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Levosimendan in dilated cardiomyopathy and refractory cardiogenic shock in children

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INTRODUCTION :
Levosimendan is a new calcium sensitizer and K-ATP channel opener. The documentation regarding this drug is one of the largest ever on the safety and efficacy of a new pharmacological agent in acute heart failure syndromes in adult population [1]. Its use in paediatric is limited to successful weaning from biventricular mechanical support in case reports or small trials conducted in the immediate postoperative period [2]. We report our experience of using Levosimendan during refractory cardiogenic shock (RCS) in infants.
PATIENTS AND METHODS :
Four infants aged 2-24 months and suffering from hypokinetic dilated cardiomyopathy were included in this study. All presented with uncontrolled RCS (LVEF <20%) despite conventional inotropes treatment. Lev was intended as a last resort before ECMO. The effectiveness of treatment was monitored by measuring the echocardiographic left ventricular ejection fraction (LVEF) and plasma BNP assay before and 8 days after administration. A total of 15 injections of Lev were realized and studied.
RESULTS :
Mean LVEF before and 8 days after administration of Levosimendan significantly increase from 19.75 % +/- 1.7 to 33 +/- 2.95 ($p<0.01$) and mean BNP level decrease from 2267 pg/ml +/- 518 to 1673 +/- 372 ($p<0.08$). These children could benefit from additional treatments of Lev in order to wean amines and defer the circulatory support. In one of these, a total of 6 cycles were necessary without the use of circulatory support for an improvement. In the 4 patients studied, the outcome was favorable.
Figure 1 : the individual changes in LVEF and BNP after each injection of Levosimendan
CONCLUSION :
During the refractory cardiogenic shock of the child with hypokinetic dilated cardiomyopathy, levosimendan may improve myocardial function allowing weaning of conventional inotropes and circulatory support. Re-injection may also be necessary. Randomized studies with larger number of patients are needed to confirm these very encouraging results.

1: Kota B, et Al. J Cardiovasc Pharmacol Ther. 2008;13:269-78.
2: Eriksson HI, et al Ann Thorac Surg. 2009;87:448-54