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

A252 - ***Hyperacute prediction of targeted temperature management outcome after cardiac arrest: a computational approach***

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Introduction:

Targeted temperature management (TTM) is associated with higher odds of neurological recovery in comatose survivors of cardiac arrest. However, the efficacy of TTM is not consistently observed, possibly due to heterogeneity of treatment effects. The aim of this study is to determine if models leveraging data available in the first 6 hours after ICU admission (hyperacute phase) are predictive of short-term outcomes after TTM.

Methods:

Adult patients receiving TTM after cardiac arrest were selected from a multicenter ICU database. Predictive features were extracted from clinical, physiologic, and laboratory data available in the hyperacute phase. Primary endpoints were survival and favorable neurological outcome, determined as a motor Glasgow Coma Scale (mGCS) of 6 upon discharge. Three machine learning algorithms were trained: GLM, random forest (RF), and gradient boosting (XGboost). Models with optimal features from forward selection were 10-fold cross-validated and resampled 10 times.

Results:

Data were available on 969 cardiac arrest patients who received TTM, of whom 491 survived and 237 had favorable neurological discharge. The GLM performed best, with an AUROC of 0.702±0.029, sensitivity 0.621±0.116, and specificity 0.666±0.117 for the prediction of survival and an AUROC of 0.678±0.041, sensitivity 0.691±0.149, and specificity 0.565±0.137 for the prediction of favorable neurological function. Highly ranked features predictive of survival and favorable neurological outcome included male gender, higher respiratory rate, and greater systolic blood pressure range.

Conclusion:

In patients receiving TTM after cardiac arrest, short-term outcomes can be predicted with data routinely collected in the first 6 hours after ICU admission. Ongoing model iterations will integrate novel features and include external validation. Hyperacute prediction could increase the effectiveness of clinical decision-making in the post-cardiac arrest setting.