

Category : **Respiratory: ARDS**

A241 - The advanced organ support (advos) hemodialysis system balances blood ph within 24 hours in patients with multiple organ failure and hypercapnic acidosis

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Introduction:

The dialysate fluid with customizable pH and bicarbonate content available within the ADVOS hemodialysis system supports a fast balancing of blood pH in patients with acidosis [1]. Considering that the rapidity of acidemia recovery is an independent risk factor for mortality [2], the aim of this work is to analyze the exact timing for pH correction and the main factors leading to it in patients with multiple organ failure (MOF) and hypercapnic acidosis treated with ADVOS.

Methods:

Patients treated with ADVOS for MOF and hypercapnic acidosis in the tertiary care ICU of the University Hospital of Technical University of Munich (Germany) from 01/2021 to 02/2022 that survived at least 24 hours were included in this retrospective analysis. The primary outcome was the time to reach a blood pH ≥ 7.35 . During the ADVOS treatments pre- and post-dialyzer blood samples were taken to analyze the course of blood gases and the CO₂ removal rates. The course of hemodynamic, hepatic, renal and ventilation parameters were documented.

Results:

Each of the 24 patients (75% male, 61 years, SOFA 15) received a median of 5 sessions (total 134) with median blood flows of 300 ml/min, concentrate flows of 320 ml/min and dialysate pH of 8.5 under citrate anticoagulation alone (4%) or combined with UFH (96%). The median time to reach pH ≥ 7.35 was 4 h showing a significant pH increase at 24 h (7.21 to 7.39, p<0.01). A total of 461 pairs of pre and post-dialyzer samples showed a median CO₂ removal of 53 ml/min which reduced pCO₂ (64 to 55, p<0.241). The main determinants for CO₂ removal were a dialysate with a lower bicarbonate content and a higher pH in combination with a higher blood flow (Figure 1).

Conclusion:

A single session of ADVOS corrected blood pH within 4 hours and supported the reduction of pCO₂ through a median CO₂ removal of 53 ml/min in patients with multiple organ failure and hypercapnic acidosis.

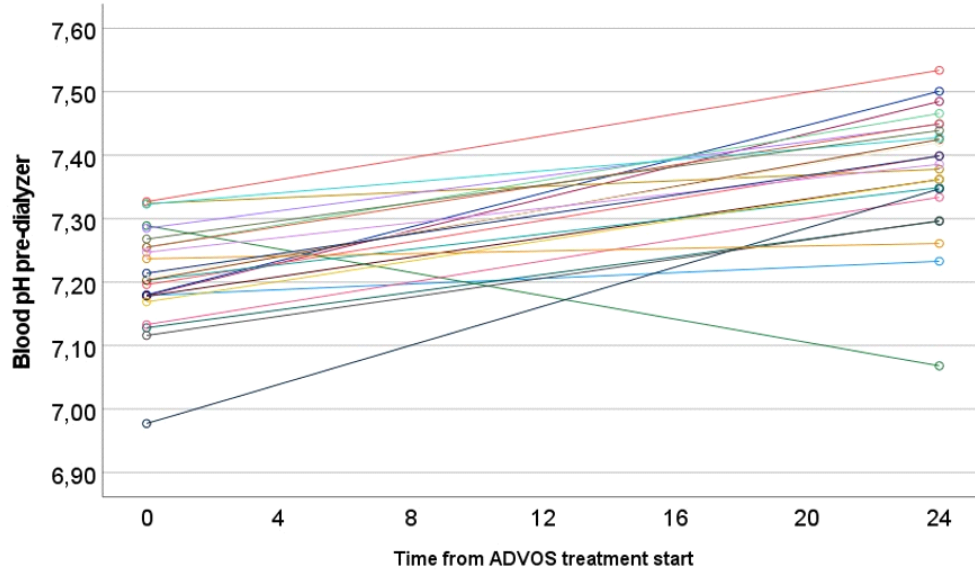
References:

- [1] Allescher A, et al. Artif Organs. 2021 Dec;45(12):1522-1532.
- [2] Jung B, et al. Crit Care. 2011;15(5):R238.

