Both right and left ventricular dysfunction are associated with an increased mortality in patients undergoing prolonged invasive ventilation

M Chotalia ¹; M Bangash ²; T Matthews ²; M Kalla ²; D Parekh ²; J Patel ²

¹University Hospitals Birmingham, NHS Foundation Trust, Critical Care and Anaesthesia, Birmingham, United Kingdom, ²University Hospitals Birmingham, NHS Foundation Trust, Birmingham, United Kingdom

Introduction:
In patients undergoing prolonged invasive ventilation we hypothesise that abnormal right ventricular (RV) and left ventricular (LV) function are associated with increased 90-day mortality. Whether changes in LV or RV function could aid in the prognostication of these patients has not been directly studied.

Methods:
Patients admitted to the Queen Elizabeth Hospital Birmingham ICU between April 2016 and July 2019 who were intubated and ventilated for more than 7 days and had a formal transthoracic echocardiogram (TTE) whilst in ICU were included. Abnormal RV function was defined by the presence of depressed function, dilated size or moderate to severe risk of pulmonary hypertension. Abnormal LV function was defined by the presence of LV depression (LV ejection fraction £45% or grade II or more diastolic dysfunction) or a hyperdynamic LV (formally mentioned in TTE report). Patients who had a neurological cause for prolonged ventilation were excluded. The primary outcome was 90-day mortality. Categorical data is presented as % and analysed using a chi-squared test. Continuous data is presented as median (IQR).

Results:
871 patients required prolonged ventilation, of which 350 (40%) had a TTE. Patients were aged 62 (49-75), were 61% male and had a 36% 90-day mortality. The median ventilator days were 13 (6-20) and 77% required a tracheostomy. Abnormal RV function was present in 26% (n=90) and was associated with an increased 90-day mortality compared to normal RV function (68% vs. 25%, RR 2.71 [2.10-3.50], p<0.0001). LV function was abnormal in 27% (n=95) and was associated with an increased 90-day mortality compared to normal LV function (54% vs 28%, RR 1.91 [1.47 – 2.49], p < 0.0001). Abnormal RV function had a trend towards an increased mortality compared to abnormal LV function (68% vs 54%, RR 1.26 [1.00 – 1.60], p = 0.07).

Conclusion:
In this study, abnormal RV and LV function were present in a quarter of patients undergoing prolonged ventilation and were associated with an increased mortality.