



# A hybrid approach for the successful weaning of an EXCOR-LVAD with an ongoing intracranial bleeding

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## Introduction

Berlin Heart EXCOR remains the only MCS-system suitable for small children. It requires heavy anticoagulation and comes with an inherent risk for bleeding and thrombosis.

## Case report

We report the case of a previously healthy girl, who at the age of 6 months presented with a short history of vomiting and fatigue. The initial investigation showed normal heart and coronary artery anatomy and a severely dilated left ventricle.



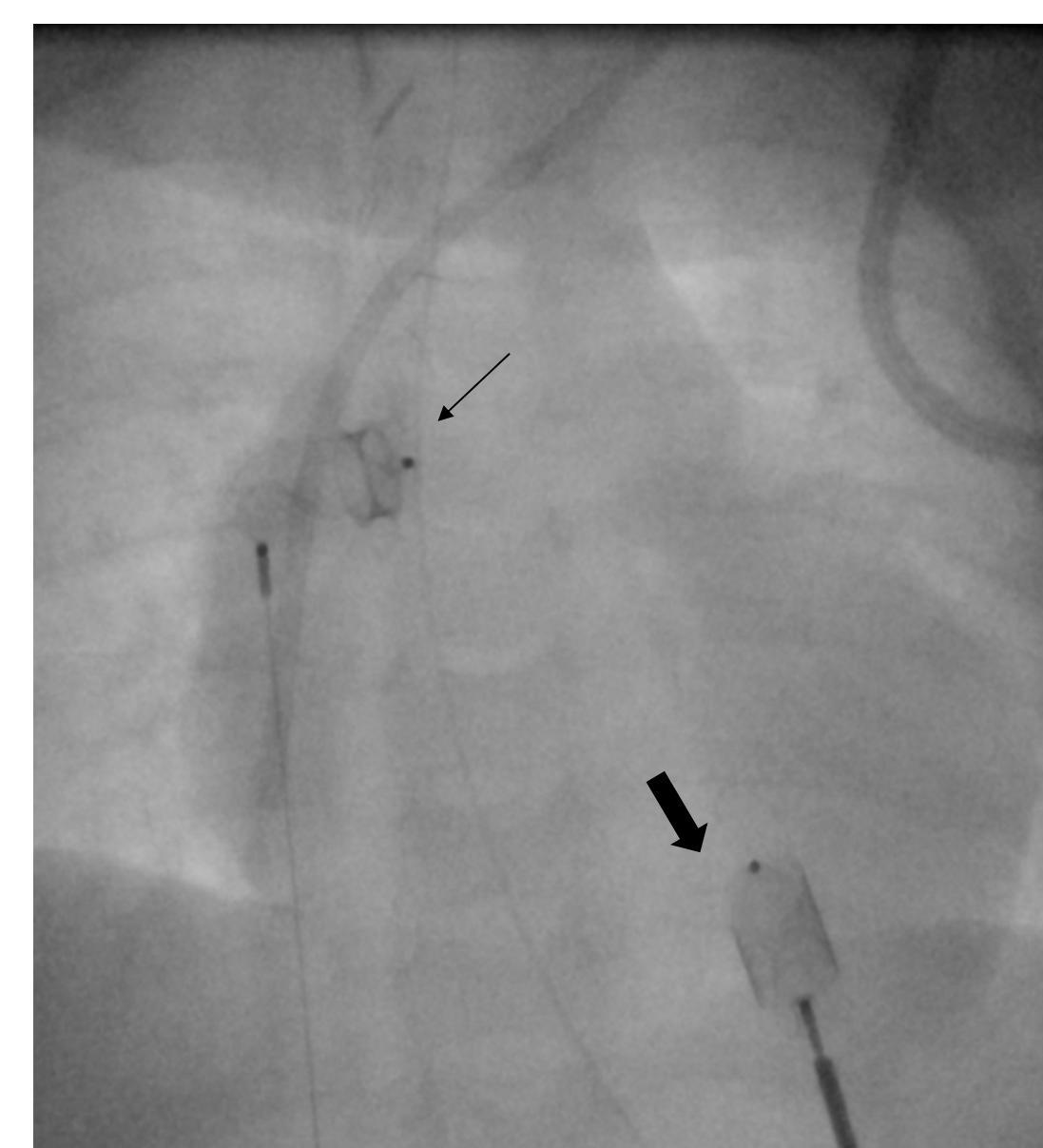
Picture 1. Severely dilated left ventricle as indication for MCS

She deteriorated and was started on veno-arterial ECMO, that after four days was converted to an LVAD Berlin heart EXCORE. The patient was started on an anticoagulation protocol with warfarin, acetylsalicylic acid and clopidogrel. 22 days later, she debuted with a focal seizure. A CT-scan showed an ischemic stroke and she was given phenobarbital. The further clinical course was complicated by problems in achieving successful anticoagulation, probably in part due to interactions of phenobarbital and warfarin. Extensive work-up did not reveal any cause of her heart disease. After 2 months on LVAD, the left ventricle had regained normal function on echocardiography and a ramp-test was scheduled. Before that, she again had a seizure and a CT scan revealed subdural hematoma. During the course of the next two weeks, the hematoma grew, leading to a midline shift of cerebral structures.



Picture 2. Large subdural hematoma as contraindication to anticoagulation

It became obvious that further massive anticoagulation was contraindicated. An operation on CPB was rejected in favor of a hybrid-approach: The pump was stopped and transeptal sheaths were inserted in both cannulas. Using a duct occluder for the left ventricle and a vascular plug device for the aorta, the open ends of the cannulas were plugged. The delivery systems were left in place. 3 weeks after the procedure, the heart function was good and the intracranial bleeding had stopped. The cannulas were then successfully removed. 132 days after her initial presentation, the patient was discharged home.



Picture 3 (left): Successfully plugged cannulas in aortic (thin arrow) and left ventricular (thick arrow) position.



Picture 4 (right): Cannulas after the procedure, with delivery systems left in place.

## Summary

In a patient with an EXCOR-LVAD and an ongoing intracranial bleeding as an absolute contraindication for CPB, a hybrid approach resulted in the successful plugging of the LVAD cannulas, allowing the patient to be weaned off her LVAD in a two-step fashion.

## Take home message

**Interventional plugging of EXCOR-LVAD without cardiopulmonary bypass is feasible in an emergency case**

Abbreviations:  
CPB Cardiopulmonary bypass  
ECMO: Extracorporeal membrane oxygenation  
LVAD: left ventricular assist device  
MCS Mechanical circulatory support