Role of Yin and Yang in Diurnal Blood Pressure Variation for Cardiovascular Disease

To the Editor:

We read with great interest the work by Verdecchia et al,1 which reported that, in initially untreated subjects with hypertension, a blunted day-night blood pressure (BP) dip was associated with a blunted morning BP surge and vice versa. In these subjects, a blunted morning BP surge was an independent predictor of cardiovascular events, whereas an excessive BP surge did not portend an increased risk of events.1 As compared with previous reports, there are conflicting results regarding the association between morning BP surges and following cardiovascular events, and these results should be interpreted carefully. Here, we use the concept of yin and yang representing the neuro-hormonal effect on diurnal BP variation to explain the discrepancy in cardiovascular outcome among studies. As we know, depressed function of yin during initial phase of sleep cycle or rest may result in a blunted BP response and reflects a status of autonomic nervous dysfunction. Clinically, a blunted day-night BP dip has been found in association with orthostatic hypotension and future heart failure in a hypertensive population.2 In addition, a blunted decline in systolic BP or heart rate at recovery stage after peak exercise has been linked to an increased risk of acute coronary events, stroke, and emergence of hypertension.3 Furthermore, some reports addressed antihypertensive drugs dosing at night to reduce more BP nondipper rates, which promoted cardiovascular outcomes in comparison with dosing in the morning.4 Therefore, in the study by Verdecchia et al,1 a blunted BP surge could predict cardiovascular diseases attributed to an interaction with a blunted day-night BP dip.

In another respect, a morning BP surge may be an independent predictor to the occurrence of cardiovascular events regardless of a day-night BP dip when poor arterial compliance or elasticity is present, which is common in the elderly or black populations. The pressure overload of sleep-trough systolic BP surge reflecting overexpression of yang during the late-sleep phase on such stiff and inflexible vessels for hours would result in higher rates of target organ injury, including stroke and myocardial infarction. Accordingly, the study by Kario et al5 concluded that the sleep-trough systolic BP surge was associated with a higher risk of stroke in the older hypertensive populations, and the investigators of the International Database of Ambulatory Blood Pressure in Relation to Cardiovascular Outcome, the largest multiracial study, found that a morning BP surge was associated with a higher risk of most cardiovascular diseases.

Finally, the impacts of yin and yang expressions on cardiovascular diseases during sleep cycles may depend on different situations, such as age and race. In our opinion, further studies should be taken to test the yin-yang theory in diurnal BP variation for cardiovascular events according to stratified neuro-hormonal status and vascular stiffness in their study populations.

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