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Abstract:

Mortality after an out-of-hospital cardiac arrest (OHCA) remains excessively high. The use of extracorporeal cardiopulmonary resuscitation at admission may improve survival, but selecting candidates for this therapy is challenging. Finding the best predictive biomarkers of severe hypoxic-ischemic brain injury (HIBI) on arrival might aid in the multimodal decision making. Our aim was to analyse the predictive value of the acid-base balance components in this scenario.

This was a prospective observational study of OHCA patients that achieved return of spontaneous circulation without administration of HCO_3 during resuscitation, admitted to an ICCU of a tertiary care centre. Point-of-care arterial biomarkers on arrival, including pH, pCO_2 and HCO_3 were analysed. The primary objective was severe HIBI.

From 2019 to 2021, 50 OHCA patients were included, of which 17 (34%) suffered severe HIBI. Initial pH (6.99 ± 0.20 vs. 7.14 ± 0.15 , $P=0.007$) and HCO_3 values ($14.13 \pm 3.24 \text{mEq/L}$ vs. $17.97 \pm 4.28 \text{mEq/L}$, $P=0.003$) were significantly lower in severe HIBI patients, while no difference was observed regarding pCO_2 ($52.44 \pm 14.41 \text{mmHg}$ vs. $51.38 \pm 13.38 \text{mmHg}$, $P=0.801$). HCO_3 showed higher accuracy to predict severe HIBI than pH (AUC of 0.764 vs. 0.727), with a value of 16.5mmol/L as the best cut-off point.

First HCO_3 levels on admission of OHCA patients who achieved ROSC significantly predicted severe HIBI, unlike pCO_2 , and showed even better accuracy than pH.