition for ‘initial OH’ (>40 mm Hg drop SBP, >20 mm Hg drop DBP), a requirement for a larger drop in people with hypertension (>30 mm Hg SBP, but without a definition of what to consider as hypertension) and the addition of ‘sustained drop’ to our usual diagnostic criteria of OH (without a definition of what constitutes a sustained drop).

Cook et al’s research paper, in this issue of A&A describes the prevalence of OH and the beat-to-beat BP profile in a cohort of 326 community-dwelling older adults in Ireland [4]. Their cohort are derived from an original sample of 552 older adults and are fitter than those who would typically undergo assessment for OH. The majority had no cognitive impairment on MMSE, no functional impairment on Barthel and a low prevalence of self-reported falls. Given their cohort’s demographic it may be a surprise that the prevalence of OH that they report is 59%. In common with previous studies those with OH had a lower body mass index, higher resting heart rate and higher rate of psychoactive medication co-prescription [5, 6].

Previous studies, which identified the prevalence of OH as 7% to 30% in community-dwelling older people, all used traditional sphygmanometers with varying methodologies [7, 8]. It is unsurprising that beat-to-beat BP measurement can identify more instances of BP dropping below the diagnostic threshold; indeed, a recent study using beat-to-beat measurements reported a prevalence of 94% in community dwelling elders [9]. This is one of the challenges of beat-to-beat monitoring; when to consider a brief and transient BP drop as artefact, normal or diagnostic. Longitudinal studies to quantify the longer term risks associated with these BP drops of unknown significance are required to answer these questions. However, without such evidence, the answer is probably to interpret the drop in the context of the individual undergoing the test, with clues from the history, risk factors and symptoms at the time of testing.

One method of addressing the diagnostic difficulty would be to categorise OH into different morphological patterns of orthostatic drop, rather than using crude cut off values. Using cluster analysis on their full cohort, Cook et al identify
three distinct BP profiles which are based on the rate of BP drop and the degree of BP recovery. The analysis they used is based on previous work by Romero-Ortuno et al which identified three distinct patterns of BP drop in a similar Irish population [9]. Both studies report identical profiles which they describe as small drop, fast recovery; medium drop, slow recovery and large drop non-recovery. Unfortunately, Cook et al do not present their cluster means to demonstrate just how distinct these clusters are, but it would appear that 19% of cases are not accounted for. These three patterns may seem familiar to those who use beat-to-beat monitoring. The small drop, fast recovery is most likely a cluster of what is more widely known as initial OH [2]; the large drop, non-recovery would be in keeping with OH associated with autonomic failure and the medium drop, slow recovery likely represents the predominant type of OH which Geriatricians see. An interesting aspect of this is whether those who have a medium drop, slow recovery but do not cross the diagnostic threshold of 20/10 mm Hg, have OH or not. Unfortunately, Cross et al do not provide descriptive data for each cluster. However, Romero-Ortuno et al demonstrated that 98% of cases of medium drop, slow recovery and 100% of cases of large drop, non-recovery would have been diagnosed using consensus criteria anyway [9]. It is the cluster of small drop, overshoot in which only 80% of cases satisfy the consensus criteria for a diagnosis, in fact, had they used the 2011 updated consensus this figure would have been much lower as the mean drop was 15.9 mm Hg. So it seems unlikely that diagnosis based on BP morphology offers any advantage over consensus criteria at present.

In 2007, Deegan et al proposed a classification system based on the location of the abnormality within the circulation: arteriolar, venular or mixed [10]. These categories are determined on computer model-derived estimates of total peripheral resistance and cardiac output, extracted from non-invasive haemodynamic assessment. As derivatives rather than gold standard measures, the ability of beat-to-beat blood pressure monitoring to accurately measure such parameters is debated [11]. Cook applied this cardiovascular model to their cohort diagnosed with beat-to-beat OH; 47% were considered arteriolar in origin, 33% venular and 9% mixed. The implication here is that those with arteriolar type OH have impaired total peripheral resistance and would potentially be more suitable for treatment with midodrine (to activate alpha-adrenergic receptors); whereas those with venular type OH, who have impaired venous return may be more responsive to peripheral compression or fludrocortisone. However, Deegan’s work has not yet been validated or evaluated further, but it does offer a simple and elegant classification system which warrants further investigation.

Of course, it would be logical to fully define the pathophysiology of OH in older people before attempting to refine the diagnostic criteria. The majority of our understanding on the pathophysiology has been determined by studies on younger people with autonomic failure rather than in older people. OH in older people is uncommonly associated with autonomic failure [12], suggesting possible alternative underlying mechanisms. Developing the diagnosis and treatment will depend on identifying the single common pathological deficit, or,
the possible heterogeneous conditions captured by our current diagnostic criteria.
References