CAN STRESS ELECTROCARDIOGRAPHY (ECG) ADD TO THE ACCURACY OF THALLIUM-201 MYOCARDIAL SCINTIGRAPHY (TI-201) FOR THE DETECTION OF CORONARY ARTERY DISEASE (CAD)?

M.J. O'HARA, A. LAHIRI, J.C.W. CRAWLEY, D.G. ALTMAN AND E.B. RAFTERY

Northwick Park Hospital & Clinical Research Centre, Harrow, Middx.

We have examined both ST segment and Q wave changes during exercise to determine whether stress ECG analysis can add to the accuracy of TI-201 for the detection of CAD. One hundred and ten patients who underwent diagnostic coronary arteriography had TI-201 at the peak of treadmill exercise and, in addition, maximal treadmill tests with computerised ECG analysis. The arteriograms showed significant coronary disease in 88 and no significant disease in 22. TI-201 had a sensitivity of 95% (82/88) and a specificity of 75% (16/22) and a predictive accuracy of 93% (82/88) for the detection of CAD. The corresponding values for ST segment analysis were 93% (46/48) (p = 0.001 vs TI-201), 66% (15/22) (NS) and 87% (48/55) (NS) and for Q wave analysis the values were 83% (73/88) (p < 0.05 vs TI-201), 60% (15/22) (p = NS vs TI-201 and vs ST) and 91% (75/80) (NS). No improvement in diagnostic accuracy over that of TI-201 alone was achieved by the addition of ST segment analysis. However, using either an abnormal TI-201 or Q wave exercise response (for all cases of significant CAD) (sensitivity 100%; p = NS vs TI-201 alone); specificity 50% (11/22) (p = NS vs TI-201 alone) and predictive accuracy 89% (88/99) (p = NS vs TI-201 alone) we conclude that stress ECG analysis can add to the accuracy of TI-201 for the detection of CAD but that variables from the stress test other than ST segment displacement should be included.

BLOOD PRESSURE AND HEART RATE VARIABILITY

F.J. CONNAY, N.A. BOON, J.V. JONES AND P. SLEIGHT

Department of Cardiovascular Medicine, University of Oxford

Blood pressure (BP) and heart rate (HR) vary considerably throughout the day largely as a result of physical and mental activity. We have investigated whether other factors, related to blood pressure control, may contribute to BP and HR variability. 20 subjects underwent 24 hour intra-arterial BP monitoring during which they were exposed to several standardised pressor stimuli (noradrenaline 1-3 μg iv, phenylephrine 20-80 μg iv, physical exercise and mental arithmetic). Baroreflex sensitivity was estimated from the regression of pulse interval (R-R) on systolic pressure after intravenous phenylephrine.

The rise in systolic BP produced by iv phenylephrine (PE) and noradrenaline (NA) correlated with the fall in systolic BP with sleep (PE: r = 0.63, P < 0.01; NA: r = 0.42, P < 0.01) and with the standard deviation of systolic BP during the night (PE: r = 0.4, P < 0.01; NA: r = 0.6, P < 0.05). None of these variables correlated with the pressor response to exercise or mental arithmetic. Baroreflex sensitivity was inversely correlated with the rise in systolic BP produced by iv phenylephrine (r = -0.71, P < 0.01). The fall in blood pressure at night (r = -0.49, P < 0.01) and the standard deviation of SBP at night (r = -0.52, P < 0.01).

When the 24 hour intra-arterial records were broken down into 2 minute intervals there was a linear correlation between the means of pulse interval and systolic BP in every subject and those with the most sensitive baroreflexes had the steepest slope. The subjects with the most sensitive baroreflexes also had a smaller range of systolic pressure during the day and a greater range in heart rate. The opposite was true for subjects with insensitive reflexes. Thus spontaneous and induced variability in BP and HR is modified to some extent by the sensitivity of the baroreflex which limits fluctuation in pressure by changes in heart rate.

NAB is supported by the British Heart Foundation

ADVERSE EFFECTS OF ALCOHOL AND HYPERTENSION ON CARDIAC PERFORMANCE

J.V. JONES, A.E.G. RAINE, D.I. GRAHAM AND R. CARETTA

Cardiac Departments, Bristol Royal Infirmary and John Radcliffe Hospital, Oxford

To test the hypothesis that alcoholic cardiomyopathy might be the end result of two abuses, alcohol and hypertension, cardiac performance was assessed, using an in vitro technique on hearts from spontaneously hypertensive rats (SHR) fed long-term on 20% alcohol (equivalent to wine drinking). The results were compared to those from normotensive controls (NCR) both with and without alcohol and from SHR without alcohol. As has been shown previously the hypertrophied hearts of SHR perform better than those of NCR under these conditions. Alcohol had little effect on the performance of NCR hearts compared to control but had a marked deleterious effect in the SHR. Cardiac output at any given afterload or preload was reduced greatly in alcohol SHR compared to control SHR eg. afterload 140 mmHg, cardiac output in SHR = 64 ± 6 ml/min (n = 10) and alcohol SHR = 45 ± 18 ml/min (n = 12); preload 15 mmHg. SHR = 73 ± 12 ml/min and alcohol SHR = 51 ± 11 ml/min. So reduced was cardiac performance in 20% alcohol SHR that they performed worse than either of the NCR groups. The combination of alcohol and hypertension markedly reduces cardiac performance in SHR and may provide an animal model of alcoholic cardiomyopathy as seen in man.