20296

Mean value of Perfusion Index in patients resuscitated from an out-of-hospital cardiac arrest predict the incidence of lactic acidosis on ICU admission

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Backround: Regional and general hypoperfusion cause hypoxia, resulting in excess production of lactate secondary to reduced mitochondrial oxidation. Peripheral perfusion index (PI) is the fraction of the pulsatile blood flow to the non-pulsatile blood in peripheral tissue obtained by standard pulse-oximetry. Recent literature has highlighted its association with both survival and ECG reliability in patients resuscitated from an out-of-hospital cardiac arrest (OHCA).

Purpose: We raised the hypothesis that the mean value of PI over 30-minutes monitoring (MPI30) after ROSC in patients resuscitated from an OHCA is associated with the probability of detecting a lactic acidosis (LA) at the first arterial blood gas analysis available after ICU admission.

Materials and Methods: This was a retrospective study, obtaining data from our cardiac arrest registry. Among 172 post-ROSC patients admitted to the ICU (between 1st January 2017 and May 2021) post-ROSC MPI30 was available in 76 patients: 54 (72%) males; median age 70 years (IQR 59-77). PI was automatically and continuously measured by the manual monitor/defibrillator (Corpuls by GS Elektromedizinische Geräte G. Stemple GmbH, Germany) once the pulse oximeter was placed, then registered in the report. The population was divided in quartiles according to MPI30 values, then the incidence along the quartiles were compared with chi-squared test. The association between MPI30 and LA incidence was investigated both with univariate and multivariate logistic regression.

Results: LA was documented in 57% of the study population. We found a significant trend toward reduction of incidence of LA along the four quartiles (p=0.0386). Univariate logistic regression showed a statistically significant association between MPI30 and LA on admission [OR 0.62 (95%CI 0.44-0.89), p=0.005] which was confirmed after correction for age and sex [OR 0.63 (95%CI 0.43-0.91), p=0.009].

Conclusions: Low perfusion as measured by MPI30 after ROSC predicts a higher incidence of lactic acidosis in patients on admission to the ICU. Our results could help clinicians in identifying patients at risk for metabolic derangements even before a blood gas analysis is obtained.