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Extracorporeal Life Support in Lung Transplantation with Dual-Lumen Cannulas: A Systematic Review

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2025110005

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 4 November 2025 and was last updated on 4 November 2025.

INTRODUCTION

Review question / Objective Element Description Population (P) Adult patients (≥ 18 years old) with end-stage lung disease or severe respiratory failure requiring ECMO as a bridge to lung transplantation. Intervention (I) ECMO using single-site dual-lumen cannulas (Avalon Elite, Crescent or ProtekDuo) for VV or VP ECMO. Comparison (C) Studies without comparator arms were included; comparison with conventional dual-site VV ECMO or VP ECMO was recorded. Outcomes (O) Feasibility, bridge-to-transplant success, in-hospital and post-transplant survival, complications and mobilisation during ECMO. Study Design (S) Case reports (> 3 patients), case series, observational or cohort studies involving human subjects. Reviews, editorials and conference abstracts were excluded.

Condition being studied Patients with end-stage lung disease with or without right ventricular failure requiring extra-corporeal support (VV or VP ECMO) to lung transplantation.

METHODS

Search strategy A web-based literature search on PubMed and EMBASE.
The search strategy included specific terms and their combination such as ProtekDuo, dual-lumen cannula, single-lumen cannula, Crescent cannula, Avalon cannula, Spectrum cannula, percutaneous right ventricular assist device and oxygenator, ECMO or Extracorporeal Membrane Oxygenation or ECLS or Extra Corporeal Life Support and RVAD or RVAD/OXY or oxyRVAD and Transplantation/ Lung Transplantation. These terms were combined using Boolean operators such as AND, OR and NOT to obtain a comprehensive search pattern.

Participant or population Patients with end-stage lung disease with or without right ventricular failure

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requiring extra-corporeal support (VV or VP ECMO) to lung transplantation.

Intervention VV and VP ECMO using single-site dual-lumen cannulas.

Comparator Not applicable.

Study designs to be included Case series, case reports, observational studies and cohort studies were selected and further reviewed to ascertain their suitability. No randomised prospective trials were available.

Eligibility criteria Element Description Population (P) Adult patients (≥ 18 years old) with end-stage lung disease or severe respiratory failure requiring ECMO as a bridge to lung transplantation. Intervention (I) ECMO using single-site dual-lumen cannulas (Avalon Elite, Crescent or ProtekDuo) for VV or VP ECMO. Comparison (C) Studies without comparator arms were included; comparison with conventional dual-site VV ECMO or VP ECMO was recorded. Outcomes (O) Feasibility, bridge-to-transplant success, in-hospital and post-transplant survival, complications and mobilisation during ECMO. Study Design (S) Case reports (> 3 patients), case series, observational or cohort studies involving human subjects. Reviews, editorials and conference abstracts were excluded.

Information sources A web-based literature search on PubMed and EMBASE.

Main outcome(s) This review aims to evaluate the feasibility, outcomes and reported complications associated with dual-lumen cannulas – specifically the Avalon Elite, Crescent and ProtekDuo – used for VV and VP ECMO in adult patients requiring bridge to lung transplantation.

Quality assessment / Risk of bias analysis PICOS and PRISMA approach
Oxford grading system.

Strategy of data synthesis Already described.

Subgroup analysis Not applicable.

Sensitivity analysis Not applicable.

Language restriction Articles in English language.

Country(ies) involved USA, UK, Germany, The Netherlands.

Keywords ECLS, ECMO, Extracorporeal Membrane Oxygenation, Lung Transplantation, ProtekDuo, Right Ventricular Assist Device.

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