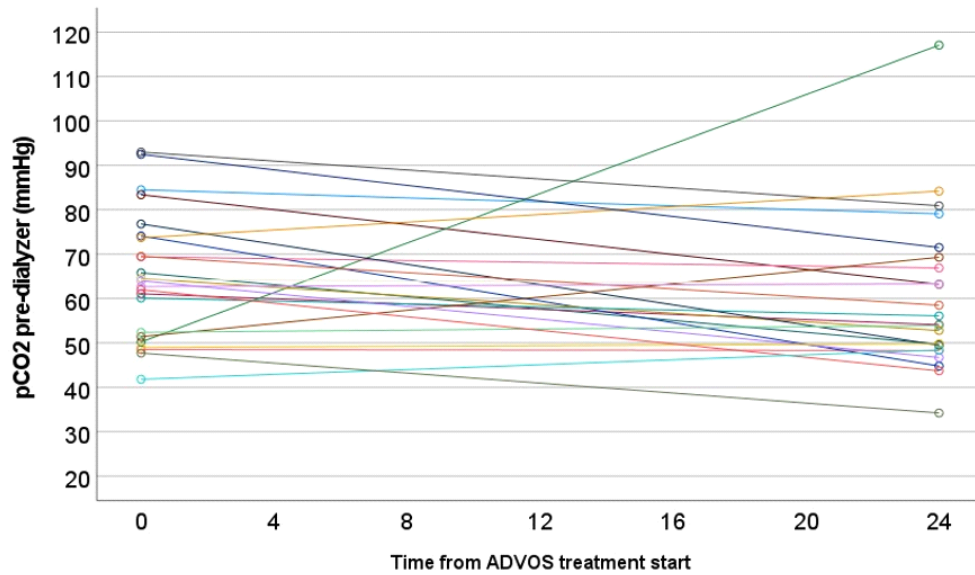
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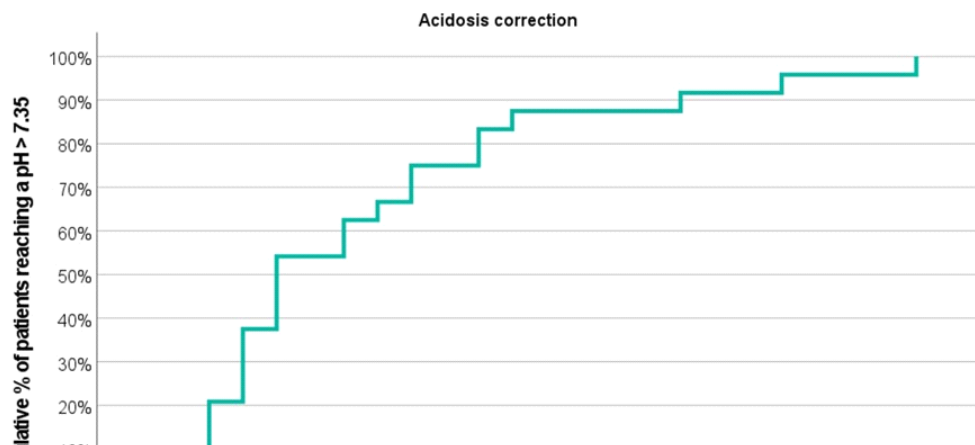
Change of blood pH in 24 hours

