INPLASY PROTOCOL

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Conflicts of interest:
None declared.

Efficacy of supplemental hemoadsorption therapy on severe and critical patients with COVID-19: an evidence-based analysis

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Review question / Objective: **The patient population, intervention, comparison, and outcome (PICO) framework was used to formulate the following question: for patients with severe COVID-19, does additional HAT provide better clinical outcomes than conventional therapy?**
Condition being studied: **The COVID-19 pandemic has posed a disproportionately high threat to the global health system and social stability. COVID-19 damage can lead to hyperinflammation and tissue damage due to a "cytokine storm", which in turn contributes to an increase in the mortality rate. Extracorporeal hemoadsorption therapy (HAT) in patients with severe COVID-19 may improve organ function and stabilize hemodynamic status; however, the effects and safety of HAT remain controversial.Thus, we conducted this meta-analysis with all evidence available in the published literature to date to evaluate the clinical curative effect and safety of supplemental hemoadsorption therapy in patients with severe COVID-19.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 19 April 2023 and was last updated on 19 April 2023 (registration number INPLASY202340065).

INTRODUCTION

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METHODS

Search strategy: ("hemadsorption"[MeSH Terms] OR "hemadsorption"[All Fields] OR "haemoadsorption"[All Fields] OR ("cytosorb"[All Fields] OR "cytosorbents"[All Fields]) OR ("adsorption"[MeSH Terms] OR "adsorption"[All Fields] OR "adsorptions"[All Fields] OR "adsorptive"[All Fields] OR "adsorptively"[All Fields] OR "adsorptives"[All Fields] OR "adsorptivities"[All Fields] OR "adsorptivity"[All Fields]) OR "hemoadsorption"[All Fields] OR "haemadsorption"[All Fields]) AND ((("corona"[All Fields] OR "coronae"[All Fields] OR "coronas"[All Fields]) AND ("virus diseases"[MeSH Terms] OR ("virus"[All Fields] AND "diseases"[All Fields]) OR "virus diseases"[All Fields] OR ("virus"[All Fields] AND "disease"[All Fields]) OR "virus disease"[All Fields]) AND "2019"[All Fields]) OR ("covid 19"[MeSH Terms] OR "covid 19"[All Fields] OR "coronavirus disease 2019"[All Fields]) OR (("covid 19"[All Fields] OR "covid 19"[MeSH Terms] OR "covid 19 vaccines"[All Fields] OR "covid 19 vaccines"[MeSH Terms] OR "covid 19 serotherapy"[All Fields] OR "covid 19 serotherapy"[Supplementary Concept] OR "covid 19 nucleic acid testing"[All Fields] OR "covid 19 nucleic acid testing"[MeSH Terms] OR "covid 19 serological testing"[All Fields] OR "covid 19 serological testing"[MeSH Terms] OR "covid 19 testing"[All Fields] OR "covid 19 testing"[MeSH Terms] OR "sars cov 2"[All Fields] OR "sars cov 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "ncov"[All Fields] OR "2019 ncov"[All Fields] OR (("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "cov"[All Fields]) AND 2019/11/01:3000/12/31[Date - Publication])) AND ("pneumonia"[MeSH Terms] OR "pneumonia"[All Fields] OR "pneumonias"[All Fields] OR "pneumoniae"[All Fields] OR "pneumoniae s"[All Fields])) OR (("sars cov 2"[MeSH Terms] OR "sars cov 2"[All Fields] OR "covid"[All Fields] OR "covid 19"[MeSH Terms] OR "covid 19"[All Fields]) AND ("pneumonia"[MeSH Terms] OR "pneumonia"[All Fields] OR "pneumonias"[All Fields] OR "pneumoniae"[All Fields] OR "pneumoniae s"[All Fields])) OR ("covid 19"[All Fields] OR "covid 19"[MeSH Terms] OR "covid 19 vaccines"[All Fields] OR "covid 19 vaccines"[MeSH Terms] OR "covid 19 serotherapy"[All Fields] OR "covid 19 serotherapy"[Supplementary Concept] OR "covid 19 nucleic acid testing"[All Fields] OR "covid 19 nucleic acid testing"[MeSH Terms] OR "covid 19 serological testing"[All Fields] OR "covid 19 serological testing"[MeSH Terms] OR "covid 19 testing"[All Fields] OR "covid 19 testing"[MeSH Terms] OR "sars cov 2"[All Fields] OR "sars cov 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "ncov"[All Fields] OR "2019 ncov"[All Fields] OR (("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "cov"[All Fields]) AND 2019/11/01:3000/12/31[Date - Publication]))).

Participant or population: Patients with severe COVID-19.

Intervention: Traditional standard treatment supplemented with hemadsorption therapy.

Comparator: Traditional standard treatment.

Study designs to be included: Randomized controlled trails (RCTs) or cohort study.

Eligibility criteria: Studies for inclusion that met the criteria, as follows: 1) Population:

patients with severe COVID-19; 2) Intervention: traditional standard treatment supplemented with hemadsorption therapy; 3) Comparison: traditional standard treatment alone or sham hemoadsorption; and 4) Outcome: mortality at longest follow-up available. The exclusion criteria were as follows: 1) duplicate studies; and 2) case series or single-arm trials without control group, reviews or meta-analyses, and animal experiments.

Information sources: The Cochrane Library, Embase and PubMed databases were comprehensively searched from inception to August 20, 2022 for potential studies.

Main outcome(s): Mortality at longest follow-up.

Quality assessment / Risk of bias analysis: A risk of bias assessment for the included studies was independently conducted by two authors using the Cochrane Collaboration Risk of Bias Tool or Newcastle Ottawa scale (NOS).

Strategy of data synthesis: STATA statistical software (version 15.0) and Review Manager software (version 5.3) were used to extract and assess the data to make the outcome assessment more comprehensive. RRs with 95% CIs presented the estimated effects for dichotomous outcomes. Cochran's Q statistic and the I2 statistic were performed to estimate between-study heterogeneity, with thresholds of >75%, 25–75% and 50%), and a fixed-effect model was used to pool the outcomes of those studies with lower statistical heterogeneity. Begg's and Egger's tests were also conducted to estimate potential publication.

Subgroup analysis: Subgroup analysis was performed base on whether the patient's condition reached the critical level that required ECMO support.

Sensitivity analysis: Leave-one-out sensitivity analysis was conducted to validate the stability of the outcomes.

Language restriction: Without restrictions of language.

Country(ies) involved: China.

Keywords: COVID-19, Hemoadsorption.

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