EXTRACORPOREAL MEMBRANE OXYGENATION (ECMO) AS A TREATMENT STRATEGY FOR SEVERE ACUTE RESPIRATORY DISTRESS SYNDROME (ARDS) IN THE LOW TIDAL VOLUME ERA: A SYSTEMATIC REVIEW

Tillmann, Bourke¹; Klingel, Michelle²; Iansavitchene, Alla²; Nagpal, Dave⁴
¹Critical Care and Emergency Medicine, London Health Sciences Centre, London, Canada; ²Emergency Medicine, London Health Sciences Centre, London, Canada; ⁴Critical Care and Cardiac Surgery, London Health Sciences Centre, London, Canada

Introduction: The mortality associated with severe acute respiratory distress syndrome (ARDS) remains high at 52%. A recent clinical trial demonstrated a significant increase in disability-free survival when patients diagnosed with severe respiratory failure were transferred to a centre with an extracorporeal membrane oxygenation (ECMO) based management protocol.

Objectives: The primary objective of this systematic review was to determine the hospital mortality rate as reported in the literature. Length of stay (LOS) in the intensive care unit (ICU), hospital LOS, ECMO complications, indications for initiation of ECMO, and ventilation settings during ECMO therapy were also described.

Methods: Electronic searches of Medline, EMBASE, Cochrane Central Register of Controlled Trials were conducted and reference lists for relevant articles were hand searched. Randomized controlled trials (RCTs), retrospective and prospective cohorts, case control studies and case series with at least 10 patients reporting the use of ECMO in adults (age ≥16 years) with ARDS published in any language were included. Studies were excluded if patients did not receive low tidal volume lung protective ventilation strategies or the diagnosis of ARDS was not in keeping with the Berlin definition. Two reviewers independently screened the titles and abstracts, assessed the quality of the studies, and independently extracted data.

Results: The search strategy identified 1782 studies, and 32 studies met the inclusion criteria. These studies represented a combined total of 2192 patients; 1209 patients received ECMO, totaling 1210 ECMO ‘runs’, and 983 received conventional therapy. One of the studies was a RCT, 8 were cohort studies, and 23 were uncontrolled case series. Of the 32 included studies, 5 were determined to have a low risk of bias. Hospital mortality for patients on ECMO was reported in 19 studies with a median of 37%. In the studies with a low risk of bias the median mortality for patients on ECMO was 37% while median mortality for patients who received conventional therapy was 50.7%.

Conclusion: Although of relatively poor quality, the current data supports the use of ECMO for the treatment of severe ARDS. To improve the quality of existing literature future studies should focus on controlling standard therapy and ensuring appropriate comparability between exposed and control groups.

References: N/A