

Risk factors for RV failure in paediatric patients requiring LVAD implantation due to heart failure secondary to cardiomyopathy

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Introduction

The assessment of the right ventricular (RV) function in patients with a failing left ventricle is important and difficult. We hypothesise that echocardiographic imaging is insufficient to evaluate the degree of dysfunction and the symptoms of RV failure are not always apparent on admission. Our objective was to evaluate the presence of clinical and biochemical risk factors suggesting RV failure in patients undergoing left ventricular assist device (LVAD) insertion.

Methods

We conducted a retrospective study of paediatric patients with end-stage heart failure secondary to cardiomyopathy who required biventricular assist device (BIVAD) between January 2014 and January 2016.

Results

During the 5 year period 25 patients required BIVAD support. Twelve (48%) patients had simultaneous BIVAD insertion, 9(36%) had RVAD inserted after LVAD during the same operation and 4(16%) had RVAD at a later stage. The mean age was 4.3 years (2 months-14 years), 68% patients had symptoms of RV failure pre-operatively, 48% renal, 54% liver impairment, 40% had arrhythmias. Echocardiogram In most patients showed severe RV function, in 8/25 'moderate' and in 1 satisfactory. Post VAD insertion, 6 patients had mesenteric hypoperfusion, 5 requiring intestinal resection; 2 developed liver dysfunction, 3 had acute kidney injury requiring dialysis, 7 patients had thromboembolic complications and 5 had cerebral haemorrhage. The outcome for 68% was transplantation, 24% died and 8% recovered.

Conclusions

Patients undergoing BIVAD support have a high mortality rate (24%) hence the major importance of an early detection of the RV failure. In half of the cases the severity of the RV failure was not detected prior to LVAD insertion. The classical signs of right heart failure (liver and renal failure) were present in most of our patients. Moreover, this cohort showed increased incidence of arrhythmias, both atrial and ventricular.

Whilst echocardiography and clinical risk factors alone may not accurately predict the need for RVAD, they may serve as a warning that such support may be required and all efforts should be made to medically optimise the functional performance of the RV before LVAD implantation with agents such as milrinone, diuretics and pulmonary vasodilators.