

Use of prone position ventilation in patients with COVID-19 induced severe ARDS treated with VV ECMO: a nationwide cohort study with focus on adverse events.

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Background: Prone position ventilation (PPV) of patients with severe Adult Respiratory Distress Syndrome (ARDS) is recommended in national guidelines and protocols exist to increase safety and prevent adverse events and harmful side effects. However, turning patients treated with VV ECMO for PPV carries several risks and contraindications and is technically challenging.

Purpose: To present nationwide data on the use and adverse effects of prone position ventilation in patients with COVID-19 induced ARDS, treated with VV ECMO.

Methods: A nationwide (2 ECMO centers) retrospective cohort study of all COVID-19 induced ARDS patients treated with VV ECMO from March 2020 - December 2021. Indication for VV ECMO in patients with COVID-19 induced severe ARDS were not altered compared to standard protocol (Berlin definition). Data collection was performed by the authors by single patient retrieval of relevant data from the regional PDM system. Patients were turned to prone position (PP) following a department protocol. PPV was started in the afternoon at a pre-determined time and patients were turned to supine position in the morning or before if clinically indicated. This study reports data on patients treated with PPV, number of PPV events, reasons for stopped proning (stop/pause \geq 48 hrs.), adverse events and numbers of acute supinations as well as outcomes.

Results: 68 patients were included. PPV was performed 220 times (440 single turns) in 44 out of 68 patients. Patients spent a median of 16 hours in PP. Adverse events (AE) were identified in 99 out of 220 (45%) PPV events and occurred among 31 patients (70,5). 1 fatal PPV related serious adverse event (SAE) was registered. The most frequent AE were pressure sores and/or ulcers (38,4%), airway related (33,3%), hypoxia (20,2%) and cannula insertion sites or ECMO related (20,2%). A total of 80 "stopped proning" incidents were registered and in 20 cases (25%) it was due to AEs. Other reasons included weaning off ECMO (17 cases; 21%), no beneficial effect (23 cases; 29 %) and death (16 cases; 20%). Acute supination was performed in 19 cases (8,6%) and most often caused by severe hypoxia.

The overall survival after 90 days was 29 out of 68 patients (42,6%) and there was no statistically significant difference between PPV treated patients (36,4 % [24,6-53,0]) vs. no-PPV treated patients (54,5% [37,5-78,0]).

Conclusion: Prone position ventilation was used 220 times in 44 out of 68 patients with severe COVID-19 induced ARDS treated with VV ECMO. PPV treatment did not improve survival in this cohort of patients compared to the non-PPV patients. The study found a high incidence of PPV related AE (in 99 out of 220 PPV), indicating a signal of harm not previously reported in other studies.

Figure 2: AE plot of all PPV events

