Extracorporeal membrane oxygenation (ECMO) is used to provide life-sustaining support to patients with severe acute respiratory distress syndrome (ARDS). Its use has dramatically increased during the current COVID-19 pandemic. Current prediction scores focus on mortality. This study aimed to identify pre-ECMO clinical characteristics that determine early ARDS resolution.

In this retrospective observational study, point of referral data from patients treated with veno-venous ECMO at a regional centre (2017-2019) were analysed. Patients aged 18 years and above with ARDS, defined by the Berlin criteria, were included. The primary outcome was early ARDS resolution, defined as liberation from ECMO within ≤14 days, or delayed ARDS resolution, defined as ECMO run >14 days (survivors and non-survivors). Multiple logistic and backwards step-wise logistic regression were used to identify independent predictors. Multiple imputation was used for missing values.

Of the 159 patients included in the study, 86 (54.1%) had early ARDS resolution. Following univariate analysis and exclusion of colinear variables, multiple logistic regression showed aspiration pneumonia to be a significant predictor of early resolution. Plateau pressure, social alcohol use and prophylactic heparin were significant predictors of non-early resolution. Backwards step-wise regression retained plateau pressure (odds ratio [OR] 1.15, 95% CI 1.06-1.24, p=0.001), social alcohol use (OR 2.73, 95% CI 1.17-6.34, p=0.020), prophylactic heparin (OR 3.24, 95% CI 1.46-7.21, p=0.004), aspiration pneumonia (OR 0.19, 95% CI 0.06-0.62, p=0.006) and log(FiO2) (OR 0.06, 95% CI 0.005-0.64, p=0.02) as independent significant predictors.

This study identified important clinical characteristics at the point of referral, in particular aetiology of ARDS, that predict disease dynamics in ARDS patients receiving ECMO. These can help better prepare families, inform clinicians, plan resource utilisation and guide future research into severe ARDS.