ABSTRACTS

Monitoring and treating elevated lactate levels during early ICU admission may reduce mortality

Initial or persistent high lactate levels are associated with significant morbidity and mortality in critically ill patients. As increased lactate levels may result from an imbalance between oxygen delivery and oxygen consumption, as well as several other causes, it is not known whether a strategy that aims at reducing increased lactate levels would result in an improved outcome.

In a multicenter, open-labeled randomized controlled study, Jansen et al. investigated whether patients with an initial lactate level ≥ 3 mmol/l on ICU admission could benefit from a strategy aiming for ≥ 20% reduction in 2-hourly lactate levels (study group) compared to patients in the control group receiving standard therapy. In the latter group, no lactate measurements except for those at admission were available. After 8 hours, both groups were put on standard therapy. Standard therapy was adapted from the Surviving Sepsis Campaign guidelines. Therapy in the study group was also based on the same protocol but included additional treatment measures if lactate levels did not decrease ≥ 20% per 2 hours. These additional measures included vasodilators if SvO2 was > 70% and fluid-responsiveness was excluded or transfusion, inotropic agents and reduction in oxygen consumption if SvO2 was < 70%. The primary end-point of the study was in-hospital mortality.

A total of 348 patients were included. Baseline characteristics were comparable between groups. Approximately 40% of the patients had a diagnosis of sepsis. After 8 hours the decrease in lactate levels was identical in both groups. The lactate group received slightly more fluids in the first 8 hours and significantly more vasodilator treatment. There were no differences in inotropic or vasopressor therapy. Unadjusted in-hospital mortality was 43.5% in the standard treatment group and 33.9% in the lactate treatment group (p = 0.067). After adjustment for predefined risk factors, the lactate treatment group had a significantly reduced in-hospital mortality (HR 0.61, 95% CI 0.43 - 0.87). Furthermore, patients assigned to the lactate group had less organ failure, were weaned faster from inotropic agents and mechanical ventilation and were discharged earlier from the ICU.

This is a very important study essentially showing that increased volume expansion and increased use of vasodilators aimed at reducing elevated lactate levels may reduce mortality when executed early. Although the study had an open design, the authors provide convincing data that co-interventions were similar in the two groups. The control group was treated effectively although SvO2 monitoring could have been mandatory. Monitoring and treating elevated lactated levels during early ICU admission appears to be indicated. The best resuscitation algorithm is still under investigation.


Adaptive support ventilation with protocolized de-escalation and escalation does not decrease weaning time after nonfast-track cardiothoracic surgery

Adaptive support ventilation (ASV) is a closed-loop mode of mechanical ventilation that may reduce weaning time after cardiothoracic surgery if study results are contradictory. Decreasing set %-%-minute ventilation may accelerate spontaneous breathing and push patients towards earlier tracheal extubation. Dongelmans et al. compared ASV with protocolized de-escalation and escalation with standard ASV in patients after nonfast-track cardiothoracic surgery.

The study had an open-label randomized controlled design. Patients with COPD or haemodynamic instability were excluded. Both groups were treated according to a standard local ICU protocol. Tracheal extubation criteria followed generally accepted guidelines. In the study group, ASV set %-minute ventilation was decreased until 70% providing the pH level was > 7.25. In the standard group, set %-minute ventilation was only changed when PaCO2 was < 3.5 or > 5.5 kPa. The study had an open-label randomized controlled design. Tracheal extubation criteria followed generally accepted guidelines. In the study group, ASV set %-minute ventilation was decreased until 70% providing the pH level was > 7.25. In the standard group, set %-minute ventilation was only changed when PaCO2 was < 3.5 or > 5.5 kPa. The primary endpoint was the total duration of tracheal intubation.

A total of 126 patients were included. Groups were comparable in baseline characteristics and ICU mortality was 0%. As expected, %-%-minute ventilation at tracheal extubation was lower in the protocolized group. Duration of tracheal intubation was not significantly different between the protocolized and standard ASV group (10.8 vs 10.7 hours). There was also no difference in the time to the first assisted breathing period.

Unfortunately, the authors found no difference between protocolized and standard ASV in the duration of tracheal intubation after uncomplicated cardiothoracic surgery. Although the authors speculate that this may be due to an insufficient aggressive de-escalation protocol, it is highly doubtful that ASV reduces weaning time in this population at all. Previous studies showing beneficial effects of ASV on weaning time in cardiothoracic surgery patients are flawed by the overtly slow weaning protocol in the control groups. As discussed by the authors, time to tracheal extubation in cardiothoracic patients factors may very well depend on factors other than ventilator strategy.