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To stand or not to stand: The effectiveness of early verticalization therapy in critically ill patients requiring mechanical circulatory support.
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Abstract

The development of technology such as ventricular assist devices (VAD) and extracorporeal membrane oxygenation (ECMO) have become a vital life-saving technology in patients with advanced heart failure and cardiogenic shock; however, this technology comes at the expense of prolonged hospitalization, physical deconditioning, and emotional suffering. Thus, early mobility of critically ill patients with verticalization therapy is a potential way to improve patient outcomes. The purpose of this study is to determine the safety and effectiveness of verticalization therapy on the acute shock and ECMO population in the Cardiac Intensive Care Unit.

Initial trial results showed a decrease of average length of stay and time on circulatory support. Thus, in combination of the evidence and trial, a verticalization therapy guideline was created that included patient criteria, contraindications, key personnel, and a procedural checklist for use of the verticalization bed. Daily collection of patient and device related variables including complications and outcomes were tracked to establish the feasibility and safety of verticalization therapy.

A total of 120 patients supported by mechanical support received verticalization therapy in the CICU. Most were female 67% (n=40), age 55±15, eCPR 9 (7.5%), 10±8, therapy days. Discharge disposition: home 59 (70.24%), hospice 1 (1.19%), SNF 3 (3.57%), rehab 12 (14.29%), other 9 (10.71%).

This project demonstrates a nursing-driven intervention of verticalization therapy can safely be implemented on patients requiring MCS. The use of this therapy provides mobility for patients that otherwise may have an increased length of ICU stay and poorer outcomes due to prolonged immobility.

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vaECMO as a support therapy in massive acute pulmonary embolism treated with catheter-directed thrombolysis

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Abstract

Introduction: Acute pulmonary embolism (PE) leads to increased pulmonary vascular resistance and right ventricular afterload, resulting in right ventricular dysfunction (RVD). Stratification is crucial to early identify patients with elevated risk of hemodynamic collapse. Latest therapeutic options include percutaneous treatment such as pulmonary catheter thrombolysis. ECMO can support hemodynamic in high-risk or in rapid evolving intermediate-high-risk PE.

Methods: A 66-year-old female presented to our Emergency Department with acute dyspnea, severe hypoxemia and echocardiographic signs of RVD. Angio-CT demonstrated extensive bilateral pulmonary artery thromboses. Initially classified as intermediate-high risk (hemodynamic stability), she started high-dose parenteral anticoagulation without improvement. Catheter-directed thrombolysis with alteplase (rtPA) over 24 hours was performed after unsuccessful mechanical aspiration and lysis. At the end of the procedure, due to early signs of hemodynamic deterioration and severe hypoxemia (pO₂/FiO₂ 36), a femoral-femoral venous-arterial ECMO (vaECMO) was initiated as support therapy with the patient awake. Echocardiography confirmed severe RVD (TAPSE 5 mm). Early ECMO performed in angiographic room allowed safe transfer to ICU, induction and intubation.

Results: PE underwent almost complete resolution after 24 hours of rtPA. RVD recovered completely in 48 hours (TAPSE > 20 mm). Patient was safely decannulated on day 3 of vaECMO.

Conclusion: vaECMO seems safe in supporting hemodynamic in PE. Intermediate-high risk patients with elevated right-to-left intrapulmonary shunt may benefit from early ECMO support to prevent heart failure progression towards cardiac arrest and to safely perform high risk invasive procedure included intubation and mechanical ventilation which may have limited effectiveness on hypoxia but worsen RV function.