

Long-term survival after pediatric ECMO therapy

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Objectives: Extracorporeal membrane oxygenation therapy (ECMO) is commonly used in pediatric heart centers to treat cardio-pulmonary failure which occurs perioperatively or primarily e.g. in cases of cardiomyopathy. In 2007 a pediatric ECMO program was introduced in our center. This study shall examine the short and long-term survival rate of this method and identify potential risk factors for mortality.

Methods: Between 2007 and 2014 86 children were treated with arterio-venous ECMO therapy at our center, 7 of them without previous heart operation. The age of the patients varied between 1 day and 16 years (median 26 days), 47 patients were newborns. Median weight was 6,7 kg (2,2 -68 kg). 45 patients had univentricular anatomy, most of them after stage 1 palliation. 41 patients had biventricular anatomy. In 57 cases the indication for ECMO installation was postoperative cardiac failure (including 3 cases of cardiopulmonary resuscitation in the long-term follow up), in 29 cases the indication was pulmonary failure (e.g. severe postoperative cyanosis, suprasystemic pulmonary hypertension, pulmonary infection or diaphragmatic hernia). In 37% of the cases ECMO was implanted during CPR. **Results:** 66 out of 86 patients could be weaned off ECMO (76,7%), but in the long-term follow up only 48 patients survived (55,8%). Children with pulmonary indication had a significantly higher survival rate versus the cardiac indication. (79,3% vs.43,8%; $p < 0,05$). ECMO duration < 12 days showed significant advantage versus prolonged duration (61,8% vs.10%; $p < 0,05$). Children with single ventricle physiology, newborns, patients with CPR and implantation after the first pod showed worse outcome, but without statistical significance.

Conclusions: The fact, that three quarters of the patients survived a potentially life threatening period of cardio-pulmonary failure due to ECMO therapy, verifies this method as an indispensable postoperative instrumentarium. In the long-term follow up a considerable late mortality and complication rate shows up. In our series we could only identify cardiac indication and longer ECMO duration as significant risk factors.