

**Use of the Heartware® Ventricular Assist Device for Left Ventricular Dysfunction at bodyweight below 30 kilograms**

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**Introduction:** Ventricular assist devices are well-accepted for prolonged mechanical support in children and adults with end-stage heart failure, with smaller devices allowing improved mobility and functional capacity. However, patient size is often a limiting factor. The Heartware® ventricular assist device (VAD) is officially approved for patients above 18 years of age and body surface area of 1.5 m<sup>2</sup>, and few cases have been described of its use in children.

**Objectives and methods:** We aim to describe the feasibility of Heartware® left ventricular (LV) assist device implantation in a child with a bodyweight below 30kg and to provide a review of the cases available in the literature of the use of this VAD in small children.

**Results:** We implanted a Heartware® VAD in an eight year old boy with severe aortic insufficiency after neonatal arterial switch for transposition of the great arteries. Attempted aortic valve repair and mechanical valve replacement brought about severe left ventricular dysfunction, requiring mechanical support. Patient weight was 28kg, height 125cm, BSA 0.98 m<sup>2</sup>, left ventricular diastolic diameter 5.4 cm (z-score +5.5), and mitral to LV apex distance 8.4 cm on echo. The VAD was implanted in the LV apex via median sternotomy along with bioprosthetic replacement of the aortic valve after 5d (days) of ECMO support and 8d on the Levitronix CentriMag® short term VAD. The device was set at 2500rpm yielding a cardiac output of 2.7 L/min. This allowed weaning of mechanical ventilation (16d), inotropic support (18d), and oxygen (21d), hospital discharge (53d), and return to school (100d), maintaining anticoagulation with oral Warfarin and Aspirin while awaiting heart transplant. Literature review has shown 10 previous children with BSA<1.0 m<sup>2</sup> in whom the Heartware® VAD has been implanted with no mortality, eight undergoing successful transplant and four being discharged home while listed for transplant.

**Conclusions:** Heartware® VAD implantation is feasible in small children with a dysfunctional, dilated left ventricle, due to relatively small device size. Its portability allows improved quality of life and return to school for children awaiting heart transplant.

