The use of extracorporeal life support devices such as extracorporeal membrane oxygenation in adults requires cannulation of the patient’s vessels with comparatively large diameter cannulae to allow circulation of large volumes of blood (>5 L/min)” Broman et al (2019).

Abstract:

The use of extracorporeal life support devices such as extracorporeal membrane oxygenation in adults requires cannulation of the patient’s vessels with comparatively large diameter cannulae to allow circulation of large volumes of blood (>5 L/min). The cannula diameter and length are the major determinants for extracorporeal membrane oxygenation flow. Manufacturing companies present pressure-flow charts for the cannulae; however, these tests are performed with water. Aims of this study were 1. to investigate the specified pressure-flow charts obtained when using human blood as the circulating medium and 2. to support extracorporeal membrane oxygenation providers with pressure-flow data for correct choice of the cannula to reach an optimal flow with optimal hydrodynamic performance. Eighteen extracorporeal membrane oxygenation drainage cannulae, donated by the manufacturers (n = 6), were studied in a centrifugal pump driven mock loop. Pressure-flow properties and cannula features were described. The results showed that when blood with a hematocrit of 27% was used, the drainage pressure was consistently higher for a given flow (range 10%-350%) than when water was used (data from each respective manufacturer’s product information). It is concluded that the information provided by manufacturers in line with regulatory guidelines does not correspond to clinical performance and therefore may not provide the best guidance for clinicians.

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