Patients with NSTEMI have prolonged QT as compared to patients with Unstable Angina

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No Conflict of Interest

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Background

- Patients with Non ST Elevation Myocardial Infarction (NSTEMI) are at increased risk of cardiac death and subsequent infarctions, compared to patients with Unstable Angina Pectoris (UAP).
- An early diagnosis and treatment may improve outcome and reduce complications.

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Objectives

We aimed to investigate if QT interval prolongation may differentiate between NSTEMI and UAP.

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Methods

- Patients hospitalized for NSTE-ACS were included in the study if they had at least three digitized ECG tracings*:
  - upon admission
  - after 24 hours
  - pre-discharge.

- QTc measurements :
  - QTc was calculated using the Bazett's formula
  - QT intervals were measured in V5
  - Results were divided into deciles for further analyses.

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Methods - continued

- Prolonged QTc was defined as ≥440 msec/√sec for males and ≥450 for females.

- Follow-up ECGs were recorded in the outpatients clinic at least 90 days after the event.

Patients with NSTEMI have prolonged QT as compared to patients with acute coronary syndrome without MI

Study Population

- 2033 patients with NSTE-ACS were admitted to the cardiology department between 2006-2011 .
- 802 patients had at least 3 digitized ECGs and comprised our study population.
- Patients were dichotomized to NSTEMI or UAP by troponin-I levels (0.08 μg/L).

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Baseline Patients Characteristics

	ALL 802	UAP 234 (29%)	NSTEMI 568 (71%)	p-value°
Female	210(26 %)	52 (25%)	158 (75%)	0.09
Age ≥ 65 years	449(55%)	106(24%)	343 (76%)	<0.0001
Hypertension	541 (67%)	172 (32%)	369 (68%)	0.02
Diabetes Mellitus	301 (37%)	91 (30%)	210 (70%)	0.641
Hyperlipidemia	493 (61%)	172 (35%)	321 (65%)	<0.0001
Family History of IHD	171 (21%)	70 (41%)	101 (59%)	<0.0001
Smoker	309 (38%)	102 (33%)	207 (67%)	0.065

° Chi-square test

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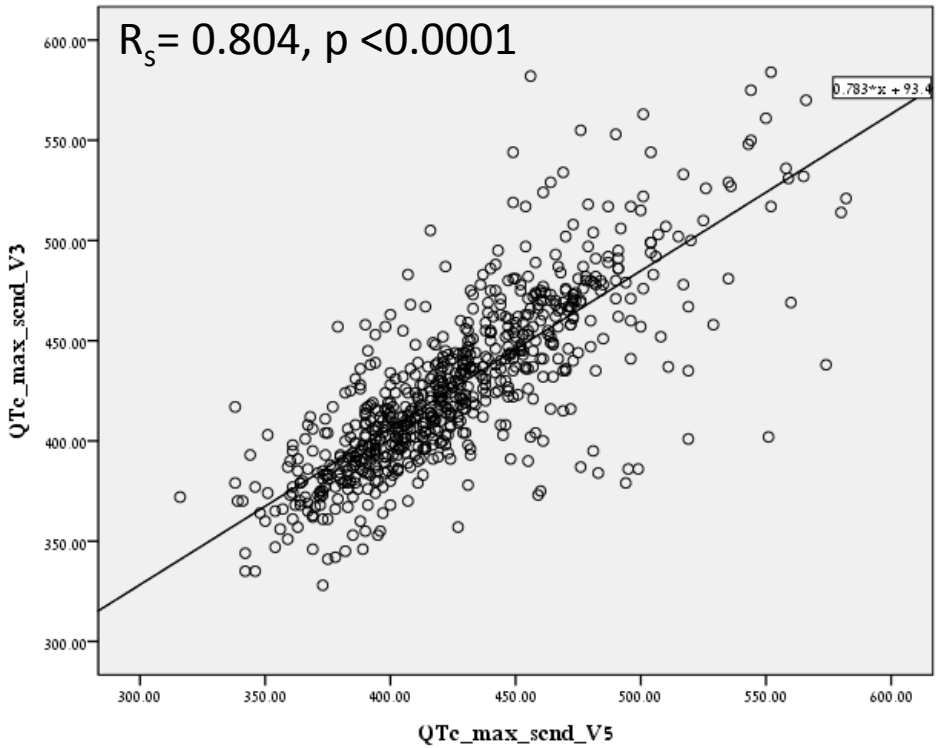
ECG lead selection

Mean QTc levels (msec/√sec) were 427 ± 43 in V5 and 427 ± 43 in V3.

A high correlation was found between the two leads.

Therefore V5 only was used for analyses.



