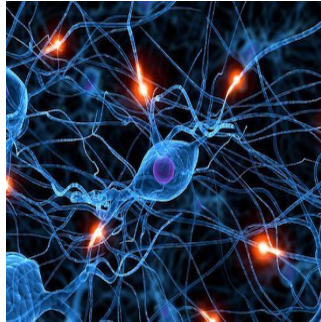


## Cerebral Oxyhaemoglobin: a Useful Indicator of Neuroprotection



A prospective, multi-centre, cohort study was conducted to test whether regional cerebral oxygen saturation (rSO<sub>2</sub>) predicts neurological outcomes after out-of-hospital cardiac arrest (OHCA). The primary goal of the study was to learn more about oxyhaemoglobin (oxy-Hb) levels in the cerebral tissues during the development of anoxic and ischaemic brain injury. The study team hypothesised that the estimated cerebral oxy-Hb level and rSO<sub>2</sub> determined at hospital arrival may reflect the level of neuroprotection in patients with post-cardiac arrest syndrome (PCAS).

While neurological sequelae are common among survivors of OHCA, there are no reliably established early prognostic markers. The neurological assessment of survivors with PCAS in the acute post-resuscitation stage is not only to determine the ongoing injury but also to establish the patient's recovery unresponsiveness. In cases of cerebral ischaemia, there is always a risk of neurological impairment following OHCA, regardless of return of spontaneous circulation (ROSC).

A subgroup of consecutive patients who fulfilled the J-POP registry criteria and who had successfully achieved ROSC from OHCA were assessed in this study. These included 4496 comatose survivors including 119 comatose patients with pre-hospital ROSC and 376 cardiac arrests at hospital arrival.

The primary outcome measure was the neurological status of the patients at day 90. The predictors associated with the primary outcome included Hb levels, rSO<sub>2</sub>, oxy-Hb levels, age, sex, bystander witness status, bystander CPR, presumed cardiac aetiology, initial shockable rhythm, advanced airway management, epinephrine use, defibrillation, time interval from EMS call to hospital arrival, achievement of ROSC prior to hospital arrival, administration of coronary angiography, percutaneous coronary intervention and therapeutic hypothermia.

A non-invasive technology, the Near-Infrared Spectroscopy (NIRS), has recently been developed to monitor cerebral oxygen saturation during cardiac arrest. During this study, two disposable NIRS probes were applied within three minutes of patient arrival in the hospital. The probes were applied bilaterally onto the patient's forehead. rSO<sub>2</sub> was stabilised over several seconds. The values were closely monitored for at least one minute and the lower of the 2 rSO<sub>2</sub> values were included in the analysis.

The results of the study showed that 15.1% of patients presented with good neurological outcomes. The study also revealed that the cerebral oxy-Hb levels were significantly higher in patients with good outcomes. Multivariate logistic regression analysis also confirmed that the oxy-Hb level was an accurate predictor of good neurological outcomes. The study also showed that an oxy-Hb cut-off of 5.5 provided optimal sensitivity and specificity for predicting good neurological outcomes. oxy-Hb level was also a more efficient prognostic indicator as compared to rSO<sub>2</sub>. Good neurological outcomes were consistent in the subgroup of patients who achieved ROSC upon hospital arrival.

The study thus concludes that the cerebral oxy-Hb level may predict neurological outcomes and is an excellent indicator of neuroprotection in patients with PCAS.

Source: Critical Care Forum  
Image Credit: Google Images

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