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COST-EFFECTIVENESS OF ECCO2R IN THE MANAGEMENT OF ACUTE RESPIRATORY DISTRESS SYNDROME (ARDS)

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Learning Objectives: Mechanical ventilation (MV) is a cornerstone in the management of ARDS patients. Recent research suggests that lung protective ventilation (LPV) with lower tidal volume (VT) and driving pressure (AP) could improve survival (NHM 2015; 372:747-55). Extra-corpuscular CO2 removal (ECCO2R) enables LPV by allowing lower VT & AP while normalizing patients’ pH and PaCO2 within normal ranges (Critical Care (2016) 20:36). This study evaluates the potential cost-effectiveness of ECCO2R-enabled LPV in France.

Methods: A state-transition model was used to compare the outcomes of ARDS patients’ across 5 ventilation strategies: MV (no ECCO2R at all), LPV (VT 6ml/kg BW and PEEP 25-30cm H2O), ECCO2R for patients with PaCO2> 55 mm Hg and Ultra-LPV.
(Vt 3–4ml/kg PBW, Pplat 20–25cm H2O; ECCO2R for all patients). The model used partitioned survival times across 6 health states: alive & ventilated, alive & weaned from ventilation, deceased. Baseline characteristics, ventilation settings, ventilation duration, survival, ICU and hospital lengths of stay were derived from a large ARDS epidemiology study (JAMA 2016; 315:788-800). Survival benefits associated with lower AP were taken from the analysis of more than 1,000 patients enrolled in 9 randomized trials. Health outcomes were expressed in life years (LYs) and quality-adjusted life years (QALYs) gained. Costs were documented from published literature. For sensitivity analyses, all parameters were individually varied within their 95% CI bounds when available or within a ± 20% range, alternatively.

**Results:** Both LPV and ULPV dominated MV. MV yielded 7.05 LYs, 2.45 QALYs, and cost €48,127. In comparison, LPV and ECCO2R produced 2.62 (±0.16) and 2.81 (±0.36) QALYs, respectively. LPV and ULPV also cost less than MV, €43,917 (±€2,188) and €46,258 (±€1,869), respectively. Cost savings were mainly due to the shortening of ventilation duration allowed by ECCO2R, leading to shorter ICU and hospital stays. Results were robust to sensitivity analysis.

**Conclusions:** ECCO2R-enabled LPV strategies might be cost-saving, providing survival benefit and reducing ICU and hospital costs. Additional data from interventional, observational studies are needed to support this model-based analysis.

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Got it, thanks!