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Results – QTc in NSTEMI vs. UAP

	All n=802	UAP n=234	NSTEMI n=568	p-value
1st ECG	424.6±41	411.1±32	430.1±42	<0.0001
2nd ECG	426.6±44	414.1±35	432.5±45	<0.0001
3rd ECG	420.8±40	411.5±36	424.9±41	<0.0001

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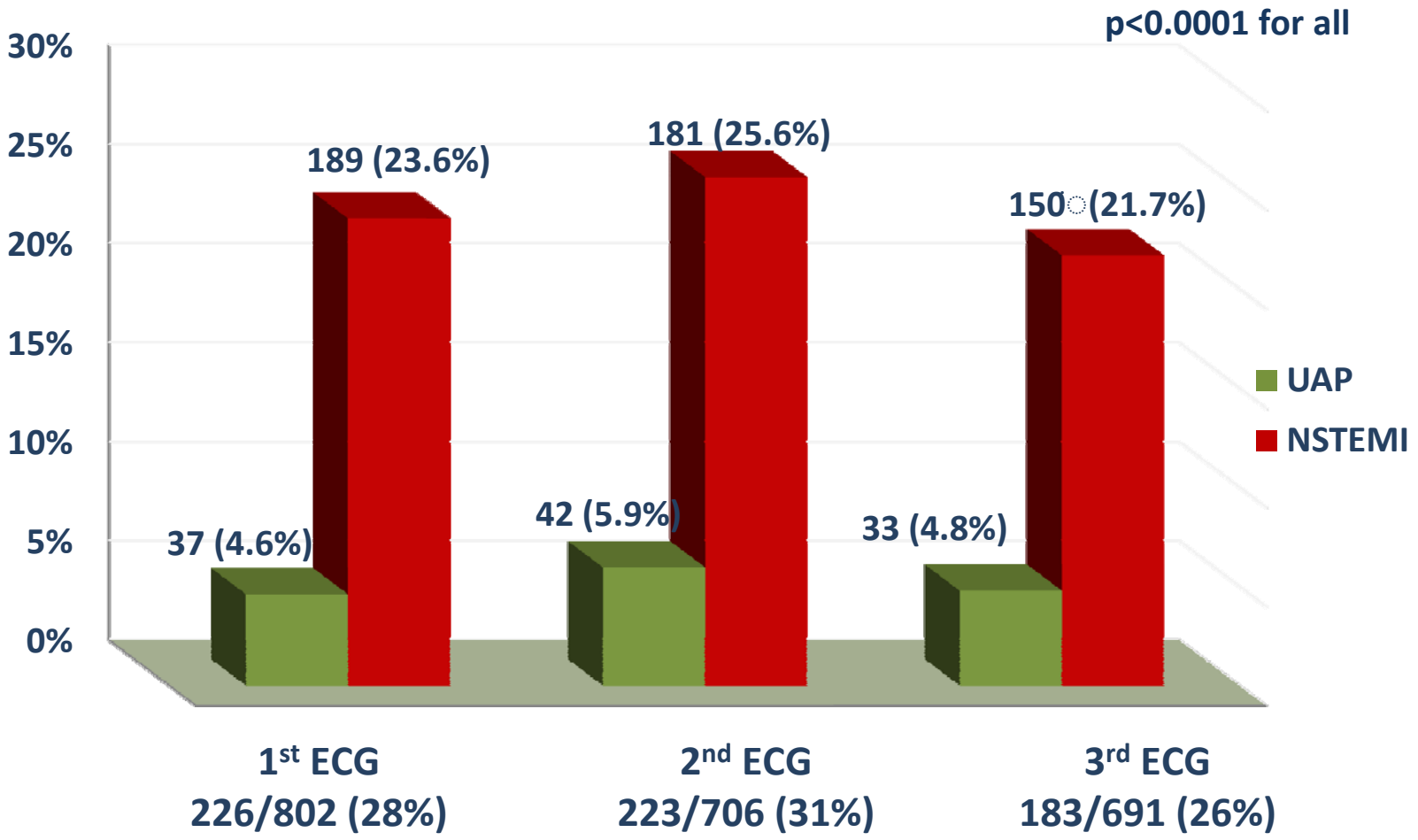
QTc prolongation in NSTEMI vs. UAP



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Multivariate Analysis: Independent Predictors for NSTEMI

	OR	95% CI	p value
Age over 65 years	1.52	1.05 - 2.21	0.027
Hypertension	0.50	0.34 - 0.74	<0.001
Hyperlipidemia	0.48	0.34 - 0.69	<0.0001
Family history	0.61	0.41 - 0.91	0.017
QTc prolongation in 1st ECG	2.43	1.61 - 3.69	<0.0001

Multivariate logistic model with NSTEMI as a dependent variable and QTc prolongation in 1st ECG as explanatory variable, adjusted for age, gender, hypertension, hyperlipidemia, diabetes mellitus, family history of ischemic heart disease and smoking.

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Mechanism of QT prolongation

- ???
- Damage to subendocardial layer and exposure of M cells which cause prolongation of repolarization.
- Abnormal sensitivity to catecholamine.
- Parasympathetic effect
- Abnormal calcium influx during action potential

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Conclusions

- QTc prolongation in the first ECG in the emergency ward, usually obtained before the results of Troponin levels, contributes to an early diagnosis of NSTEMI versus UAP.
- These results may have important implications regarding revascularization strategy in these patients.
- Further studies are needed to confirm our findings.

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