Introduction:
Prone positioning (PP) improves survival in patients with severe ARDS. However, there is little evidence if PP is able to improve outcome in veno-venous extracorporeal membrane oxygenation (ECMO) patients. Therefore, we performed a retrospective analysis of patients treated with PP while ECMO support.

Methods:
We report retrospective data of a single-center registry of all patients treated with veno-venous ECMO for severe ARDS between October 2010 and Mai 2018 at the Interdisciplinary Medical Intensive Care Unit at the Medical Center, University of Freiburg, Germany. ECMO weaning success and survival were analysed before and after propensity score matching. Moreover, predictive factors for survival in patients with PP while ECMO were analysed.

Results:
A total of 158 patients with complete medical data could be analysed (age 52.2 years, 67% male). 38 patients (24.1%) received PP while ECMO therapy. There was no difference in ECMO weaning rate (47.4% vs. 46.7%, p=0.940) or ICU and hospital survival (36.8% vs. 36.7%, p=0.984, figure 1 A) between patients with and without PP while ECMO therapy. Propensity score matching confirmed this finding (survival: 36.8% vs. 42.1%, p=0.639). However, early initiation of PP while ECMO support (cut off via Youden Index <0.71 days) was associated with superior survival in univariate and multivariate analysis (Odds ratio 20.6 [95%-CI 1.4-312.9], p=0.029, figure 1 B).

Conclusion:
This retrospective analysis was not able to show a survival benefit for additive PP to ECMO support in general. Early initiation of PP could be an important factor for improving survival in this setting and should be considered in a randomised controlled trial for further evaluation.

Figure 1. A) Survival of ECMO patients with vs. without prone positioning while ECMO. Initial survival differences equalized in Kaplan-Meier survival curve after 30 days (Log rank=0.109). B) Survival depending on early prone positioning after initiation of ECMO support. Patients treated with early PP while ECMO showed a superior survival to patients treated with late PP or without PP while ECMO. Optimal cut off value for duration of ECMO initiation to first PP was
calculated using ROC-analysis (AUC = 0.789) and the Youden-Index. Highest sensitivity and specificity for beneficial survival were achieved for a beginning of PP in <0.71 days. (Log rank=0.018). PP: Prone positioning.