Conclusion: The presence of a notch, especially in the horizontal plane, between the end of QRS and beginning of T-wave loops featuring the appearance of a "nose" in Brugada, and a "fishhook" in early repolarization, and their location in the quadrants, can be the differential diagnostic elements in these conditions.

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Relevance of individualized qt interval correction in subjects with large heart rate fluctuations

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Introduction: Careful measurement and individualized correction of the QT interval for heart rate are necessary to provide a stable physiological value, as demonstrated by Malik and colleagues. Our aim is to provide further arguments to support the use of this subject-specific approach when large fluctuations in heart rate are caused by atrial arrhythmias or induced by a treadmill stress test.

Methods: Four healthy subjects and ten patients with ventricular dysfunction underwent a stress test on a treadmill wearing a Holter ECG with pseudo-orthogonal leads. Twenty patients with atrial flutter undergoing catheter ablation were continuously recorded before, during and after the intervention using the same Holter monitoring system. In all cases, RR and QT time series were extracted and semi-automatically validated. QTc intervals were computed using Bazett's (QTc,B) and Fridericia's (QTc,F) correction formulae, and compared to a 3-parameter nonlinear subject-specific methodology incorporating transfer-function based hysteresis reduction (QTc,I). Stability in QTc determination was estimated as the intra-subject standard deviation (std) of the QTc time series.

Results: Table 1 shows the intra-subject QTc variability in each group for the three different QT correction formulae.

Table 1
Intra-subject QTc variability.

Group	std (RR)	std (QTc,B)	std (QTc,F)	std (QTc,I)
Stress test healthy	156 ± 34 ms	16.8 ± 2.4 ms	12.9 ± 4.4 ms	7.1 ± 2.1 ms
Stress test patients	125 ± 28 ms	22.1 ± 5.6 ms	15.7 ± 4.8 ms	10.4 ± 4.5 ms
Flutter patients	193 ± 55 ms	30.1 ± 9.1 ms	20.0 ± 5.1 ms	8.4 ± 3.5 ms

Conclusion: When large RR fluctuations occurred, hysteresis reduction and individualized QT correction significantly and consistently decreased intra-subject QTc variability.

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Detection of the role of anxiety in the genesis of idiopathic ventricular parasystole and the choice of pathogenetic therapy

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Introduction: High levels of anxiety are common in patients with idiopathic ventricular parasystole (VP). The aim of the study was to define the possibility of treatment of VP with an anxiolytic in patients with anxiety.

Methods: Inclusion criteria consisted of an abnormal amount of idiopathic VP during Holter ECG recording, and a medium or high anxiety level according to psychological questionnaires. All patients underwent a clinical examination, ECG, echocardiogram, ETT, psychological questionnaires, psychological counselling, and an emotional Stroop Colour and Word Test (SCWT). There were two groups formed out of 56 patients. Group I included 20 patients (12 women), mean age 46.6 ± 14.7 years, with ventricular ectopic complexes (VEC) totalling 11354.7 ± 536.3/day, who received an anxiolytic in a therapeutic dose for 30 days. The control group consisted of 20 patients (11 women), 45.2 ± 11.3 years, VEC 12467.2 ± 423/1 /day, without any therapy. Holter ECG, SCWT and psychological questionnaires were repeated in 30 days.

Results: The average number of VEC decreased significantly from 478.8 ± 47.2 to 155.7 ± 73.2 ($t_{emp} = 2.4$, $p \leq 0.05$) in the first group according to Holter ECG findings, while in the control group, VEC decreased from 512.5 ± 67.5 to 467.3 ± 39.4 ($t_{emp} = 0.5$, $p \geq 0.05$). A positive SCWT became negative in 95% of patients in the first group, i.e. an arrhythmia was not provoked ($\varphi_{emp} = 3.1$, $p \leq 0.01$). The number of patients with middle and high anxiety level decreased more than 3 fold ($\varphi_{emp} = 1.85$, $p \leq 0.05$), after therapy with an anxiolytic. There were no significant changes in the second group with respect to the results of the questionnaires and SCWT.

Conclusions: This study shows that psychogenic factors play an important, and sometimes a decisive role in the genesis of idiopathic VP. Anxiolytic therapy can be recommended for patients with VP and a high anxiety level.

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T wave alternans, detection, quantification and pattern definition

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Introduction: T Wave Alternans (TWA), a ventricular repolarization phenomenon, can identify increased risk of sudden cardiac death. This study is a multilead principal component analysis technique to detect and quantify TWA with pattern classification ABAB or BABA.

Methods: The testing was done on the Physionet/CinC 2008 challenge database. This is a collection of 100 ECG records out of which 30 are synthetic, with known alternans magnitudes. The proposed method is aimed at detecting these positive alternans cases. ECG records are filtered moderately to preserve the alternans characteristics. Detection of R peaks and calculation of heart rate is then undertaken. T peaks are detected and T waves are isolated. Isolated T waves of eight independent leads are passed to a Principal Component Analysis (PCA) and the first PAC component is the signal for analysis. TWA detection is done by comparing amplitudes of alternative T waves. If a difference in amplitude is found, on alternate basis, consecutively for 1/4 of total detected beats and heart rate and variance criteria are matching, then alternans is considered as present. The alternans magnitude is calculated for detected records with pattern classification.

Results: After examining 100 records, 29 were detected as TWA positive, with no false detection, where 30 were expected. Our results were compared with those of Bortolan G, Christov I. (2012) and show considerable improvement, as indicated in the table. For those TWA records detected, the magnitude was calculated and compared with the actual values. This revealed that there were 9 records with 0% error, 12 records with <25%, 2 records with 30% and 6 records with 50% error out of the total of 29 detected records. Furthermore, the TWA pattern ABAB or BABA was also classified.

Method	Sensitivity (%)	Accuracy (%)
Proposed	96.66	96.66
Bortolan G, Christov I. (2012)	86.7	87.5

Conclusion: Thus, the present work is a step in the direction of understanding and contributing to TWA research where an attempt is made to detect the presence or absence of TWA, quantify its magnitude and define the pattern of alternans. The magnitude measurement and pattern classification part of this work need further improvement. This work is currently in progress.

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