Current guidelines recommend treatment initiation with any of five major drug classes in uncomplicated hypertension. However, intraindividual differences in blood pressure (BP) responses are common, suggesting differences in the underlying pathophysiology. Ideally, reliable predictors of the BP response should guide the choice of antihypertensive treatment in individual patients. Although genotypic predictors (polymorphisms) might be the optimal approach to target disrupted pathophysiologic mechanisms, at present only phenotypic predictors such as age and ethnicity have been regarded significant.

In line with the Poiseuille’s equation (BP dependent on cardiac output [volume] and total peripheral resistance [vasoconstriction]), John Laragh has proposed two types of hypertension: R hypertension primarily driven by renin-induced vasoconstriction and V hypertension that is sodium-volume dependent. More recently, Morris Brown has named these forms of hypertension as types 1 and 2 for high and low renin, respectively. The clinical relevance of this dichotomous analysis is that R hypertension (common in younger whites) responds best to antirenin drugs (angiotensin-converting enzyme [ACE] inhibitors, angiotensin receptor blockers, β-blockers), whereas V hypertension (common in Afro-Caribbeans and older whites) responds best to drugs that reduce sodium and volume (diuretics, calcium antagonists). The British Hypertension Society is the only one that recommends treatment initiation based on the type of hypertension, by taking into account age and ethnicity.

In this issue of the Journal, Moran et al assessed ethnicity as a predictor of BP response, by comparing the effect of ACE inhibition in African-Americans versus white hypertensives. The strengths of this study are the prospective design, the large sample size, the assessment of compliance and the use of ambulatory BP monitoring. However, there are differences between the two groups, not only in genetic background, but also in lifestyle variables (eg, physical activity and smoking habits) that might have affected the daytime BP response to treatment.

The findings of this study confirm previous reports showing smaller office BP response to ACE inhibition in African-Americans. Into what extent plasma renin might explain these findings is not known because baseline renin was not measured. However, previous studies suggested that renin levels do not fully explain the lesser response of African-Americans to ACE inhibition. Interestingly, the difference in BP response between the two ethnic groups was present during daytime but not night-time. This finding is difficult to explain. Differences between groups in daytime physical activity and time of ramipril dosing have been suggested by the investigators as possible explanations. The arbitrary definition of the night-time period and chance phenomena might also have contributed. Furthermore, a pathophysiologic interaction between ACE inhibition and the disrupted nocturnal BP that is a feature of hypertension in African-Americans cannot be excluded.

Another important finding in this study is the considerable overlap (72%) in BP response pattern between African-Americans and whites, which has also been reported in a recent meta-analysis. This is probably because, although African-Americans tend to have lower renin levels than whites, the overlap by ethnicity is considerable and the difference relatively small. This similarity in BP responses between ethnic groups suggests that, in the individual patient, race cannot reliably predict the response to treatment. Therefore, at present the choice of antihypertensive treatment should be based on compelling indications, individual patient responses, and cost.

References

See related article on page 884.