Reviewer's report

Title: Prediction of Adverse Cardiac Events in Emergency Department Patients with Chest Pain Using Intelligent Variable Selection and Heart Rate Variability

Version: 2

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Reviewer: Paolo Fraccaro

Reviewer's report:

The paper describes a method to perform variable reduction and its implementation in predicting adverse cardiac events in emergency department patients through a previously published scoring system. The paper is interesting to read and the analysis is overall well conducted. However, some points have to be addressed before being suitable for publication.

Minor essential revisions:

- In the description of the variable selection methods it is not stated how many trees were used in random forest (from line 163).

- In the description of the variable selection methods, it is used a 1:1 ratio between MACE and not MACE. Why was this ratio and not others (e.g. 1:2, 1:5) used? Furthermore, during the bootstrap procedure the systematic inclusion of all MACE patients could introduce a bias of selection. Why were not statistical techniques to deal with unbalanced data (e.g. SMOTE, https://www.jair.org/media/953/live-953-2037-jair.pdf) used? (from line 163)

- In the description of the variable selection methods it is not explained why the authors decided to select 8 variables. At the moment this results an arbitrary decision that needs to be justified (from line 163).

- Which was the statistical test (e.g. Delong’s) used to pair-wise compare AUCs? (from line 213)

- In the results, authors report cut-offs for analysed model. How were these cut-offs calculated? (from line 257)

- Overall, English could be improved.

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests