

Appendix 1 (as supplied by the authors): Extracorporeal membrane oxygenation¹

Extracorporeal membrane oxygenation (ECMO) is an invasive method used to provide respiratory and/or cardiovascular support to patients in whom conventional methods of life support have failed. A patient's blood is drained from the venous system and oxygenated externally. There are two main types of ECMO: veno-venous ECMO (VV-ECMO) and veno-arterial ECMO (VA-ECMO). VV-ECMO is used in respiratory failure to provide oxygenated blood to the patient, returned to the right atrium. VA-ECMO is used in cardiogenic shock, where externally oxygenated blood is returned to the arterial system, providing both respiratory and hemodynamic support.

ECMO is indicated in patients with acute and potentially reversible cardiac and/or pulmonary failure, and can be used as a bridge to definitive therapy (heart transplantation) or as a bridge to recovery in cases of sepsis or acute respiratory distress syndrome, for example. Some risks of the procedure include neurological complications such as intracranial hemorrhage, hypoxic brain injury and brain death, bleeding, as well as the development of heparin-induced thrombocytopenia.

Details of VA-ECMO insertion related to the case presentation:

VV-ECMO was initiated at the onset, as oxygenation was considered the primary issue. Percutaneous technique was used to insert an Avalon Elite™ Bi-Caval Dual Lumen catheter in the right internal jugular vein for venous access. Transesophageal echocardiogram performed simultaneously was used to ensure the correct placement of the catheter tip and to correct the direction of the outflow jet towards the tricuspid valve for optimal circuit efficiency. Subsequently, as the patient's hemodynamic status deteriorated, the circuit was converted to VA-ECMO. Arterial cannulation was performed via a percutaneous technique in the right femoral artery and the right jugular vein catheter was modified to provide drainage access. Transesophageal echocardiogram was again performed during cannulation to ensure correct positioning of the venous cannula during the conversion process.

Reference

1. Makdisi G, Wang IW. Extra Corporeal Membrane Oxygenation (ECMO) review of a lifesaving technology. *J Thorac Dis.* 2015;7:E166-76.