

AUTHOR'S REPLY

Inadequate sleep equates to inadequate BP control

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I very much appreciate the issues raised by Dr Huang and colleagues (Huang, Y., Mai, W. & Hu, Y. Relationship of sleep quality with level and pattern of blood pressure. *Nat. Rev. Cardiol.* doi:10.1038/nrcardio.2011.202-c1)¹ regarding issues of sleep and blood pressure (BP) dipping status related to cardiovascular risk, presence of kidney disease, or both. Their comments were made in response to my Year in Review article (Bakris, G. L. Hypertension in 2011: new insights—from risk factors to treatment implications. *Nat. Rev. Cardiol.* **9**, 75–77 [2012]).² Huang *et al.* are correct when they state that the type and duration of disease is important in determining whose BP does and does not dip and who will respond to therapy. What is clear from the literature is that, unlike individuals with an estimated glomerular filtration rate (eGFR) >60 ml/min/1.73m², those with advanced kidney disease (that is,

eGFR <45 ml/min/1.73m²) are nondippers and generally do not respond to nocturnal antihypertensive dosing. The reasons for this observation are unclear. Notably, the percentage of time in deep sleep decreases with age. This decrease is associated with increased sympathetic tone and, therefore, increased BP. Data from pilot studies suggest that renal sympathetic denervation improves dipping status in patients with sleep disorders associated with sleep apnea.³ This area of research is in its very early stages and needs more work.

Centrally acting agents that affect sleep (including benzodiazepines) are generally not useful in this regard, and agents like the imidazopyridine zolpidem, which has been specifically designed to aid sleep, help some but not all people. We are just now starting to understand the importance of sleep patterns as they contribute to BP and cardiovascular risk. More good, focused research

is needed to aid in the assessment and our understanding of these interactions.

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Competing interests

The author declares associations with the following companies: CVRx and Medtronic. See the article online for full details of the relationships.

1. Huang, Y., Mai, W. & Hu, Y. Relationship between sleep quality and the level and pattern of BP. *Nat. Rev. Cardiol.* <http://dx.doi.org/10.1038/nrcardio.2011.202-c1>
2. Bakris, G. L. Hypertension in 2011: new insights—from risk factors to treatment implications. *Nat. Rev. Cardiol.* **9**, 75–77 (2012).
3. Witkowski, A. *et al.* Effects of renal sympathetic denervation on blood pressure, sleep apnea course, and glycemic control in patients with resistant hypertension and sleep apnea. *Hypertension* **58**, 559–565 (2011).