Intra-arterial blood pressure and cardiovascular responses in black and white hypertensives

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Summary

Sixteen black hypertensive patients were matched for age, sex, casual blood pressure and socio-economic status with 16 white hypertensives. All patients underwent continuous intra-arterial ambulatory monitoring of blood pressure, assessment of baroreflex activity and pressor response to exercise and cold. No differences were observed in the blood pressure and cardiovascular responses between the group.

Introduction

The difference in hypertension between black and white patients is attracting increasing interest on both sides of the Atlantic. The morbidity and mortality are much higher in black hypertensives (Stamler *et al.*, 1974) than in white although it would now seem that the prevalence is similar in both groups (U.S.A. Government National Health and Nutritional Survey Report, 1973). Work has shown that the kidney in the black hypertensive is more susceptible to nephrosclerosis than it is in whites (Levy *et al.*, 1978), and it has been suggested that the increased incidence of hypertensive complications in blacks, particularly cerebrovascular, may be due to abnormal vasculature and vascular responses.

The purpose of this study was to examine blood pressure (BP) over an extended period in black and white hypertensives, to look at some aspects of BP control and to examine the cardiovascular response to stress tests.

Patients and methods

Sixteen blacks with mild-to-moderate hypertension were matched for age, sex, casual BP readings and socio-economic status with 16 white

hypertensive patients (Table 1). No patients had evidence of target organ damage and none was on hypotensive therapy.

All patients were studied as hospital in-patients under standardized conditions, when they underwent a 24-hr period of continuous ambulatory intra-arterial monitoring of BP (Littler *et al.*, 1972). Patients were supplied with a diary and asked to record the time of retiring at night and early morning waking, so that BP could be analysed for the total 24-hr period, the awake period and during sleep. During the study sensitivity of sino-aortic baroreflexes was measured (Smyth, Sleight and Pickering, 1969) and the BP and heart rate response to sub-maximal bicycle exercise and to cold were measured.

Results are expressed as the mean $\pm$ s.d. and differences between the groups assessed by Student's *t*-test.

Results

The mean 24-hr BP for the blacks of 128/82 mmHg was not significantly different from that of the whites, 135/85 mmHg. Similarly the mean awake BP of both groups was not different, although the mean awake BP of blacks and whites were significantly lower than mean casual BP readings. For blacks the casual BP was $158 \pm 12/102 \pm 7$ mmHg compared with the awake BP of $134 \pm 15/86 \pm 11$ mmHg ($P < 0.001$). The figures for whites were $163 \pm 15/100 \pm 7$ mmHg (casual) and $140 \pm 14/89 \pm 10$ mmHg (awake) ($P < 0.001$).

The mean sleep BP was $113 \pm 16/17 \pm 11$ mmHg in the blacks representing a mean percentage fall of systolic and diastolic BP from the awake BP of 16% in both cases. In the whites, the mean sleep BP was $121 \pm 13/75 \pm 9$ mmHg, the mean percentage

falls being 14% and 15% systolic and diastolic respectively.

The values of variability of awake systolic BP (blacks, 17 ± 4 mmHg; whites, 17 ± 3 mmHg) and awake diastolic BP (blacks, 13 ± 3 mmHg; whites, 12 ± 2 mmHg) were again not different.

Mean baroreflex activity in blacks was 8.5 ± 4.5 msec/mmHg, similar to that found in the whites of 7.2 ± 3 msec/mmHg.

The mean changes in systolic BP and heart rate in response to the pressor stimuli of cold and exercise are shown in Table 1, and were again not statistically different.

TABLE 1. Age and BP comparisons of blacks and whites

	Blacks (9 male, 7 female)	Whites (9 male, 7 female)
Mean age (years)	42 ± 10	43 ± 10
Casual BP (mmHg)-systolic	158 ± 12	163 ± 15
-diastolic	102 ± 7	100 ± 7
Exercise		
Mean change in systolic BP (mmHg)	72 ± 29	62 ± 22
Mean change in heart rate (beats/min)	67 ± 22	75 ± 18
Cold pressor		
Mean change in systolic BP (mmHg)	28 ± 16	25 ± 19
Mean change in heart rate (beats/min)	9 ± 5	4 ± 9

Conclusions

These data would suggest that for matched populations of black and white hypertensives, blood pressure and its variability over prolonged periods shows similar features.

Control of BP by the sino-aortic baroreflexes in both groups is similar and the haemodynamic responses to the stress of exercise and cold is again comparable in both blacks and whites.

If black hypertensives were more susceptible to the effects of hypertension on peripheral blood vessels, differences in BP variability, baroreflex activity and response to pressor stimuli would be anticipated. After matching these 2 groups of patients the similarities in response lend no support to this hypothesis.

References

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