TITLE (SHORT, 200 CHARACTERS MAX.):

Prognostic value of veno-arterial PCO_2 difference in post cardiac arrest patients

MAIN HYPOTHESES TESTED (2 MAX)

Previous studies have demonstrated the prognostic values of lactate, lactate clearance and $ScVO_2$ in post cardiac arrest patients. *Venoarterial CO_2 difference* (v-a PCO_2) correlates inversely with cardiac output and has been shown to vary in parallel with semiquantitatively assessed microcirculation in septic patients (ie. functional capillary density and heterogeneity of microvascular blood flow). An increased v-a PCO_2 have been evaluated both as a marker of hypoperfusion and microvascular dysfunction as well as a prognostic tool in patients with severe sepsis and critical illness. However, to our knowledge, v-a PCO_2 has not been analyzed as a marker of poor outcome in patients who have attained ROSC after cardiac arrest. We are interested in whether this marker adds additional prognostic value at the beginning of, and during, ICU care and how it correlates with clinical parameters.

The hypothesis is that increased v-a PCO_2 correlates positively with death within 180 days in post cardiac arrest patients.

The design is a one cohort, prospective, explorative study.

SINGLE CENTER [ ], MULTICENTER [X]

Sahlgrenska University Hospital, Gothenburg, Sweden

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PICO

Patients: Patients unconscious after ROSC who are treated in intensive care post cardiac arrest.
Intervention/Exposure/Prognostic factor: Blood gas sampling and analysis of v-a PCO_2 in patients who have a central venous catheter and an arterial catheter in situ.
Comparison: None
Outcome: Mortality at 180 days

DATA NEEDED FOR THE ANALYSIS
(SPECIFY VARIABLES AND MOTIVATE ANY PROPOSED ADDITIONS TO THE ECRF)

- Time of placement of CVC and arterial catheter.
- Blood gas sampling simultaneously from CVC and arterial catheter at 0, 6, 12, 24 and 72 hours.
- Measurements of arterial lactate, ScvO2, hemoglobin, a-PO2, a-PCO2, v-PO2, v-PCO2,

LOGISTICS – HOW WILL ADDITIONAL DATA BE GATHERED?

- Blood gas analyses from repeated sampling (i.e. 0, 6, 12, 24 and 72 h) of arterial and central venous blood gases. Samples are drawn simultaneously from an arterial line and central venous line after a minimum of 20 minutes of stable ventilation. Data subject to analysis are arterial (a-PCO_2) and venous carbon dioxide (v-PCO_2), arterial lactate and central venous saturation ($ScvO_2$). The correlation between v-a PCO_2 and mortality at 180 days as well as certain clinical parameters known to have a negative prognostic value (time in no-flow, time until ROSC and cumulative adrenaline dose), ScvO2 and lactate clearance (i.e. change in arterial lactate during 12 hours) will be analyzed.

BRIEF STATISTICAL ANALYSIS PLAN AND SAMPLE SIZE ESTIMATE

According to previously published studies of v-a PCO_2 in critically ill patients, an abnormal value is defined as more than 0,8 kPa (6 mmHg). Correlations will be examined using Spearman's rank correlation coefficient. Comparisons between patients with normal and abnormal values will be performed with the Mann–Whitney U test and Student's t test for continuous variables, and with the chi-square test or Fisher's exact test for categorical variables. A multiple logistic regression model will be constructed to explore whether increased v-a PCO_2 at admission is an independent predictor of mortality. The performance of the v-a PCO_2 for predicting mortality and lactate clearance is calculated by creating a receiver operator characteristic curve.

FUNDING (IF APPLICBABLE)

<N/A>

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