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Journal of Hypertension 1996, 14:679–680

Nocturnal blood pressure fall depends on the period chosen

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Received 13 February 1996 **Accepted** 4 March 1996

Non-invasive ambulatory blood pressure monitoring is increasingly used in daily clinical practice. It is not unusual that such a new diagnostic (and therapeutic) tool leads to a new concept based on observations with the investigational instrument. Like with the echocardiogram, introduction of ambulatory blood pressure monitoring resulted in modern diagnoses, for example, of the phenomenon of a non-dipper. However, the classification of a non-dipper is already used for physiological considerations, such as that it is related to secondary hypertension and to target organ damage and so on, without adequate data concerning reproducibility and without a generally accepted definition of the non-dipper state.

In a previous study [1] we reported that the phenomenon was not reproducible in normotensives. The interesting paper of van Ittersum *et al.* [2] clearly demonstrated that the day–night blood pressure difference depends on the definition of the period chosen. The authors have already found 17 different definitions in the *Journal of Hypertension* over a 5-year period. We want to support the conclusions of van Ittersum *et al.* by giving our own data. In 80 untreated hypertensives we performed two ambulatory blood pressure monitoring registrations; in 60 using the Oxford Medilog (Oxford Medical Ltd, Abington, Oxfordshire, UK) device and in 20 using the SpaceLabs 92027 (SpaceLabs Inc., Hills Boro, Oregon, USA) device. Only registrations that satisfied the conditions formulated in advance [1] were accepted. We then calculated the day–night differences according to 16 of 17 time periods. The one with a variable night period [3] was left out. Results are given in Table 1. It is clear that there is a wide range of day–night blood pressure differences according to different definitions of waking and sleeping periods. The range was found on both study days and with both systems. So the number of non-dippers will also be variable with the definition. Although the means of the differences and the range were similar on both days, there was a wide interindividual variation (not shown), implying that the non-dipper phenomenon is not reproducible.

There are two more factors that clearly influence the nightly blood pressure but that are seldom controlled and discussed in papers concerning this subject. First, the quality of sleep is not controlled and, from our own questionnaire and that of van Ittersum *et al.* [2], a more or less disturbed sleep quality was also not reproducible within the subjects. Secondly, the position during sleep is not standardized and almost never discussed in papers, whereas it is well known that the blood pressure is different when the arm is in variable positions relative to the heart. Differences of the order of 10 mmHg can be attributed to differences in the height of the arm against the position of the heart [4]. Thus there is a need for a consensus that studies concerning the dipper–non-dipper division should be based on a clear definition of waking and sleeping periods, on the certainty that the quality of sleep is objective and on careful observation of the position of the arm during sleep. Especially when studies concern further pathophysiological considerations, these factors should be mentioned and studied in a standardized manner, before drawing definite conclusions with diagnostic and (pharmaco)therapeutic consequences.

It seems likely that the next problem in this ambulatory blood pressure monitoring field will be the methodology of the measurement of the trough:peak ratio [5]. There again, the term is introduced without sufficient data for definition and reproducibility.

Table 1 Mean day–night blood pressure differences (mmHg) according to 16 different definitions of waking and sleeping periods. For definitions, see [2].

	Oxford (n=60)				SpaceLabs (n=20)			
	Day 1		Day 2		Day 1		Day 2	
	Systolic	Diastolic	Systolic	Diastolic	Systolic	Diastolic	Systolic	Diastolic
Difference	16.8±2.7	13.1±1.8	17.2±2.5	12.9±2.0	17.8±2.9	15.8±2.1	18.8±2.9	16.1±2.1
Range	12–20	10–15	13–20	10–15	13–23	13–19	14–23	13–29

Values are expressed as means±SD.

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