Multicenter analysis of left ventricular unloading on top of VA-ECMO for treatment of cardiogenic shock

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Background:
Veno-arterial extracorporeal membrane oxygenation therapy (VA-ECMO) is increasingly used for treatment of severe cardiogenic shock, although it causes an increase in left ventricular (LV) afterload and might therefore hamper myocardial recovery. Recently, the addition of catheter-based left ventricular assist device (cLVAD) on top of VA-ECMO has been used to unload the LV and to improve outcome measures. However, there is limited data on predictors of outcome in this high-risk population.

Aim:
The aim of this study was to evaluate predictors of 30-day survival in a multicentre cohort of severe cardiogenic shock patients treated with cLVADon top of VA-ECMO.

Material and Methods:
We report on consecutive patients from six tertiary care centers being treated with cLVAD in addition to VA-ECMO for treatment of cardiogenic shock. The primary endpoint is 30-day all-cause mortality. To identify predictors of the primary endpoint, multivariate analysis using an "elastic net" variable selection algorithm was done after imputation of missing variables.

Results:
A total of 220 patients treated with cLVAD on top of VA-ECMO were included in the analysis. Of these, 79.1% were male with a median age of 55.5 (25th percentile 48.0, 75th percentile 65.6) years. In 60.5% of the patients, acute myocardial infarction was the underlying cause of cardiogenic shock and in 44.6% VA-ECMO was used for refractory cardiac arrest (eCPR). In the multivariable analysis, the following baseline parameters were significantly associated with the primary endpoint: Age (odds ratio of 1.68 per standard deviation), duration of cardiopulmonary resuscitation (OR 2.08 per SD), lactate (OR 1.04 per SD) and time from onset of shock to VA-ECMO (OR 1.30 per SD).
Conclusion and Outlook:

In this large-scale multicentre analysis of severe cardiogenic shock patients treated with VA-ECMO plus additional cLVAD unloading, age, duration of cardiopulmonary resuscitation, lactate and time from onset of shock to VA-ECMO were significantly associated with 30-day all-cause mortality.

To further investigate this topic, we will evaluate predictors of outcome in distinct patient populations such as acute myocardial infarction vs. acute heart failure and patients without vs. patients with prior cardiopulmonary association.