Cardiac Arrhythmias

### 1210-105   Methodological Problems in ST Segment Analysis by Holter Monitoring

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**Background:** There has been a renewed interest in ST segment analysis by Holter monitoring, especially in clinical trials, without a consensus on how to define an ischemic event. A survey of publications over 25 years from 29 centers in U.S.A. and Europe showed, that in 52% there were no correction for baseline ST segment deviation. In 45% J-point depression was required in addition to ST segment depression measured either 60 msec (24%) or 80 msec (76%) after the J-point. In 28% ST segment elevations were included. **Methods:** In order to assess what these differences mean for outcome of the analysis, we applied 4 different criteria for an ischemic event found in our survey to Holter recordings from 66 patients with acute ischemic syndrome in the Esmolol Myocardial Ischemia Trial (EMIT). The analysis of lead CM5 was done on a Reynolds Medical Pathfinder 600. The ST segment had to be planar or downsloping in order to qualify as ST depression and ST elevation included elevation of the J-point. The mid-PR point was used as reference point. **Results:** By the most sensitive method (J+80), there were 16 (24%) patients who had ischemic events in their Holter recording compared to only 10 (15%) patients if also J-point depression was required. The biggest reduction in number of ischemic events was seen if corrections for baseline ST segment deviation was made, leaving only 3 (4.5%) recordings positive for ischemic events. **Conclusion:** Outcome of Holter analysis for ischemic events is greatly dependent upon how an ischemic event is defined.

| METHOD | NO OF PATIENTS | NO OF EPISODES | ISCHEMIC BURDEN |
|---|---|---|---|
| J+80 | 16 | 136 | 3095 |
| J+60 | 14 | 131 | 2836 |
| J+(J+60) | 10 | 65 | 1607 |
| Baseline correction | 3 | 8 | 116 |

### 1210-117   Electrocardiographic Appearance of Old Myocardial Infarction in Paced Patients

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Background: We evaluated the possibility of diagnosing chronic myocardial infarction in the presence of the pacing electrocardiogram.
Methods: We studied 45 patients with known myocardial infarction (anterior 23, inferior 22) and 26 healthy controls. After coronary angiography, pacing was applied from the right ventricular apex, and the sensitivity, specificity and average diagnostic accuracy of five criteria on the paced electrocardiogram were assessed: 1) Notching 0.04 s in duration in the ascending limb of the S wave of leads V3, V4, or V5 (Cabrera's sign); 2) Notching of the upstroke of the R wave in leads I, aVL or V6 (Chapman's sign); 3) Q waves more than 0.03 s in duration in leads I, aVL or V6; 4) Notching of the first 0.04 s of the QRS complex in leads II, III and aVF; 5) Q wave more than 0.03 s in duration in leads II, III and aVF.
Results: The most sensitive criteria, for both anterior and inferior myocardial infarction were Cabrera's and Chapman's (91.1 and 86.6% respectively). All criteria had low specificity, ranging from 42.3% to 69.2%. The combination of Cabrera's and Chapman's sign decreased the sensitivity to 77.7%, but increased specificity to 82.2%. The sensitivity and specificity all the criteria were independent of the myocardial infarction site.
Conclusions: In paced patients, the application of the Cabrera's and Chapman's electrocardiographic signs, and especially their combination show promise for recognizing prior myocardial infarction in patients with a pacing electrocardiogram. More precisely, according to our results, if these patients exhibit both signs, there is a high probability that they have myocardial infarction while, in the absence of the aforementioned, a myocardial infarction can usually be ruled out. As regards determining the location of the infarction, none of the electrocardiographic criteria we examined appeared helpful.

### 1210-118   A Vector-Based 5 Electrode 12-Lead ECG (EASI®) Is Equivalent to the Conventional 12-Lead ECG for Diagnosis of Myocardial Ischemia

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Background: The conventional 12-lead ECG (cECG) derived from 10 electrodes using a cardiograph is the gold standard for diagnosing myocardial ischemia but is impractical for monitoring patients (pts). This prospective, multicenter, open data collection study tests the hypothesis that a new 5 electrode 12-lead vector based ECG (EASI®, Philips) patient monitoring system is equivalent to cECG in diagnosing acute coronary syndromes (ACS).
Methods: ECGs (EASI® and cECG) were obtained in 203 consecutive pts with chest pain on admission and 4 - 8 hours later. Both types of ECGs were graded by blinded independent reviewers as STEMI (ST elevation myocardial infarction) if at least one of the 2 consecutive recordings showed ST elevation more than 0.2 mV and as ACS if one or both showed ST elevation less than 0.2 mV, T-wave inversion or ST depression and NEG if the 2 consecutive ECGs were normal.
Results: Final diagnosis was identical in 177 (87%; 95% CI 82 to 91%, kappa= 0.81 SE = 0.035). If ischemic changes were combined identical diagnoses were achieved in 189 (93%; 95% CI 89 to 96%, kappa = 0.83 SE = 0.043). In relation to cECG EASI® had a specificity for STEMI of 94% (95% CI 89 to 97%) and a sensitivity of 93% (95% CI 86 to 97%). In relation to TnI or CK any ischemic change by both ECG methods had exactly

the same specificity of 59% (95% CI 48 to 69%) and sensitivity of 92% (95% CI 85 to 96%).
Conclusion: EASI® is equivalent to cECG for the diagnosis of myocardial ischemia.

