

ESICM News

Pulmonary Dialysis: Where are we?



REVIEW OF ARTICLES

Recent studies hint at a possible future of ventilatory support

The possibility of extracting a significant fraction of carbon dioxide by using very low extracorporeal blood flow rates is a well known principle nearly dating back to the early days of invasive mechanical ventilation, but only recently have technical advances made it safe and practical for clinical use. Due to the low blood flow rates necessary, the invasivity of catheter access can be minimised.

Will ECCO2R allow us to better maintain lung protective ventilation, or will it even tip the balance of risk to benefit away from invasive mechanical ventilation and its sedation-associated morbidity and mortality? Some recent studies do not provide a definite answer, but do succeed in posing the question.

In 2009, Terragni et al. led the way in the description of minimally invasive veno-venous extracorporeal carbon dioxide removal (ECCO2R) systems (1) and have shown the feasibility of an extended lung protective ventilation approach, where tidal volumes in mechanical ventilation could successfully be lowered using concurrent ECCO2R.

The study by Hermann et al. is a rather small case series using the Novalung active device (2), but it is part of a series of emerging similar endeavours to describe the feasibility of not only an extended lung protective ventilation approach, but also of using ECCO2R to keep eligible patients from being intubated and mechanically ventilated – their significance lies in the potential impact of ECCO2R on our management of respiratory failure.

Del Sorbo et al. attempt to go a step further and not only pose the question of feasibility, but also look at outcomes (3). Utilising a slightly different technical approach with the Decap device, they describe intubation rates in respiratory failure due to COPD in awake patients with and without employing ECCO2R in addition to providing non-invasive ventilation. While only a borderline statistically significant reduction in intubation rates was found between the two groups and the study employs the shortcut of matched cohorts, its results may already be clinically relevant.

The current evidence base succeeds in demonstrating the feasibility of two strategies, extended lung protective ventilation and awake ECCO2R, and even hint at a beneficial effect of the latter, which in addition to protecting the lungs from injury also allows for the reduction of sedation. It now remains to be shown if these strategies result in a survival benefit for patients.

Might we really be at a point in the history of Intensive Care Medicine where the balance of risk to benefit in the management of respiratory failure will be tipped away from invasive mechanical ventilation and its associated morbidity and mortality?

*This review was prepared and submitted by **Matthias Hilty** on behalf of the ESICM NEXT Committee.*

References

1. Terragni, P et al. [Tidal volume lower than 6 ml/kg enhances lung protection: role of extracorporeal carbon dioxide removal](#). *Anaesthesiology* 111, 826–835 (2009).
2. Del Sorbo L et al. [Extracorporeal CO₂ Removal in Hypercapnic Patients At Risk of Noninvasive Ventilation Failure: A Matched Cohort Study With Historical Control](#). *Crit Care Med*. 2014 Sep 16. [Epub ahead of print]
3. Hermann A et al. [First Experience With a New Miniaturised Pump-Driven Venovenous Extracorporeal CO₂ Removal System \(iLA Activve\)](#). *ASAIO J*. 2014 May-Jun; 60(3): 342-7.

- See more at: <http://www.esicm.org/news-article/Article-review-ECCO2R-recent-studies-NEXT-Hilty-Dec-2014#sthash.yn30HYJH.dpuf>