

## More Accurate Impact of as an Independent Predictor of Fragmented QRS on Cardiovascular Events

To the Editor,

With great interest, I read the manuscript entitled "Fragmented QRS as a Predictor of Cardiovascular Events in Patients with Type 2 Diabetes Mellitus: A 36-Month Follow-Up Data" by Çetin et al<sup>1</sup> published in *The Anatolian Journal of Cardiology* March 1, 2024; 28 (4): 208-212. This study aimed to evaluate the predictive value of fragmented QRS (fQRS) on major cardiovascular events (MACE) with type 2 diabetes mellitus patients. The study design deserves praise; however, I would like to offer methodological and statistical suggestions and evaluations about the mentioned manuscript.

When establishing a regression model, less datas cause weak predictions which are unclear. To avoid this situation, a widely used rule 10 events per 1 variable (EPV) in the literature.<sup>2</sup> If the number of independent predictors in the performed standard binary logistic regression model is less than a certain amount compared to the number of outcomes, the performance of the model decreases and the situation is called statistically "model overfitting."<sup>3</sup> In the low-risk group, this overfitting situation predisposes to underestimating the probability of an event. On the other hand, high-risk groups overestimate the probability.<sup>2</sup> This may bias the accurate interpretation of results and clinical decision-making. In this study, investigators established a univariate and multivariate binary logistic regression model to predict major cardiovascular events (MACE) in Table 4. In the model, while there were 9 independent predictors, a total of 26 outcomes (MACE) were developed, and an "overfitting" situation occurred in the model. To avoid overfitting in this model, applying a maximum of 2 or 3 independent variables to the model according to the EPV rule (10 : 1 ratio) would have provided more accurate results.

Moreover, the main purpose of regression analysis is predicting the dependent variable with the least independent variable. In the mentioned study, when the *P*-value was taken as .05 as the cutoff value, there was no statistically significant difference between the groups in comparative analyzes in terms of both baseline demographic characteristics and laboratory and echo parameters. Therefore, according to this dataset, there was no need to perform multivariate regression analysis to evaluate the effect of fQRS on MACE. On the other hand, if the *P*-value < .1 is determined as the cutoff value, it would be appropriate to include only male, proteinuria, and left ventricular end-diastolic diameter variables in the regression analysis together with the fQRS variable.

As a result, I think that paying attention to the aforementioned issues will strengthen the value of the article. I would like to thank the authors for presenting this great job to us.

### REFERENCES

1. Çetin Ş, Bayraktar A, Demiröz Ö, Karabay KÖ, Yalçınkaya E. Fragmented QRS as a predictor of cardiovascular events in patients with type 2 diabetes mellitus: a 36-month follow-up data. *Anatol J Cardiol.* 2024;28(4):208-212. [CrossRef]



Copyright@Author(s) - Available online at anatoljcardiol.com.  
Content of this journal is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

### LETTER TO THE EDITOR

Mehmet Erdoğan<sup>1,2</sup>

<sup>1</sup>Department of Cardiology, Ankara Yıldırım Beyazıt University, Faculty of Medicine, Türkiye

<sup>2</sup>Department of Cardiology, Ministry of Health, Ankara Bilkent City Hospital, Türkiye

#### Corresponding author:

Mehmet Erdoğan  
✉ mhmerdogan@windowslive.com

**Cite this article as:** Erdoğan M. More accurate impact of as an independent predictor of fragmented QRS on cardiovascular events. *Anatol J Cardiol.* 2024;XX(X):1-2.

DOI:10.14744/AnatolJCardiol.2024.4577

2. Pavlou M, Ambler G, Seaman SR, et al. How to develop a more accurate risk prediction model when there are few events. *BMJ*. 2015;351:h3868. Erratum in: *BMJ*. 2016;353:i3235.
3. Steyerberg EW, Vickers AJ, Cook NR, et al. Assessing the performance of prediction models a framework for traditional and novel measures. *Epidemiology*. 2010;21(1):128-138. [\[CrossRef\]](#)