| | STEMI | ACS | NEG | Sum EASI® |
|---|---|---|---|---|
| STEMI | 76 | 6 | 0 | 82 |
| ACS | 6 | 48 | 7 | 61 |
| NEG | 1 | 6 | 53 | 60 |
| Sum cECG | 83 | 60 | 60 | 203 |

### 1210-119   Is the QRS Morphology of a Clinical Ventricular Tachycardia Required to Guide Catheter Ablation?

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Objectives: Obtaining a 12-lead ECG of spontaneous ventricular tachycardia (VT) prior to radiofrequency (RF) ablation in patients with prior myocardial infarction (MI) is not possible for VTs terminated emergently or by implanted defibrillators. This study assesses whether ablation is less successful when the 12-lead ECG morphology of spontaneous VT is not obtainable.
Methods and Results: In 79 consecutive patients who underwent attempted ablation of all inducible monomorphic VTs after MI, the 12-lead ECG morphology of a spontaneous VT was known in 57 patients (Group I), including 25 pts with spontaneous VT in the laboratory (Group IA) and 32 pts with ECG before ablation (Group IB), and unknown in 22 pts (Group II). Comparing groups I and II there were no statistical differences in age (67±10 vs 69±8yrs), gender (male: 79 vs 86%), MI location (inferior:61% vs 48%), LV ejection fraction (2911 vs 299%), amiodarone use (60% vs 52%), implantable defibrillator (84% vs 86%), number of inducible VTs (3.5±2.2 vs 3.6±1.6), average procedure time (6.7±2.8 vs 7.7±4.1 hours), cycle length of fastest inducible VT (336±72 vs 342±63 msec), number of RF applications (21±11 vs 26±25). Outcome of ablation was also similar for Group I compared to Group II. Immediately after ablation no monomorphic VT was inducible in 46% vs 55%. During follow-up during follow-up of 33±13 months (range 18 to 90 months) VT recurred spontaneously in 28% vs 23% of patients. In group IA all inducible VTs were abolished in 63% of pts compared to 33% of pts in Group IB (p<0.05). VT recurred in 38% of Group IA vs 21% of Group IB (p=ns).
Conclusions: Inability to obtain the ECG morphology of spontaneous VT is not a contraindication to catheter ablation, and should not delay ablation attempts for patients with recurrent symptomatic VT.

### 1210-120   New Persistent and Rate-Related Left Bundle Branch Block in 116 Apparently Healthy Males: Correlation With Coronary Angiography and Cardiac Risk Factors

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**Background:** Little information is available regarding new persistent or rate-related left bundle branch block (LBBB) and the incidence of coronary artery disease (CAD) or cardiomyopathy in apparently healthy male populations.
**Methods:** From 1957 to 1999, 216 non-diabetic male military aviators were found to have a new LBBB on electrocardiogram (ECG) and were evaluated for aircrew fitness at a centralized facility. Retrospective records review was performed for demographics, traditional coronary risk factors and results of available noninvasive and invasive cardiac testing. Of the 216, 116 (54%) underwent coronary angiography for occupational reason; 62/116 (53%) also underwent baseline His conduction studies.
**Results:** Average age of the 116 subjects was 40.4 years (+/- 6.1, range 25-56). Sixty-eight of 116 (59%) had persistent LBBB, 41/116 (35%) had rate-related LBBB, and 7/116 (6%) had intermittent but not rate-related LBBB. Ninety-seven of 116 (84%) had normal coronary angiography, 6/116 (5%) had nonocclusive CAD and 13/116 (11%) had significant CAD (maximum lesion ≥ 50%). Significant CAD occurred in 11% with persistent LBBB, 12% with rate-related LBBB and none with intermittent LBBB. Two of the 116 had cardiomyopathy; both presented with persistent LBBB and both had normal coronary angiography. Prolonged HV time >75 msec occurred in 9/62 (15%). Only 3% had hypertension, 48% had a history of smoking and 28% had a family history of premature CAD. There were no significant differences between persistent and rate-related/intermittent LBBB regarding coronary angiographic results and average age, lipid profile and blood pressure. Smoking history and family history of premature CAD were more prevalent in rate-related LBBB.
**Conclusions:** In this population of asymptomatic, apparently healthy males, the prevalence of significant CAD was only 11%. Cardiomyopathy was rare (1.7%). There was no significant difference between persistent and rate-related LBBB regarding CAD prevalence. Traditional CAD risk factors were at least as frequent in the rate-related LBBB group when compared to the persistent LBBB group.