Category :**Cardiovascular: cardiac arrest\CPR**

A245 - ***Identification of physiological subphenotypes in a post cardiac arrest patients***

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Introduction:

The management of postcardiac arrest (CA) patients may be ineffective or even harmful due to heterogeneity of treatment effects. Heterogeneity could be mitigated if undifferentiated CA populations could be resolved into biologically more uniform subphenotypes. We hypothesized that computational analysis of physiological time series (PTS) data recorded in the first 3 days of intensive care would uncover latent, clinically meaningful subphenotypes.

Methods:

Patients admitted to ICU after CA were identified in the multi-center Philips eICU database, and PTS signals recorded in first 72 hours after ICU admission were extracted (heart rate, blood pressure, pulse oximetry, and respiratory rate). Temporal, frequency, and information theory-based PTS features were derived and analyzed using consensus clustering, an unsupervised machine learning approach which reconciles clustering information about the same dataset coming from different sources or from different runs of the same algorithm.

Results:

From 2,095 CA patients in eICU we derived 91 PTS features, from which 3 unique clusters were identified, each associated with a distinct clinical outcome distribution, leading to the designation of low, intermediate, and high risk subphenotypes (respectively clusters 1,3 and 2 in Fig 1). Clusters were differentiable by PTS features but not by demographic and/or other clinical characteristics (Fig 1C).

Conclusion:

Among CA patients admitted to ICU, unsupervised learning applied to data routinely recorded in the ICU indicates the presence distinct physiological subphenotypes associated with specific outcome probabilities. These subphenotypes were latent, as they could be differentiated on the basis of clinical features.

Image :

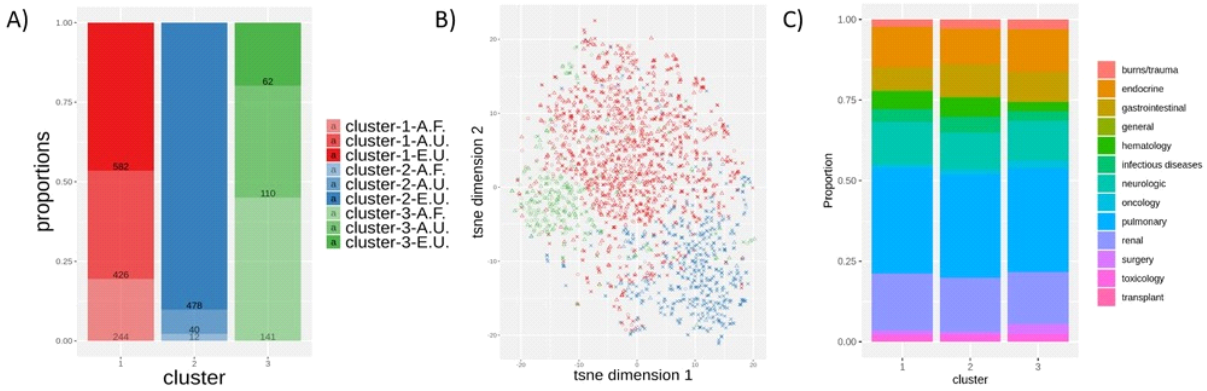

Fig 1. A) Proportion plot of identified 3 clusters of CA patients. B) t-SNE dimension reduced representation. C) Proportion of diagnosis received within first 6 hours of ICU admission stratified by subphenotypes. [A.F (alive favorable outcome), A.U (alive unfavorable outcome), E. U (Expired unfavorable outcome)]