**B**

Change of pCO2 in 24 hours

**C**

Cumulative % of patients reaching pH ≥ 7.35



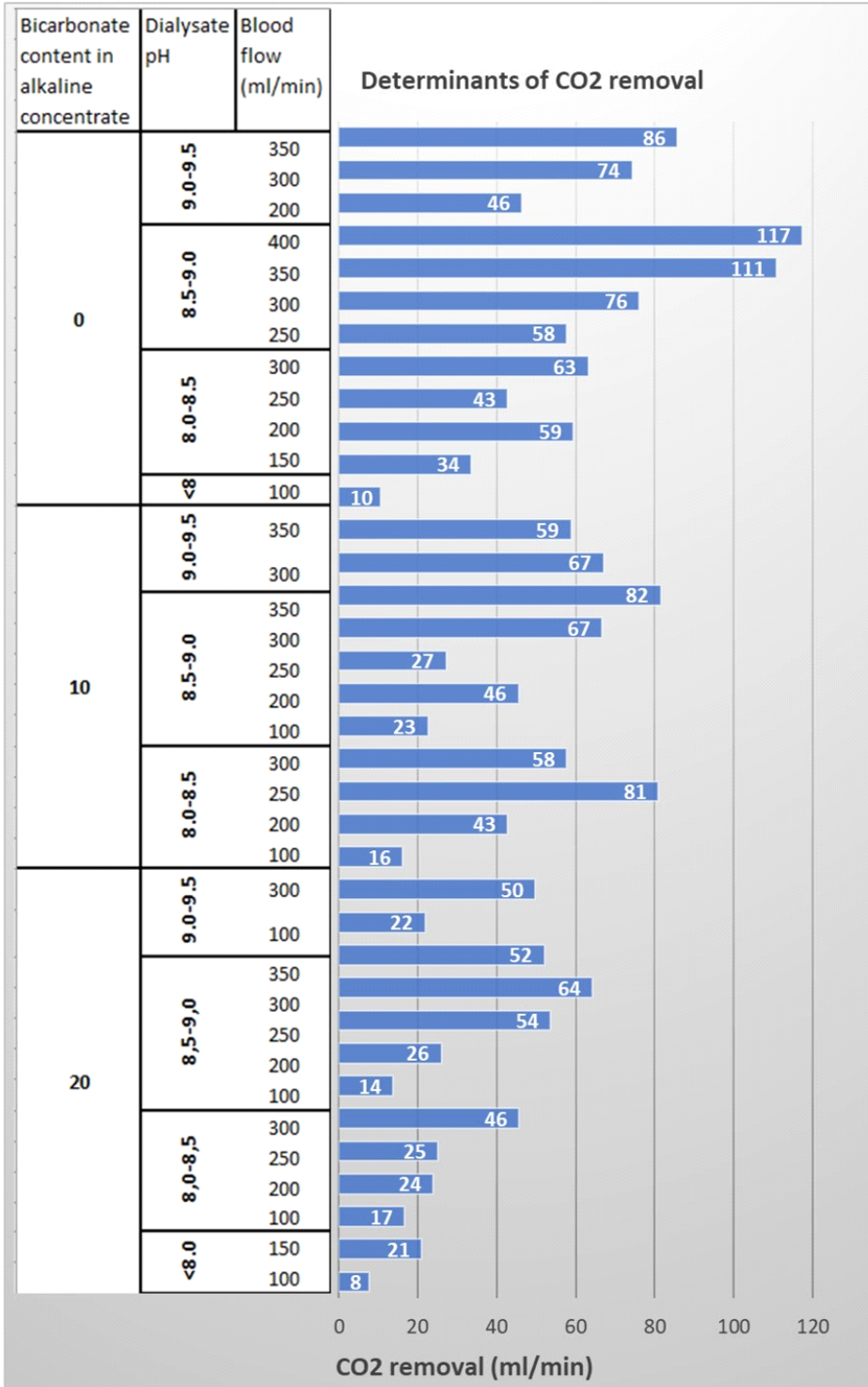
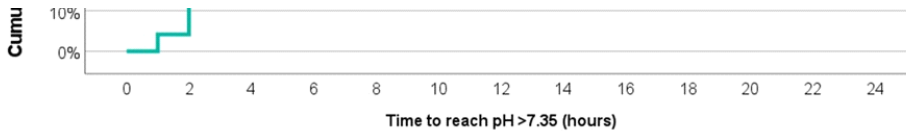


Figure 1. Effect of a 24 hour-ADVOS treatment on acidosis and CO2 removal. A: change of blood pH from baseline; B: change of pCO2 from baseline; C: time to pH correction; D: main determinants of CO2 removal.