

# Naive Bayesian-based nomogram for identification of early asymptomatic Dilated Cardiomyopathy

Aleksandar Miladinović<sup>\*1,2</sup>, Katerina Iscra<sup>2</sup>, Miloš Ajčević<sup>2</sup>, Luca Restivo<sup>3</sup>, Simone Krešević<sup>2</sup>, Marco Merlo<sup>3</sup>, Gianfranco Sinagra<sup>3</sup>, Agostino Accardo<sup>2</sup>

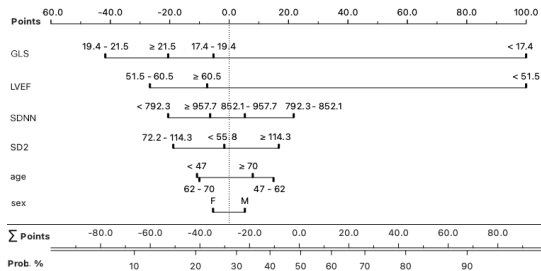
<sup>1</sup> IRCCS Burlo Garofolo, Trieste, Italy

<sup>2</sup> Dep. Engineering and Architecture, University of Trieste, Italy

<sup>3</sup> Cardiovascular Dep., ASUGI and University of Trieste, Italy

Dilated cardiomyopathy (DCM) is one of the leading causes of heart failure. The most used parameter for measuring heart function and predicting outcomes in DCM patients is the left ventricular ejection fraction (LVEF). However, it has some inherent drawbacks. One of them is that the LVEF cut-off has not yet been clearly defined, yielding diagnosis in the so-called «grey zone» (LVEF: 40%-50%) challenging, especially in the early asymptomatic phase. Recent studies have reported that left ventricular global longitudinal strain (GLS) and heart rate variability (HRV) can be used for the prediction of DCM. Therefore, we aimed to investigate a Naive Bayesian-based nomogram produced on clinical and instrumental features, which can be used to support the diagnosis of early asymptomatic DCM.

The study encompassed 49 DCM (LVEF = 51.2±10.8%) and 50 healthy subjects (HC). The models were produced by naive Bayes algorithms considering the set of selected HRV, LVEF, GLS, age, and sex features, chosen with the ReliefF method.



*Naive Bayesian-based nomogram for DCM*

The results showed that the most informative features for classification between early asymptomatic DCM and HC were: GLS, LVEF, meanRR, SD2 age, and sex, listed in order of importance. The obtained classification accuracy was 80% and the area under the ROC curve was 84%. A naive Bayesian-based nomogram highlighted that GLS brings more information than LVEF. Furthermore, it provides a tool for the further evaluation of the cut-offs for the selected parameters.

In conclusion, this study demonstrates that a Naive Bayesian-based nomogram is a powerful tool for the prediction of early asymptomatic DCM and that allows detailed clinical interpretation of the model.