

The incidence of severe hypocapnia immediately after VV-ECMO initiation.

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Introduction

Large relative decrease of PaCO₂ after VV-ECMO initiation have been shown to be associated with an increased risk of neurological complications (1–3) or even higher mortality. (4) However, these studies use data solely obtained from the extracorporeal life support organization (ELSO) registry. ((1,5,6) The ELSO registry contains PaCO₂ values before just ECMO initiation (up to 6h prior) and only 24h after ECMO initiation (up to 30h). (1) As such it has been observed that this leaves a gap in the published literature regarding the CO₂ dynamics of patients receiving VV-ECMO in the first 24 hours.

Methods

We conducted a retrospective cohort analysis of patients at a tertiary Australian hospital who received VV-ECMO and are registered in the ELSO EXCEL registry. The primary outcome was the incidence of a large change in PaCO₂ from baseline within the first 24 hours, defined as a reduction of greater than 50% of baseline (before ECMO initiation) PaCO₂.

Results

We enrolled 54 patients, where ECMO was initiated on the hospital site. Out of the 54 patients, 18 patients (1/3) showed a big drop in PaCO₂ (greater >50% from baseline) in the first 24h. The median biggest change in PaCO₂ at any point was 28.5 [21.2, 44.0] mmHg. The median biggest change in PaCO₂ from baseline was 19.0 [9.2, 29.0] mmHg. The linear model showed a rapid drop in PaCO₂ over the first few hours following ECMO initiation, which overshot the target before, levelling to a stable CO₂ level after 24h (Figure 1). The largest drop of CO₂ was numerically higher in patients that died in hospital despite the baseline PaCO₂ being similar between the groups.

Conclusion

This data shows that 1/3 of our patients experience a big drop in PaCO₂ (>50 % of baseline) in the first hours after ECMO initiation, before reaching a more stable PaCO₂ level after 24h. These findings suggest more close monitoring should be considered after ECMO initiation, in order to avoid potential complications.

References

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PaCO₂ over Time with 95% Confidence Interval

