DOI:

Abstracts of original contributions

20th Interventional Cardiology Workshop New Frontiers in Interventional Cardiology

December 12th, 2019, Krakow, Poland

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ulations was performed on the multivariable model with C-statistics as a measure of goodness of fit. ROC analysis revealed the cut-off point of 909.187 mm of AVC amount considered in radial presentation. Kaplan-Meier curves showed (p = 0.003; log-rank) worst PVL-free survival in patients with more than 909.187 mm of calcium.

Conclusions: Quantitative AVC assessment for PVL prediction may play an important role in TAVR patients' selection.

12-P

Automatic arrhythmia detection form two-channel ambulatory ECG recordings using Shannon Information Theory-based algorithms

Agnieszka Pregowska[1], Klaudia Proniewska[2], Peter van Dam[3], Dariusz Dudek[4], Janusz Szczepanski[1]

[1]Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland
[2]Department of Bioinformatics and Telemedicine, Jagiellonian University Medical College, Krakow, Poland
[3]PEACS BV Nieuwerbrug, The Netherlands
[4]Institute of Cardiology, University Hospital, Jagiellonian University Medical College, Krakow, Poland

Background: Cardiovascular disease (CVD) accounts for about 45% of deaths in Europe. Development of effective tools for automatic arrhythmia detection from electrocardiogram (ECG) is important, especially in early prevention and diagnosis.

Aim: Designing and implementation of new classification algorithms based on Information Theory concepts for quantifying the irregularity of physiological time series. Entropy, Mutual Information, and complexity are the essence of the approach proposed. The advantage of these indicators is that they take into account inner structures in the sequences of symbols (digitalized signals).

Methods: In this study, we considered a group of subjects healthy individuals (MIT-BIH Normal Sinus Rhythm Database, 18 individuals) and patients with arrhythmias (MIT-BIH Arrhythmia Database, 47 subjects). Before applying the Information Theory-based tools, bio-signals have to be digitalized. Here, the binary sequence conversion was proposed, using the encoding fluctuation addressing method [1], which strongly exploits the variability of bio-signals by taking into account oscillations of consecutive ECG values around the signal average.

Results: It turned out that normalized Lempel-Ziv complexity (LZC) values were significantly lower for patients with arrhythmias aginst control group (AVR_{ar} = 0.38 vs. AVR_{contr} = 0.86). This means, due to the essence of LZC, that healthy individuals signals exhibit much more patterns than subjects with arrhythmias. Consequently, arrhythmias group signals have LZC much lower (Figure 1). The proposed classifier provided arrhythmias diagnostics with a sensitivity of 90.00 and specificity of 92.00%.

Conclusions: Results obtained support the hypothesis that Information Theory tools can be successfully applied to classified biomedical signals addressing biological systems physiological states and can improve diagnostic speed, accuracy, and reliability.

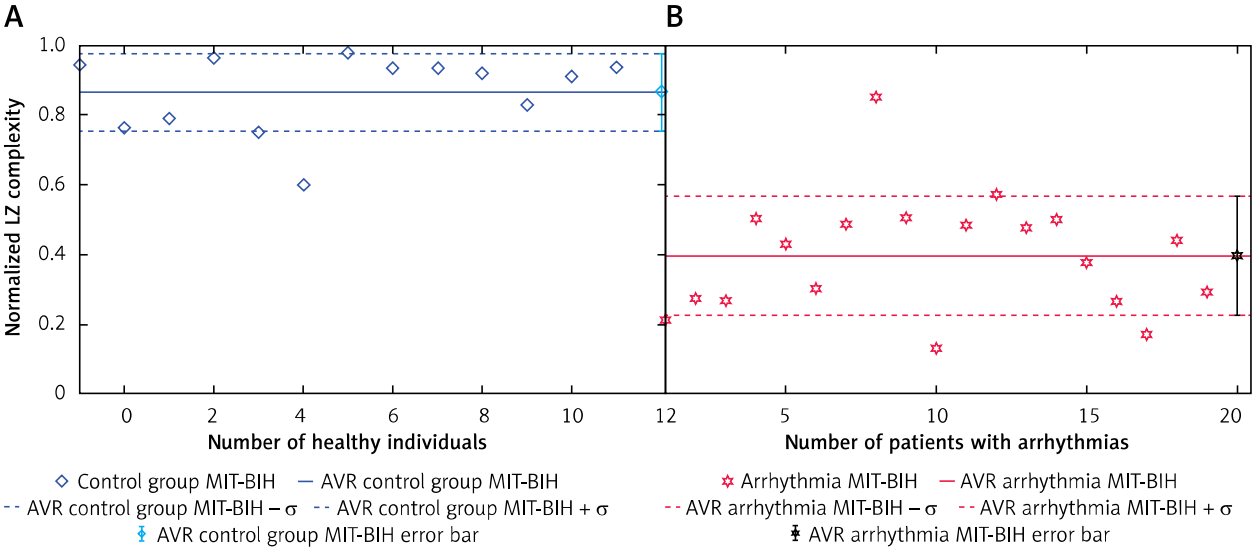

Figure 1. Normalized Lempel-Ziv complexity of ECG, for MIT-BIT control group (blue) (**A**), and for MIT-BIT arrhythmias patients (red) (**B**). The average values and standard deviations within groups are also shown. An important observation is that the intervals with the spread σ around averages do not completely overlap what was illustrated in the middle vertical axis.