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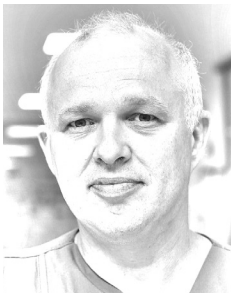

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Implementing $ECCO_2R$ and vv-ECMO in non-academic centres

Shares experiences of implementing extracorporeal life support in a non-academic hospital.

Acute respiratory distress syndrome (ARDS) is a life-threatening disorder characterised by severe impairment of gas exchange. The most common causes are pneumonia, sepsis and acute pancreatitis. It is accurately defined in the Berlin definitions (ARDS Definition Task Force 2012). Progression to ARDS is associated with an increased risk of in-hospital mortality (46%) (Bellani et al. 2016). Despite substantial progress in understanding mechanisms of ARDS (Blondonnet et al. 2016), there has been little advancement in developing effective treatments. To date, causal therapy means treatment of the underlying decompensating factors causing ARDS. Additionally, so called "lung-protective" mechanical ventilation can reduce mortality in cases of severe ARDS (Acute Respiratory Distress Syndrome Network 2000).

Only two interventions have been shown to increase survival in ARDS patients (Tonelli et al. 2014): lung protective ventilation with low tidal volume (Acute Respiratory Distress Syndrome Network 2000) and prone positioning (Guérin et al. 2013). Each intensive care unit should be able to treat lung protectively like this. In life-threatening cases where conventional lung-protective ventilation fails, extracorporeal membrane oxygenation (ECMO) can represent a life-saving alternative to treat ARDS and refractory hypoxaemia, to stabilise gas exchange and serve as a temporary replacement of pulmonary function and bridge to recovery. Recent evidence from a large multicentric, randomised trial suggested a potential positive effect of the use of veno-venous (VV) ECMO in refractory ARDS in terms of mortality and complications (Peek et al. 2009). In the past, extracorporeal lung support of ARDS was the domain only of large centres, because the need for personnel and technical resources was immense. The newest improvements for VV-ECMO applications provide the full spectrum of extrapulmonary lung support, from efficient carbon dioxide removal to complete oxygenation. The development of the acquired techniques and hardware meanwhile allows easier handling than before. Nevertheless, these techniques should only be used in clearly selected patients e.g. following the Extracorporeal Life Support Organization (ELSO) guidelines (Brogan et al. 2017).

Implementing $ECCO_2R$/vv-ECMO in non-academic centres therefore is quite possible if one takes care of the depending expertise: which patients are we able to handle, which therapy is realisable and most important: which adverse events are we able to cope with? We started to think about this treatment at our clinic, as in the past there had been sporadic difficulties to transmit ARDS patients to other centres because they had not the capacity to treat our patients in the required moment.

There are several personal and structural specifications needed: qualified intensivists and nurses in 24-hour shifts, surgical, radiologic and medical support if needed 24/7, including echocardiography, bronchoscopy and CT scans. One of our most important aims in implementing this therapy was teaching the staff and team building. In the last 5 years we treated 63 patients with $ECCO_2R$/vv-ECMO, selected from our ARDS patients. In 2015 we joined the German ARDS Network group and last year ELSO. Since that time we are following ELSO guidelines in indicating this therapy. In the ECMO-implementing phase within the first two years company support came in house for each patient to teach staff and to stay for trouble-shooting. Meanwhile we need about two hours from clinical decision to start the therapy. In the phase of inserting the catheters and installing the machine, the ECMO team is exclusively responsible for these actions. Patients with VV-ECMO require one nurse per patient all the time.

As shown in the literature, in centres with 5 or less annual treatments mortality increases (Barbaro et al. 2015). Position papers therefore define required structures (Combes et al. 2014). In our hospital we reach an overall survival rate from > 50% in our ECMO patients, treating 12 patients/year. This is quite similar to ELSO data (Brogan et al. 2016) and the ALIVE study data (Brun-Buisson et al. 2004). Guidelines from the German Society of Anaesthesiology and Intensive Care (DGAI) postulate not less than 20 treatments per year (Adamzik et al. 2017).

Conclusion

Summing up, the more patients you treat, the more effect for your patients you gain. Centres that aim to treat with VV-ECMO must be able to treat the whole patient with all the problems and difficulties alongside. That requires clear decisions and pathways in indication and contraindication for this treatment as well as benchmarking and peer review. ■

Conflict of interest

Klaus Kogelmann has received lecture honorary and travel fees from Cytosorbents Corp, Xenios AG and Sedana medicalo

References

For full references, please email editorial@icu-management.org or visit https://iii.hm/o2e