Pain relief after regional intravenous blocks with 20 mg of guanethidine made up to 30 ml with physiological saline in five patients treated after average of five months' causalgia and five treated after average of 15 months. Arterial tourniquet on for 10 minutes.

study. The success of the guanethidine technique has important implications for understanding causalgia and related types of sympathetic dystrophy.^{3,4}

I suggest that surgeons should take the opportunity of blocking the sympathetic nerve supply to an extremity with guanethidine before the tourniquet is released after elective or emergency operations on major peripheral nerves whenever there is good reason to fear the onset of causalgia in the affected limb. The increased blood supply will also help to promote healing generally in traumatised tissues.

¹ Hannington-Kiff, J G, *Lancet*, 1974, 1, 1019.

² Hannington-Kiff, J G, *Pain Relief*, p 68. London, William Heinemann, 1974.

³ Hannington-Kiff, J G, *Lancet*, 1977, 1, 1132.

⁴ *Lancet*, 1978, 2, 462.

(Accepted 27 June 1979)

Pain Relief Centre, Frimley Park Hospital, Surrey

J G HANNINGTON-KIFF, MB, FFARCS, director and consultant anaesthetist

Type A behaviour and coronary heart disease

Type A behaviour, first associated with coronary heart disease (CHD) in America in 1959,¹ is characterised by competitiveness, ambition, hurriedness, and impatience and is traditionally assessed by interview or a lengthy "activity-survey" questionnaire.² A short, 14-item questionnaire was described by Bortner in 1969³ and subsequently validated against other measures of type A behaviour.⁴ I report the relation between type A behaviour (assessed by the Bortner questionnaire) and CHD in a sample of British men.

Subjects, methods, and results

A population-based case-control study was mounted among the participants of the UK Heart Disease Prevention Project, a large controlled trial in industry of the multifactorial prevention of CHD in middle-aged men.⁵ Cases were participants who had had a myocardial infarction (according to WHO criteria) and were each matched with a control subject in the same factory who was closest in age and of the same marital state, with no evidence of CHD on symptom history or electrocardiography. Subjects receiving treatment for hypertension were excluded.

The Bortner questionnaire was completed independently by each subject: it has 14 items, each comprising two statements separated by a horizontal line of fixed length. One of the statements represents the type A pattern and the other the opposite, or type B. The subject is asked to draw a vertical line across the horizontal one at the point where he considers himself to lie between the two extremes. A score is obtained for each item by measuring

from the B end, and the total Bortner score is derived by adding up the scores of all 14 items. The maximum score for each item is 24; the higher the score the more type A is the behaviour pattern.

I studied 50 pairs of subjects, the mean ages of both cases and controls being 51 years 4 months. The mean Bortner score of the case subjects was 174.3 (SD=42), which was significantly higher than that of the controls (155.3; SD=37). For most of the items the difference between cases and controls was not normally distributed, and so a non-parametric test was used to determine significance. The case subjects scored higher than controls in 12 of the 14 items, although the difference was significant in only four (table).

Mean scores for each item of Bortner questionnaire

Type A characteristic	Mean score		Difference	
	Cases N=50	Controls N=50	Mean	Significance*
Never late	20.9	21.4	-0.5	0.29
Very competitive	12.2	12.9	-0.7	0.21
Anticipates what others are going to say and interrupts	9.2	6.4	2.8	0.02
Always rushed	11.1	9.4	1.7	0.10
Impatient	11.9	8.9	3.0	0.03
Goes "all out"	14.8	13.9	0.9	0.34
Tries to do too many things at once	12.6	8.5	4.1	0.003
Emphatic in speech	11.0	10.6	0.4	0.33
Wants good job recognised by others	15.5	15.3	0.2	0.31
Fast (eating, talking, etc)	14.4	13.5	0.9	0.21
Hard driving	9.0	6.6	2.4	0.03
Expresses feelings	12.2	10.6	1.6	0.13
Few interests outside work	10.8	8.7	2.1	0.08
Ambitious	8.7	8.6	0.1	0.36
Total	174.3	155.3	19.0	0.03

*Significance level determined by one-tailed Wilcoxon matched pairs rank test.

Among the controls those in social classes IV and V had lower scores than those in classes I and II, but this gradient was not seen in the cases, in whom even those in classes IV and V had high scores.

No consistent relations existed between Bortner score and smoking habits, plasma cholesterol concentration, blood pressure, or relative weight, which had been measured at earlier screening examinations. There was no relation between the Bortner score and the time since the case subjects had had their heart attack, which ranged from 5 to 139 months (mean 55, median 57 months) ($r = .05$).

Comment

The difference between cases and controls reached significance in only four of the individual items (as well as in the total score), but in 12 of the 14 items the subjects with CHD scored higher than the controls, which strengthens the idea that a true association between type A behaviour and CHD exists. Since the cases were studied after their infarcts, one explanation for this association might be a subsequent change in behaviour. Thus a relation might be expected between Bortner score and time since the infarct, and although this was not found, only a prospective study could determine whether the behaviour pattern or the heart attack comes first.

That there was no relation between Bortner score and conventional risk factors suggests that although type A behaviour appears to be concerned in the aetiology of CHD in Britain, it is probably not acting via associations with other known risk factors.

I am grateful to Mr D Cook for his help with statistics and to Professor G Rose for his advice and encouragement. The study was performed from St Mary's Hospital Medical School.

¹ Friedman, M, and Rosenman, R H, *Journal of the American Medical Association*, 1959, 169, 1286.

² Jenkins, C D, Rosenman, R H, and Friedman, M, *Journal of Chronic Diseases*, 1967, 20, 371.

³ Bortner, R W, *Journal of Chronic Diseases*, 1969, 22, 87.

⁴ Rustin, R M, et al, *Revue d'Epidemiologie et de Sante Publique*, 1976, 24, 497.

⁵ WHO European Collaborative Group, *International Journal of Epidemiology*, 1974, 3, 219.

(Accepted 22 June 1979)

Department of Community Medicine, St Thomas's Hospital Medical School, London SE1 7EH

R F HELLER, MD, MRCP, senior lecturer