JACC Vol. 17, No. 2
February 1991:264A

DISTURBANCE OF THE MYOCARDIAL ENERGY METABOLISM IN A.SW/SNJ MICE AFTER VIRAL INFECTION (COXSACKIE VIRUS B_3)

Bernhard Witzenbichler, Claudia Christmann, Karsten Schulze, Heinz-Peter Schultheiss, Bodo E Strauer: University of Duesseldorf, F.R.G.

The presence of autoantibodies against the ADP/ATP carrier (AAC) in sera of patients with myocarditis (MC) has suggested that autoimmunity to this protein is a sequela of the pathogenesis in MC. In this study 3 week old A.SW SnJ mice (n=18) were infected with Coxsackie B_3 (CB_3) virus (nancy strain). After 20 weeks we characterized the sera for the reactivity with the AAC using an ELISA and immunoblot technique. Furthermore we measured the cytosolic and mitochondrial phosphorylation potential by nonaqueous fractionation after Langendorff perfusion of the hearts. Five of the infected animals (=38%) showed an increased concentration of mitochondrial ATP (11.1 mmol/l) when compared with controls (5.3 mmol/l; n=10), cytosolic ATP was simultanously decreased (5.4 mmol/l; 7.6 mmol/l in controls). The cytosolic-mitochondrial phosphorylation potential difference ($\Delta G_{cyt-mit}$) was significantly reduced (4.8 kJ/mol) when compared with controls (9.4 kJ/mol). These studies suggest that: 1. AAC is a major autoantigen in CB_3 virus induced autoimmune MC; 2. the virus induced immunreaction against the AAC leads to myocardial dysfunction due to considerable disturbance of the energy metabolism.

Wednesday, March 6, 1991
Poster Displayed: 9:00AM–12:00NOON
Author Present: 10:00AM–11:00AM
Hall F, West Concourse
Cardiac Morbidity and Mortality

DIPYRIDAMOLE ECHOCARDIOGRAPHY VERSUS AMBULATORY ISCHEMIA MONITORING IN THE ASSESSMENT OF PERIOPERATIVE RISK

Marc D. Tischler, Richard T. Lee, Thomas H. Lee, Mark A. Creager, Christopher Lord, Alan T. Hirsch and Khether Raby. Brigham and Women's Hospital and Harvard Medical School, Boston MA.

To compare the diagnostic accuracy of ambulatory ischemia monitoring (AIM) and dipyridamole echocardiography (DE) in predicting major cardiac events, we prospectively examined 42 randomly selected Pts with both DE and AIM prior to elective vascular surgery. Studies were performed simultaneously and were interpreted preoperatively by physicians blinded to clinical information. DE+ was defined as development of new discrete regional wall motion abnormalities. AIM+ was defined as a minimum of 1 episode of 1 mm ST depression lasting at least 1 minute during a 24 hour period. Pts were followed to hospital discharge by MDs blinded to test results. Outcomes were assigned using strict predefined criteria by physicians blinded to test results. Six Pts (14%) had major cardiac events including 3 cardiac deaths, 1 nonfatal myocardial infarction and 2 cases of unstable angina requiring ICU care. Results are summarized in the following table:

		EVENT	
		+	-
AIM	+	4	7
	-	2	29
DE	+	6	0
	-	0	36

Thus the positive (PV+) and negative predictive (PV-) values of AIM were 36% and 94%, respectively. The PV+ of DE was 100%. These preliminary results suggest that while AIM may be a useful initial screening test for Pts undergoing elective vascular surgery, DE has superior PV+ and may improve stratification of high-risk Pts or those with positive AIM.

COMPUTER IDENTIFICATION OF LEFT VENTRICULAR ENDOCARDIUM FROM 2-DIMENSIONAL SHORT AXIS ECHOCARDIOGRAMS

David C. Wilson, Edward A. Geiser, Jeanette M. Billett, Donald A. Conetta, University of Florida, Gainesville, FL

PURPOSE: To develop a fully automated method of identifying left ventricular (LV) endocardium (endo) from short axis (SA) 2-D echo images.
METHODS: Sequences of 16 frames from 24 normal subjects with varying image quality (9 excellent, 10 good, and 5 poor) were entered into the computer. The end diastolic and end systolic frames were selected from each sequence for subsequent processing. The centerpoint of the LV was automatically determined using large circular arc filters. Coupled matched filters were used to determine the two curves that best fit the epi and endocardial boundaries. The model for endo was taken to be a continuous curve spliced together from four elliptical arcs. A computer algorithm determined the distance from the centerpoint to the endo curve along 8 equiangular radii. Independently, three blinded observers then used a cursor to define the distance from the computer centerpoint to the endo along the same radii. The correlation coefficient, r, the average error (in pixels), and the percent of radii differing by <= 5 pixels were calculated.
RESULTS:

	r	ave error	%<= 5 pixels
Computer vs Observer 1	.990	3.3	78%
Computer vs Observer 2	.985	3.6	78
Computer vs Observer 3	.987	3.2	82
Observer 1 vs Observer 2	.994	2.1	92
Observer 1 vs Observer 3	.998	2.1	94
Observer 2 vs Observer 3	.992	2.6	89

(r was calculated forcing the correlation through the origin)
CONCLUSION: The agreement among the three observers is better than the agreement between the computer algorithm and estimates made by any single expert observer. However, the estimates provided by this fully automated algorithm are in agreement with those of the expert observers in a minimum of 78% of the radii measured.

INTERMITTENT ST DEPRESSION AND PROGNOSIS AFTER MYOCARDIAL INFARCTION

William Ruberman, Richard Crow, Carl Rosenberg, Pentti Rautaharju, Bernard Pasternack, Roy Shore, New York University Medical Center, New York, N.Y.

We investigated the contribution made to mortality by intermittent ST depression (STD) among pts enrolled in the already completed Beta Blocker Heart Attack Trial. STD was determined by computer analysis of 24-hour ECG tapes as area of depression from the median value of ≥ 100 mV-seconds for ≥ 1 minute.

The prevalence of STD among 91 randomly selected pts was 21% and 5% for STD > 30 minutes.

To develop estimates of risk of dying with STD we compared 261 deaths with age, sex, and drug status matched controls. In a multivariate model including prior MI, congestive heart failure, heart rate, and angina STD had a relative risk (RR) of 1.44 (p=0.05). History of angina was not independently associated with death but interacted with STD (RR=2.32, p=0.04). A gradient of risk was shown by a RR of 1.92 (p=0.03) in those with > 30 minutes of STD.

The findings in this large study show a modest independent contribution to mortality among pts recovered from MI by the presence of transient STD on 24-hour monitoring. The risk increases with duration of depression and an interaction occurs in the presence of a history of angina.