ICU MANAGEMENT & PRACTICE

Prediction of Favourable Outcome After Cardiac Arrest

Hypoxic-ischaemic brain injury following cardiac arrest (CA) is associated with significant morbidity and mortality. Withdrawal of life-sustaining therapy (WLST) is a common cause of death in these cases. Prognostication plays a crucial role. Current guidelines, such as those from ESICM, propose a multimodal approach combining clinical examination, electrophysiology, brain imaging and biomarkers. However, current guidelines focus on the prediction of unfavourable outcomes. There is a need to accurately identify patients with a good chance of recovery to reduce uncertainty, reassure families, and allocate resources effectively.

Several indicators of a good outcome after hypoxic-ischaemic brain injury following CA have been identified, including continuous and reactive electroencephalography without epileptiform features, absence of diffusion-weighted changes on brain MRI, a Glasgow Coma Scale motor score of 3 or higher, and normal levels of serum neuron-specific enolase. However, these indicators are often described individually, and their sensitivity in predicting a favourable outcome is limited when considered alone. Predicting a favourable outcome requires high sensitivity to ensure that patients with the potential for good recovery are not missed.

The existing prognostic guidelines for cardiac arrest primarily focus on predicting unfavourable outcomes, while less attention has been given to predicting favourable outcomes. This study aimed to identify predictors of favourable outcomes after cardiac arrest and develop a multimodal model that combines these predictors.

A recent study analysed data from comatose adults treated after cardiac arrest. The patients received targeted temperature management at 36°C for 24 hours with external cooling devices and specific medications and interventions. EEG recordings were conducted during TTM and in normothermic conditions, assessing background continuity, reactivity, and epileptiform activity. Neurological examinations, somatosensory-evoked potentials (SSEPs), serum neuron-specific enolase levels, and pupillometry data were also collected.

Study researchers collected various variables related to CA, including the initial rhythm and time to return of spontaneous circulation.

The predictive performance of each variable for favourable outcomes was analysed, and the most discriminant factors were combined to create a multimodal prognostic score. The score included six modalities, each contributing one point: early EEG (12-36 hours) not highly malignant, early EEG background reactivity, late EEG (36-72 hours) background reactivity and continuity, peak serum NSE within 48 hours ≤ 41 µg/L, and FOUR score ≥ 5 at 72 hours. A score of ≥ 4 out of 6 points had a sensitivity of 97.5% and an accuracy of 77.5%. The score's performance was validated in an independent cohort and showed similar results.

This study presents a multimodal score that combines clinical, EEG, and biological factors available within 72 hours after CA. The score demonstrates high accuracy in identifying comatose CA survivors who will achieve functional independence at three months. The score's performance was externally validated, supporting its effectiveness in early prognosis prediction for CA patients.

Source: Critical Care Medicine

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