



Isolated nocturnal hypertension: an unsolved problem—when to start treatment and how low should we go?

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To the Editor:

Arterial hypertension (HTN) is the leading cause of premature death in the world [1]. The 2018 European Society of Cardiology and European Society of Hypertension Guidelines for HTN define arterial hypertension as office blood pressure (BP) levels of ≥ 140 mmHg systolic and ≥ 90 mmHg diastolic and $\geq 135/85$ mmHg for home blood pressure monitoring (HBPM) [2]. Also, the use of 24-h ambulatory blood pressure monitoring (ABPM) as a valid out-of-office tool for the diagnosis of HTN has been emphasized [2]. The threshold for hypertension on ABPM is $\geq 130/80$ mmHg for 24-h monitoring, $\geq 135/85$ mmHg for the daytime values and $\geq 120/70$ mmHg for the night-time average levels [2].

Until recently, ABPM was the only diagnostic tool that could interpret night-time BP. However, Kairo et al. showed that nocturnal home blood pressure measurements made at 1 h intervals also have a good predictive value for cardiovascular events, independent of office and morning home blood pressure measurements [3]. Night-time levels lower than 120 mmHg for systolic blood pressure (sBP) and lower than 70 mmHg for diastolic blood pressure (dBP) are considered to be normal while levels higher than these are defined as nocturnal HTN [4]. On the other hand, the isolated nocturnal hypertension (INH) is defined as nocturnal hypertension with normal daytime values [5] and it seems that more than one third of patients with nocturnal HTN have INH [6].

ABPM appears to be the only valid method that can interpret diurnal rhythm. This is important because

patients with non-dipping pattern have a worse prognosis compared to dippers [7, 8] and nocturnal HTN is usually associated with the absence of physiological drop of nocturnal BP values when compared to daytime ones although it can be found in dippers and (rarely) extreme dippers [9].

All three methods—office BP measurement, HBPM and ABPM—represent valid tools for diagnosing HTN and in deciding when to start antihypertensive therapy [10]. Treatment target for most patients is 120–129 mmHg for sBP and 70–79 mmHg for dBP if tolerated. Exceptions are patients who are ≥ 65 years old and patients with chronic kidney disease, which is when the treatment target should be 130–139 mmHg for sBP and 70–79 mmHg for dBP [2].

The out-of-office methods, such as ABPM monitoring, can be and should be used for evaluating the efficacy of BP treatment [11]. However, two questions arise when interpreting ABPM. First, if the values of night-time BP are ≥ 120 mmHg for sBP and ≥ 70 mmHg for dBP while the values of the entire 24-h monitoring are in referent range (sBP 120–129 mmHg and dBP 70–79 mmHg), should we initiate or correct antihypertensive therapy?

These patients clearly suffer from INH which is associated with hypertension-mediated organ damage [12] and carries a higher risk of all cardiovascular events and total mortality when compared to nocturnal normotension [13]. Kairo et al. showed that, even when diagnosed by HBPM, nocturnal hypertension is still significantly associated with cardiovascular outcomes after the adjustment of mean morning and evening home BP levels [3]. Furthermore, Boggia et al. found that the night-time blood pressure was associated with mortality and nonfatal outcomes, irrespective of treatment status [14].

Therefore, there is no doubt about whether we should treat (I)NH or not. However, we still do not know the cut-off values of nocturnal BP that demand therapy initiation.

The second question is: if we choose to treat (I)NH, how low should we go? All randomized clinical trials (RCTs)

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highlighted the “J curve” and suggested that values should not be below 120 mmHg for sBP and below 70 mmHg for dBP [2]. However, they all used office BP as a target and, to the best of our knowledge, no single RCT has been dealing with the problem called (I)NH and treatment target. We should definitely decline BP below 120 mmHg for sBP and below 70 mmHg for dBP but we do not know what the lower limit is.

Conclusion

So far, no paper concerning this topic has been published although higher night-time values are a predictor of future cardiovascular events and the non-dipping pattern is associated with a worse prognosis. We defined an everyday clinical problem and the definition of the problem is the first step toward its solution. Maybe adequately designed randomized clinical trials or the analyses of derived data from already conducted trials can tell us when to start treating nocturnal hypertension and how low we should go.

Compliance with ethical standards

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

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