9:15

INCREASED ULTRASONIC MYOCARDIAL REFLECTIVITY IN PATIENTS WITH THALASSEMIA MAJOR AND IRON OVERLOAD

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To assess the acoustic properties of myocardium in pts with iron overload, 38 pts with ß-thalassemia major (TH), without clinical signs of cardiac failure, and 16 young controls were studied by echocardiography. An on-line analysis of the ultrasonic radio frequency signal was performed to obtain quantitative operator independent measurements of the IB signal of the interventricular septum and the posterior wall. The integrated values of the radio frequency signal were normalized for the pericardial interface and expressed in percent (IB%). Pts and controls were matched for sex and age (18±5, mean±SD, vs 17±7 years, p=ns). TH pts were under trasfusion therapy from 16±5 years and had received 313±138 trasfusion units; they all were under chelation treatment (deferoxamine) from 9±2 years; their mean and maximal serum ferritin were, respectively, 2054±1733 and 4030±2677 ng/ml, and total transfused iron burden was 60±23 g. TH pts and controls showed comparable values of echocardiographically assessed % Fractional Shortening (32±5 vs 36±3%, p=ns), while LV mass index was higher in TH pts (118±30 vs 98±16 g/m^2, p<.05). The IB% values were higher in TH pts vs controls for both septum (35±14 vs 22±6, p<.001) and posterior wall (16±6 vs 11±3, p<.001). In TH pts, no correlation was found between the septum IB% value and septal end-diastolic thickness (r=.14).
In conclusion, our data demonstrate that myocardial reflectivity is abnormally increased in TH pts under transfusion treatment, probably due to myocardial iron deposits and/or secondary structural changes. These quantitatively assessed abnormalities in regional reflectivity can be detected when conventional echocardiographic parameters of systolic LV function are undistinguishable from normals.

9:30

USE OF ERYTHROPOIETIN TO ASSESS THE PATHOPHYSIOLOGIC MECHANISMS REGULATING THE HIGH CARDIAC OUTPUT STATE OF CHRONIC ANEMIA

Ian Santoro, Alex Neumann, Kenneth Borow, Susan Fellner, Roberto Lang, University of Chicago, IL

Endogenous correction of the chronic anemia of renal failure with erythropoietin (EPO) provides a unique opportunity to investigate the associated cardiovascular consequences of anemia. This model, unlike the use of multiple blood transfusions, does not result in changes in intravascular volume, ionized calcium, electrolytes and pH. We studied 9 hemodialysis (HD) patients before and after correction of anemia with EPO. Immediately post HD, simultaneous 2D-targeted M-mode echo and calibrated subclavian pulse tracings were obtained over a broad range of afterloads created by infusion of methoxamine or nitroprusside. LV contractility was assessed using the load independent end-systolic stress (σes)-rate corrected velocity of shortening relation (Vcf_c). Contractility was compared using Vcf_c obtained at the identical level of afterload. *=P<.05 vs Post-EPO

	Anemia	Post EPO
Hematocrit(%)	24.9±2.4*	38.5±4.5
Cardiac Output(L/min)	7.1±1.5*	5.8±1.3
Heart Rate(b/min)	85±8*	78±10
EDD (Preload; cm)	4.7±0.7*	4.5±0.7
σes (Afterload;g/cm^2)	49±33	53±47
LV Contractility(Vcf_c)	1.00±0.91*	0.91±0.43

Correction of chronic anemia resulted in reduced HR, preload and contractility, increased total vascular resistance and viscosity with no change in LV afterload. Thus, the use of erythropoietin allowed delineation of the hemodynamic factors resulting in increased LV performance in patients with chronic anemia.

9:45

VALUE OF TARGET-DIRECTED ENDOMYOCARDIAL BIOPSY IN IDIOPATHIC RIGHT VENTRICULAR TACHYCARDIA

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Routine endomyocardial biopsy reveals patho-anatomical abnormalities (PA) in approximately 30% of patients (pt) with idiopathic RV tachycardias (VT). To investigate whether the diagnostic value of this procedure can be improved, we compared conventional with target-directed RV biopsy in 8 pts with symptomatic VT (6 males; mean age 29 years). L and R ventriculography and echocardiography showed local RV disease in only 3 pts. Using a 0.094 inches biopsy forceps 29 routine biopsies (range 2-7/pt) were taken from the RV septum. Thereafter the site of VT origin was determined with pacemapping. VT origin was found in the RV outflow tract in 7 pts and in the RV apex in 1 pt. A total of 21 biopsies were taken from these sites (range 1-7/pt).

Biopsy type:	target-directed	conventional
PA-positive	12 (57%)	11 (38%)
PA-negative	9 (43%)	18 (62%)

Five pts had RV dysplasia and 2 an aspecific cardiomyopathy. Target-directed biopsy uncovered a clinical diagnosis in 3 pts where conventional biopsy failed.
Conclusion: the diagnostic value of endomyocardial biopsy in idiopathic right ventricular tachycardias can be improved through target-directed procedures, aiming at the VT origin.

Tuesday, March 5, 1991
8:30AM–10:00AM, Room 214, East Concourse
Electrocardiography/Ambulatory Monitoring Signal Averaging: Late Potentials

8:30

PREDICTIVE VALUE OF LOW NOISE SIGNAL-AVERAGED ECG FOR THE INDUCTION OF VENTRICULAR ARRHYTHMIAS

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The signal-averaged ECG (SA) has emerged as a useful noninvasive test to predict sustained ventricular arrhythmias (VA). Typically, 100-200 beats are analyzed to reduce noise levels <1.0 uV. To study prospectively the effects of further reducing noise levels on the predictive value of the SA, 66 consecutive pts with surface QRS duration < 120 msec were investigated before undergoing programmed cardiac stimulation (PCS) for suspected VA. The age, gender and prevalence of coronary artery disease (CAD) did not differ between the groups with and without inducible VA. Prolonged averaging (470±92 beats) to 0.35±0.12 uV noise resulted in excellent sensitivity (91%) and specificity (91%) for predicting VA. The accuracy of SA was 96% in pts with CAD and 81% in those without (p<.05) and it was 91% in pts presenting with syncope (n=33) and 86% in those with cardiac arrest (n=14). In contrast, frequency domain analysis had lower predictive value (sensitivities and specificities < 70%), despite using 4 different published algorithms. Conclusions: Low noise signal averaging is highly predictive of the results of PCS, particularly in pts with CAD. With this technique, time domain analysis is superior to frequency domain analysis in pts without QRS prolongation.