The impact of veno-venous extracorporeal membrane oxygenation on cytokine levels in patients with severe ARDS: a prospective, observational study

Appendix E1

Materials and Methods

“Different ECMO-systems from three companies (Cardiohelp HLS-set; PLS-system, both Maquet Cardiopulmonary, Rastatt, Germany; Deltastream-system/HILITE 7000 /ILA-activve, Xenios, Heilbronn, Germany; ECC.O5-system, Sorin Group, Modena, Italy) were applied. Variable types of back-flow cannulae (single-lumen, diameter 15, 17, 19 French (Fr); Maquet), drainage cannulae (single-lumen, 21 Fr, 23 Fr; Maquet), and single dual-lumen cannulae (Avalon 23 Fr, 27 Fr; Maquet) were inserted. All oxygenators are made of Poly-Methyl-Pentene membranes. Both Maquet and Xenios devices are heparin coated, while the Sorin device has a Phosphorylcholin coating.”

Statistical Analysis

The cytokine levels were non-normally distributed. They were log transformed initially. However, there was significant curvature in cytokine trajectories even after log transformation. Therefore, piecewise linear regression (spline) was used with the log transformed cytokine levels in the multilevel analysis. Random effects for both intercepts and slopes were included allowing individual intercepts and slopes to vary. Different trajectories for the type of ARDS (pulmonary vs extra-pulmonary) for various cytokines was allowed by adding ARDS type and type by time interaction term in the analysis. Trajectories for the pre-ECMO positive end expiratory pressure, ventilation tidal volume and driving pressures and in-hospital survival status were similarly allowed for different cytokines. For trajectories for white cell count and CRP for the type of ARDS, only log transformation was used in the multilevel analysis.