Letters to the Editor

New Way to Express Ambulatory Blood Pressure Variability

To the Editor: In their recent article, Sega et al1 provide the first demonstration that, in the population, there is a positive independent association between left ventricular mass index and the blood pressure variability component that has an erratic nature. For these conclusions we would report some considerations, based on our studies. Ambulatory blood pressure variability, measured as the standard deviation of the overall 24-hour blood pressure recording, has been shown to have a significant relationship to end-organ damage in hypertension. So far, the standard deviation of mean values, which is easily calculated by most physicians who use ambulatory blood pressure monitoring in their clinical practice, has been most widely used. Some studies have shown that the standard deviation of daytime pressure values tends to be higher in hypertensive than in normotensive people.2 So an important question concerns whether variability should be expressed in absolute terms (eg, as standard deviation) or in relative terms (eg, as coefficient of variation=standard deviation/mean blood pressure). In a recent study we showed that the coefficient of variation for diastolic blood pressure has an inverse association with mean diastolic blood pressure, whereas a new parameter named index of variation (standard deviation of 24-hour blood pressure values/square root of average blood pressure) is independent of mean blood pressure level.3 It would be very interesting to know if there is an association between left ventricular mass and blood pressure variability, when estimated by means of the index of variation, in the PAMELA population. The calculation of the individual residual blood pressure variability, as done by Sega et al, appears difficult for most physicians, whereas the calculation of the index of variation may be done by anyone. Our index may also facilitate communication about patients with hypertension and may provide a more precise basis for including patients in and for evaluating the outcome of clinical trials.

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Response: How to Measure Blood Pressure Variability

Using intra-arterial ambulatory blood pressure monitoring, we showed many years ago that (1) the standard deviation of mean 24-hour (not just day time) values increases progressively from normotensive to borderline mild and more severe hypertensives1 and (2) this value is positively related to organ damage and predicts its worsening over time.2,3 This was followed by several other cross-sectional and longitudinal studies that strengthened the hypothesis that the magnitude of the daily life blood pressure excursions around the mean may be a determinant of the cardiovascular risk in patients with a blood pressure elevation. We have been aware throughout, however, that 24-hour (or day and night time) standard deviation is no more than a gross measure of blood pressure variability. This is because the same standard deviation value is compatible with highly different patterns of blood pressure variability. Also, when (as in all recent studies) automatic blood pressure monitoring is used, short-term blood pressure variations are missed, leading to grossly erroneous standard deviation values if reading intervals are too long.4 The search for new measures of blood pressure variability that could complement the information provided by 24-hour (or day and night time) blood pressure standard deviation is therefore justified and, as we have shown in our recent paper calculation of blood pressure variations with an erratic nature,3 sometimes scientifically fruitful. This may be the case also for the index proposed by Doctors Prattichizzo and Galetta, although at first sight it is difficult to appreciate why using (arbitrarily) the square root of average blood pressure should make it substantially different from the coefficient of variation (CV) in which average blood pressure is used. Whether the coefficient of variation (CV) is a more appropriate index of variability than the standard deviation remains a debated matter. In our studies CV was comparable in groups with different blood pressure levels and showed little change during antihypertensive treatment, indicating that changes in blood pressure variability tend to be proportional to changes in average blood pressure values. This was not invariably the case,5 however, and anyway it may also be maintained that the cardiovascular system is more likely to suffer from absolute than from normalized blood pressure excursions.

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