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Tatjana Gligorijevic

University of Belgrade, Serbia

Follow up and risk assessment using artificial neural networks in patients with myocardial infarction

Artificial Neural Networks (ANN) is learning models that mimic the principles of morphological and functional organization of biological neurons, which has the capacity to promote and facilitate current statistical methods. The aim of this paper is to identify individuals with high risk of all causes of mortality after acute myocardial infarction using ANN, and to assess their survival rates. A total of 1,705 consecutive patients who underwent 24-hour ECG monitoring, short ECG analysis, non-invasive beat-to-beat heart rate variability and baroreflex sensitivity were followed for 3 years; of these, 286 patients died. Depressed baroreflex sensitivity BRS (≤ 5.33 ms/mmHg) was independently related to increased risk of mortality. The proposed neural network classifier showed good performance for survival prediction. Neural network architecture with 25 neurons in the first hidden layer and 30 neurons in the second hidden layer showed the best classification performance 88% accuracy, 81% sensitivity, 93% specificity and 0.85 F-measure. The error threshold value of 0.03 showed the best results. These findings support the theory that patients with high sympathetic activity have an increased risk of mortality independent of other risk factors. The artificial intelligence infrastructure can reliably identify individuals with higher risk.

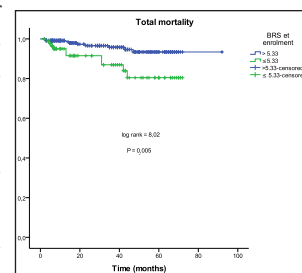


Figure-1: Kaplan-Meier survival curves for cardiac death in patients with reduced BRS at or below 5.33 ms/mmHg in early phase after acute myocardial infarction.

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Biography

Tatjana Gligorijevic is a PhD student and Resident of Internal Medicine, working at the cardiology department. She has her expertise in research of heart rate variability in different patient groups. Her research field of interest is risk stratification, classification and clustering algorithm using data mining.

dr.tatjana.gligorijevic88@gmail.com