

EVALUATION OF EXTRACORPOREAL GAS EXCHANGE DEVICE HEMOLUNG FOR POTENTIAL APPLICATION IN PEDIATRIC PRACTICE

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Aim. The main purpose of this work is to evaluate the Hemolung pumping ability and gas exchange effectiveness while using the catheters of smaller diameter and blood flow rates applied in pediatrics.

Material and methods. The bench testing of the device with pediatric catheters have been performed. The bovine blood and carboxymethylcellulose water solution were used as a model. The device operation data, blood gas analysis and hydrodynamic pressure data were collected.

Results. The pump curve results show that at the maximum rotation rate the Hemolung device was able to achieve flow rates substantially greater than target 280 ml/min that is used in pediatrics. The calculated operating curve plotted against the observed pressure-flow relationships shows the device to be able to operate against pressure heads of 80 and 100 mmHg. In general, carbon dioxide elimination rate increased with increasing rotation rate, reaching maximum levels of 168 ± 0.3 ml CO₂/min at 1750 RPM and a blood flow rate of 670 ± 42 ml/min. As a passive oxygenator, the small gas exchange fiber surface area of the Hemolung resulted in oxygen saturations of 81% and 78% at 1.5 and 2.0 L/min, respectively.

Conclusions. The results of this study show the prospect of application of the Hemolung system in pediatrics.