9:45

PROGNOSTIC SIGNIFICANCE OF HOLTER MONITORING IN APPARENTLY HEALTHY OLDER SUBJECTS

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The long-term prognostic significance of frequent or complex ectopic beats on ambulatory ECG (AECG) in apparently healthy older subjects is unknown. We have therefore followed 98 volunteers from the Baltimore Longitudinal Study of Aging who were 60-85 years old and free of cardiac disease by history, physical examination and maximal treadmill testing at the time of AECG between 1978 and 1980. Over a mean followup period of 10 years, coronary events (CE) have developed in 10 subjects: angina pectoris in 5, myocardial infarction in 2, and sudden cardiac death in 3. The prevalence of the following arrhythmias did not differ significantly between subjects who developed CE and those who did not, respectively; ≥ 30 supraventricular ectopic beats (SVEB) in any hour, 40% vs 20%; paroxysmal atrial tachycardia (PAT), 20% vs 13%; ≥ 30 ventricular ectopic beats (VEB) in any hour, 10% vs 13%; ≥ 100 VEB in 24 hours, 20% vs 17%; or Lown Grade 4 VEB, 20% vs 13%. The mean 24 hour heart rate (74.7 vs 71.7/min) as well as the maximum (114.9 vs 111.3/min) and minimum heart rate (50.9 vs 52.8/min) also did not differ between the respective groups. Although flat or downsloping ST segment depression ≥ 1.0 mm was seen in only 5 subjects, CE occurred in 2 of these 5 (40%) vs only 8 (8%) of 93 subjects without such ST segment changes. Thus, neither SVEB nor VEB on AECG predict the development of future CE in clinically healthy older subjects; silent ischemia, although infrequent, may be the most specific AECG predictor of future CE in such a low risk population.

Thursday, March 7, 1991
8:30AM–10:00AM, Room 260, West Concourse
Ischemia and Infarction: Diagnostic Methods I

8:30

Detection of Acute Myocardial Infarction in Patients with Non-Diagnostic ECGs: Use of Serial CK-MB Sampling in the Emergency Department

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Serial CK-MB sampling was used in the emergency department (ED) to determine if patients with acute myocardial infarction (AMI) and non-diagnostic ECGs (NDECGs) could be identified. Seven hundred and nineteen patients hospitalized for possible ischemic chest pain were evaluated at eight academic medical center hospitals. CK-MB levels were determined on ED admission and 1, 2, and 3 hours after presentation. Patients with one CK-MB level >7 ng/ml or rising CK-MB levels over the three hour time interval were considered to have a positive ED enzyme study using a new rapid immunochemical method (Tandem™ ICON QSR CK-MB assay, Hybritech, Inc.) requiring ten minutes to perform. ECGs were considered to be diagnostic for AMI if 1 millimeter of ST-segment elevation was present in two or more electrically contiguous leads. The development of new Q-waves or standard in-hospital enzyme changes confirmed AMI patients. Of 719 patients,128 (17.8%) were considered to have AMI with 75 (58.5%) having NDECGs. Of patients with NDECGs, 62 (82.6% sensitivity) had a positive serial CK-MB study within 3 hours of ED presentation (specificity 93.4%, negative predictive value 94.6%). Combining serial CK-MB sampling results in NDECG patients and patients with a diagnostic ECG demonstrated a 91.3% sensitivity for detecting AMI in the ED.

Conclusions: Serial CK-MB determinations in the ED may 1) help prevent the ED discharge of patients with AMI and a NDECG; 2) improve the disposition of patients with AMI and NDECGs to intensive care settings; and 3) potentially identify patients with AMI and a NDECGs for treatment with thrombolytic therapy.

8:45

CLINICAL ASSESSMENT OF A RAPID SENSITIVE ENZYME IMMUNOASSAY SPECIFIC FOR HUMAN CARDIAC TROPONIN-I

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A sensitive human cardiac troponin-I (Tn-I) specific enzyme immunoassay with the use of monoclonal antibodies was developed and evaluated as a selective diagnostic test for acute myocardial infarction (AMI) and unstable angina (UA). The assay was completed within 30 minutes and had a sensitivity of 0.5 µg/L. The cross reactivity with skeletal muscle Tn-I was less than 0.01%. Tn-I was not detected in serum from 150 normals and 26 Pts with skeletal muscle damage, whose creatine kinase (CK) activities ranged from 2,500 to 18,000 U/L. The serial Tn-I levels were measured after admission in 52 Pts with AMI. The significant elevations of serum Tn-I level (>1.0 µg/L) were shown in 62% of pts at 1 hour, 75% at 4 hours and 87% at 8 hours after the onset of chest pain. CK-MB activities were elevated in 0% at 1 hour, 24% at 4 hours and 87% at 8 hours. Serum Tn-I level reached a mean peak level of 127 µg/L (range 45 to 256 µg/L) at 20 hours, and remained above normal for up to 8 to 10 days following infarction. The interval during which Tn-I and CK-MB were elevated abnormally in all patients were 12 hours to 5 days and 12 hrs to 48 hrs after the onset, respectively. Thus Tn-I was a specific marker of myocardial cell necrosis and elevated during early and late period of AMI. Fourteen of 25 Pts with UA had elevated Tn-I on admission. Complications occurred or urgent interventions were required in 10 pts of Tn-I positive pts, however none of Tn-I negative pts required urgent interventions or suffered from complications.
Conclusion: The rapid sensitive assay for Tn-I was useful for early and late confirmation of AMI and may have prognostic value for managing Pts with UA.

9:00

Utility of Serial Creatine Kinase MB Levels During Initial Assessment of Acute Chest Pain
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Improved initial diagnostic accuracy in acute chest pain may help a) conserve hospital resources in pts without myocardial infarction(MI), b) identify MI pts who may benefit from early intervention and c) avoid accidental discharge of pts with MI. Since newly available creatine kinase(CK) MB assays can provide results in <1 hr, we determined if early, serial CK-MB levels could distinguish MI from non-MI chest pain. In pts admitted to the cardiac unit with <12 hrs of pain, CK-MB was sampled at baseline(B), ie, hospital arrival and hourly for 3 hrs (B+1 hr, B+2, B+3). These CK-MB levels were analyzed for ability to predict the subsequent clinical diagnosis of MI.

Of 313 eligible pts enrolled, index chest pain was due to MI in 70(22%). Of these 70, index ECG showed MI in 27(39%). CK-MB at B had a sensitivity(Sens)=76% and specificity(Spec) =72% for MI. The ability to identify MI by a rising CK-MB level using B plus 1-3 subsequent samples was evaluated. Sens and Spec for MI diagnosis improved with each additional result to a maximum of 92% & 96%, resp, with all 4 samples. An algorithm using 2 samples, 2 hours apart (B & B+2) had an overall Sens=94% and Spec=91%; when pts with MI on index ECG were removed, Sens=90% and Spec=91%.

Serial CK-MB sampling during triage of acute chest pain appears to identify most pts with and without MI within 2-4 hrs of hospital arrival. Further studies are required to confirm this finding, to validate these algorithms and to evaluate the impact of this strategy on patient care.