Conclusions: 1) SCN5A+ pts have increased beat-to-beat repolarization variability. 2) WT provides insight into time and amplitude of T-wave variability without the need to identify T wave endpoints. 3) The combination of wavelet time and amplitude variability parameters provided very effective phenotypic identification of SCN5A+ pts.

11:00

843-3 Prevalence of the Bifid T Waves in Genotyped LQTS Children

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Background: Our group previously reported that LQTS children had more bifid (obvious or subtle) T waves (BI-T) on 12-lead ECGs than normal children (NL). In this study we determined the frequency of BI-T by specific genotype in both younger and older children.

Methods: ECGs of 99 LQTS (58 LQT1, 26 LQT2, 15 LQT3), and 462 NL, all unmedicated, age range 0–15 yrs, were studied. Some patients had multiple ECGs at different ages, yielding 199 LQTS and 623 NL records for this study. The frequency of BI-T in 12 leads was compared for the three genotypes and NL in two age groups (0–5 yrs and 6–15 yrs) using Wilcoxon Matched-Pairs Signed-Ranks test.

Results:

	0–5 yrs				6–15 yrs			
	NL	LQT1	LQT2	LQT3	NL	LQT1	LQT2	LQT3
BI-T%*	18.5	45	63	2.1	8.6	14	64.8	4.8
p**		0.0022	0.0047	0.0076		0.0653†	0.0029	0.0995

* average of all 12 leads ** each genotype compared with NL † obvious plus subtle BI-T; for subtle BI-T alone, p = 0.0029

The frequencies of BI-T within genotypes were significantly different: LQT2 >LQT1 >LQT3 (p values not shown) in both age groups. In LQT1, the frequency of BI-T also varied by age, with a lower % in older children (p = 0.0022).

Conclusions: LQT1 and LQT2 children have significantly more BI-T than do NL. The frequency of BI-T in LQTS children is different by genotype with the highest in LQT2 and lowest in LQT3. The frequency decreases with increasing age in LQT1, whereas it remains unchanged in LQT2. These findings may increase understanding of LQTS genotype pathophysiology, and may be helpful for clinical diagnosis.

11:15

843-4 A Mutation in KVLQT1 Causes Decreased Sinus Rate Without Evidence of Autonomic Nervous Abnormalities

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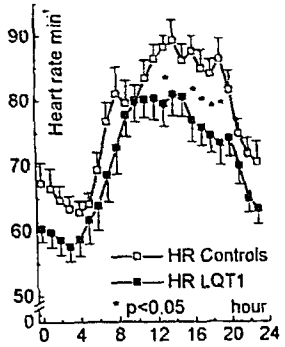
Background: We previously demonstrated abnormally low maximal heart rate during maximal exercise test in long QT syndrome type 1 (LQT1) patients. We therefore investigated whether a sinus node impairment is also present at lower heart rates and whether it is associated with altered autonomic nervous activity.

Methods: Circadian rhythmicity of heart rate (HR) and heart rate variation (HRV) were assessed in 19 LQT1 patients with Asp188Asn mutation of KVLQT1 gene (LQT1) and 19 healthy controls (C) matched for age (LQT1: 41 ± 19, C: 39 ± 19 years) and gender (7 men, 12 women in each group). All subjects underwent 24-hour Holter recording in sinus rhythm without medications.



	LQT1	C	p-value
HR	70 ± 10	76 ± 8	<0.05
SDANN	144 ± 45	136 ± 31	NS
HF	14 ± 7	16 ± 10	NS
LF	23 ± 10	27 ± 9	NS
LF/HF	1.7 ± 0.4	1.9 ± 0.5	NS

Results: HR was lower in LQT1 (table and fig.). No differences were found in HRV variables (table).

Conclusions: Sinus rate was found lower than normal even during rest and regular daily activities. The decreased rate could not be attributed to any alteration in autonomic nervous function. These results suggest that a potassium channel defect in KVLQT1 is responsible for the decreased sinus rate.

11:30

843-5 ECG Repolarization Parameters in LQTS Family Members With Borderline QTc Duration and Cardiac Events

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QTc duration of 0.42–0.47 sec can be found in both linked and non-linked LQTS pts. The aim of the study was to evaluate an association between clinical and ECG variables with cardiac events (CE) in 2,008 family members of LQTS pts with borderline QTc (0.42–0.47) enrolled in the International LQTS Regstry. Results of CE and noCE groups as follows:

Variables	no CE (n = 1,715)	CE (n = 293)	
Median Age at ECG (yrs)		28	29
Females		946 (55%)	197 (67%)*
Mean RR (ms)		787 ± 191	864 ± 212*
Age-adjusted bradycardia		267 (16%)	77 (26%)*
QTc (ms)		436 ± 18	446 ± 21*
QTmc (ms)		341 ± 27	353 ± 29*
TmTpc (ms)		95 ± 24	93 ± 23
L2 T wave: flat	112 (7%)	23 (8%)	
broad	40 (2%)	7 (2%)	
bifid biphasic	42 (2%)	7 (2%)	

* p < 0.001

Conclusions: In LQTS family members with borderline QTc duration, a longer QTc duration, bradycardia, and female gender are associated with increased likelihood of cardiac events. Morphologic T-wave abnormalities are infrequent and do not have prognostic significance in LQTS family members with borderline QTc.

11:45

843-6 Non-stationarity of Microvolt T Wave Alternans in Long QT Syndrome Patients

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Background: Detection of microvolt T wave alternans (TWA) is a non-invasive method to identify pts at risk for sudden cardiac death. ECG tracings with visible TWA often show non-stationary pattern of this phenomenon. The purpose of the study was to evaluate stationarity of TWA in long QT syndrome (LQTS) pts, using our new correlation method (CM) for microvolt TWA detection.

Method and Results: Differently from accepted spectral method (SM), CM is able to identify TWA in as few as seven beats, and to detect which beats are alternating. In a group of 32 LQTS pts, 128-beat ECG recordings were performed to detect TWA using both CM and SM. TWA was identified by CM in 14 (44%) pts, and in 4 (13%) pts using SM. The features of TWA detected by CM in relation to the number of alternating beats (N) are shown in the following table (A_{CM} = alternans correlation amplitude; NS_TWA = non-stationary TWA; SNS_TWA = strongly NS_TWA; S_TWA = stationary TWA).

	SNS_TWA N < 38	NS_TWA 38 ≤ N ≤ 64	S_TWA N >64	p**
#pts	8	4	2	
N	20 ± 9	45 ± 10	78 ± 15	
A_{CM} (μV)	83 ± 51	35 ± 14*	44 ± 5*	0.094
RR (ms)	957 ± 203	1115 ± 55*	1264 ± 22	0.061

* p < 0.05 when comparing SNS_TWA vs. NS_TWA and S_TWA. ** Kruskall-Wallis Test

Significant correlations between A_{CM} and RR (r = 0.70; p = 0.005) and between N and RR (r = −0.57; p = 0.033) were observed.