

Experience of VV ECMO in children with the Avalon® cannula

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Background. The Avalon® bicaval double lumen cannula (Avalon®) represents an innovative concept for veno-venous(VV)ECMO support in children. We report our experience with the use of this cannula for pediatric respiratory support.

Methods. Retrospective analyses of all VV ECMO support using Avalon® cannula (2014-2018).

Results. Eighteen patients with a median age and weight of 3.6 years (0.1-13) and 19 kg (4.2–50) respectively, received respiratory support using Avalon® cannula. Respiratory failure occurred due to viral or bacterial pneumonia in 7 (including 3 oncologic patients), septicemia in 3, a neoplastic disease in 4, near drowning in 2 and post heart-/chest- surgery in one patient each. VV ECMO was mainly installed at bedside under echocardiographic guidance. In 3 patients, the initial veno-arterial (VA) ECMO was successfully converted to VV ECMO after a mean of 5 days. In one patient, an initial VV ECMO needed conversion to VA ECMO after 12 days of support; in one patient a second VV ECMO run was needed.

Successful weaning was possible in 16 patients after median support of 6 days (2-32). Two patients died due to their underlying disease. Overall survival to discharge was 83% (n=15). Median ventilation time after VV ECMO withdrawal was 3 days (1-32), median ICU stay 16 days (5 – 64). Three patients suffered 4 major complications (all haemorrhagic): 1 haemopericardium due to cardiac perforation (needing sternotomy); 2 explorative thoracotomy for bleeding after lung biopsy and 1 spontaneous haemopericardium due to therapeutic anticoagulation. Cannula repositioning (3 patients) and change of oxygenator (one patient) were other notable events. 4/16 patients (25%) experienced thrombosis of the internal jugular vein. At a median follow-up of 166 days (0-1400) overall survival was 78%.

Conclusion. VV ECMO with Avalon® cannula provides a safe and versatile respiratory support in paediatric patient population, with excellent survival in reversible lung pathologies. Surgical complications during placement, haemorrhagic complications due to anticoagulation or thrombotic complications of the oxygenator or the internal jugular vein may occur. Once survived to discharge, the long-term survival is good.