

Survival and neurocognitive outcome after cardiac ECLS in children - a single centre study

Logeswaran T. (1), Kehl A. (1), Valeske K. (2), Mueller M.(3), Bauer J. (1), Akintuerk H.(2), Schranz D.(1), Hahn A. (4) , Thul J.(1)

Paediatric heart Centre, Giessen, Germany (1);

Department of paediatric heart surgery, Giessen, Germany (2); Department of Anaesthesia, Giessen, Germany (3), Department of Neuropaediatrics, Giessen, Germany (4)

Background: The use of extracorporeal membrane oxygenation in infants and children with cardiac disease is increasing; survival and neurological morbidity varies. The aim of this study was to examine neurodevelopmental long-term outcome and health-related quality of life (HRQoL) in school children who underwent cardiac surgery and required ECLS in infancy / early childhood.

Methods: Between 2000 and 2013, 91 children (median age of ECLS: three months; range: 0-203 months) required postoperative ECLS. After successfully weaning, 13 patients died during hospital stay; 56 children (62%) were discharged home, respectively. Neurocognitive Follow-Up was performed in survivors between 5-18 years: 23 of 30 patients (77%) were re-examined. Median age at follow up was eight years and three months. Re-Evaluation included a detailed neurological examination, assessment of the intelligence coefficient (IQ) by means of the Culture Fair Test and assessment of selective attention. Parental questionnaire were used to measure health related quality of life (HRQoL). Results were compared with those of 23 age- and sex-matched healthy comparison individuals.

Results: Median IQ was 97 in the study group (range: 45-124). IQ was poorer in patients after ECMO than in the comparison group ($p < .001$). Neurological examination revealed handicap in three patients; however, fine motoric assessment showed significant lower scores on all motor domains in 12 patients (52%). These results were significant poorer compared to the healthy comparison group ($p < .001$). In the attention test the group after ECMO showed no significant difference. Quality of life was described as significant poorer to that of typically developing peers.

Conclusion: ECLS is an important therapeutic issue in children with low cardiac output and survival is improving. Children after ECLS have higher risk for cognitive and motor impairments. Consequently, long-term neurodevelopmental follow up are necessary to provide early educational and therapeutic support.