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Extracorporeal Membrane Oxygenation in Immunocompromised Patients With Acute Respiratory Distress Syndrome: Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

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Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 3 December 2024 and was last updated on 3 December 2024.

INTRODUCTION

Review question / Objective Patients with immunocompromise are prone to develop refractory ARDS. This study is aim to investigate the clinical effects of ECMO-supported treatment on immunocompromised patients with ARDS for reducing the mortality rate of patients.

Condition being studied Respiratory failure remains the main cause of ICU death in immunocompromised patients with acute respiratory distress syndrome(ARDS). ECMO is widely used in the treatment strategies for patients with respiratory failure and effectively improves prognosis. Although immunocompromise is associated with an increased mortality rate in patients treated with ECMO, as more and more immunocompromised patients with acute respiratory failure are admitted to the ICU, the number of immunocompromised patients requiring ECMO and the number of cases requiring a decision on using ECMO may also gradually increase. Current research shows that ECMO - supported treatment is feasible in some immunocompromised ARDS patients. Therefore, we have systematically reviewed relevant literature to explore the role of ECMO support in the treatment of patients with immunodeficiency.

METHODS

Participant or population Immunocompromised patients with acute respiratory distress syndrome.

Intervention Venovenous extracorporeal membrane oxygenation.

Comparator Standard therapy.

Study designs to be included Unlimited.

Eligibility criteria Studies were included in the systematic review and meta-analysis if they (1) assessed the impact of ECMO in immuno-compromised patients with ARDS;(2) recorded patient clinical snd treatment characteristics such as demographic datas,ARDS etiology and

configuration of ECMO); (3) included clinical and biological endpoints for specific immuno-compromised status and specific causes of ARDS; and (4) described the risk factors of failure to wean from ECMO.Exclusion criteria included (1) published abstract without full-text publication and (2) studies lacking endpoint measures.

Information sources Pubmed, Web of science, Embase, the Cochrane Library and the International Clinical Trails Registry platform databases.

Main outcome(s) The clinical impact of ECMO in immunocompromised patients with ARDS (Six-month mortality,ECMO duration and weaning of ECMO).

Quality assessment / Risk of bias analysis Using the Joanna Briggs Institute case series checklist to qualitify the article.

Strategy of data synthesis Relevant data were extracted from the selected studies. For binary outcomes, the odds ratio (OR) was calculated, and for continuous outcomes, the weighted mean difference (WMD) or standardized mean difference (SMD) was determined, all accompanied by 95% confidence intervals (CIs).The Cochrane Q - statistic and I - squared (I^2) test were used to measure heterogeneity. If the I^2 value is less than 50%, it indicates low heterogeneity, and a fixed - effects model was applied for meta - analysis. If the I^2 value is 50% or greater, a random - effects model was used.Publication bias was examined. Funnel plots were visually inspected, and if there are enough studies (e.g., more than 10), statistical tests such as Egger's test was conducted to detect potential publication bias.An exclusion sensitivity analysis was performed when necessary and the P value less than 0.05 indicated statistical significance.

Subgroup analysis None planned.

Sensitivity analysis The Cochrane Q statistic was calculated and used to evaluate the heterogeneity among the included studies for each outcome of interest. The I^2 statistic will be used in conjunction, where values between 25% and 50% will signify low heterogeneity, 51% - 75% moderate heterogeneity, and over 75% high heterogeneity.An exclusion sensitivity analysis was performed when necessary and a 2-sided P value of <0 .05 was considered statistically significant for all analyses.

Country(ies) involved China.

Keywords respiratory distress syndrome; extracorporeal membrane oxygenation; immunocompromised host; meta-analysis.

Contributions of each author

Author 1 - Shiqi Fei - Author 1 drafted the manuscript.
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