

## Blood Pressure Monitoring

### 1.7 Different Morning Blood Pressure Increases are Associated to a Diverse Microvascular Damage

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The large utilisation of ambulatory blood pressure monitoring (ABPM) highlighted several measures of BP variability. Among these, the SBP increase during awaking hours (morning surge: MS) was found to be associated to the onset of major cardiovascular events. Aim of the study was to recognise if MS, calculated in order of nocturnal minimal SBP (mNBP) or last 2 hours of sleep, as pre-awaking time (PAW), was characterised by a different microvascular damage during the early phases of hypertension. By diurnal (day:08.00-22.00) and nocturnal (night:24.00-06.00) ABPM, personal diary, calculation of mNBP-MS and PAW-MS, we studied 200 consecutive untreated grade-1 hypertensives, divided in patients with lower ( $\downarrow$ ) and higher ( $\uparrow$ ) MS, with similar age, metabolic features and smoking habit (see table).

Group/Variable	SBPday	DBPday	SBPnight	DBPnight	MS
mNBP-MS $\downarrow$	137 $\pm$ 1	85 $\pm$ 1	124 $\pm$ 2	75 $\pm$ 1	19 $\pm$ 1
mNBP-MS $\uparrow$	139 $\pm$ 1	87 $\pm$ 1	118 $\pm$ 1***	72 $\pm$ 1**	40 $\pm$ 1***^
PAW-MS $\downarrow$	138 $\pm$ 1	86 $\pm$ 1	126 $\pm$ 2	77 $\pm$ 1	7 $\pm$ 1
PAW-MS $\uparrow$	138 $\pm$ 1	86 $\pm$ 1	115 $\pm$ 1***	71 $\pm$ 1***	26 $\pm$ 1***^

m $\pm$ s.e.\*:p<.05, \*\*:p<.01, \*\*\*:p<.001 MS $\downarrow$  vs MS $\uparrow$ ; ^:p<.05, ^^:p<.01, ^^:p<.001 mNBP-MS $\uparrow$  vs PAW-MS $\uparrow$ .

No haemodynamic difference was demonstrated by applanation tonometry. By videocapillaroscopy of proximal and distal 1/3 of the forearm and the mean peri-ungueal field of the 2nd and 4th finger of the non-dominant arm, the basal capillarity (CAPIN) was obtained. By venous congestion manoeuvre, capillarity was maximised (CVC) and the secondary capillary recruitment (GAIN) was obtained. They represented the structural and functional indices of microcirculatory damage (see table).

Group/Variable	CAPIN	CVC	GAIN
mNBP-MS $\downarrow$	30.9 $\pm$ 0.5	51.7 $\pm$ 1	16.9 $\pm$ 0.6
mNBP-MS $\uparrow$	32.1 $\pm$ 0.6	45.4 $\pm$ 0.9***	8.3 $\pm$ 0.6***
PAW-MS $\downarrow$	32.4 $\pm$ 0.7	46.4 $\pm$ 1	8.6 $\pm$ 0.6
PAW-MS $\uparrow$	30.7 $\pm$ 0.4*	50.9 $\pm$ 0.9***^^	16.7 $\pm$ 0.6***^^

m $\pm$ s.e.\*:p<.05, \*\*:p<.01, \*\*\*:p<.001 MS $\downarrow$  vs MS $\uparrow$ ; ^:p<.05, ^^:p<.01, ^^:p<.001 mNBP-MS $\uparrow$  vs PAW-MS $\uparrow$ .

The results highlighted that mNBP-MS $\uparrow$  patients are characterised by a structural microvascular damage while PAW-MS $\uparrow$  hypertensives show a functional capillary rarefaction, probably due a vascular neuroadrenergic overdrive. Furthermore, the findings show that ABPM has the ability to display new measures which might be employed because associated to vascular disorders since the early phases of hypertension.