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## Ambulatory Intravenous Inotropic Support and or Levosimendan in Failing Pediatric and Congenital Heart Disease: Safety, Survival, Improvement or Transplantation

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Introduction: End-stage heart failure (HF) frequently needs continuous inotropic support in hospital and has high morbidity and mortality. It is often treated with mechanical circulatory support or transplantation, both options associated with significant adverse events and not readily available in many countries.
Methods: This is a retrospective analysis of our experience using continuous ambulatory inotropes (AI) and/or periodic levosimendan (LS) infusions in pediatric end-stage HF patients in a tertiary care center focusing on outcome, efficacy and safety of AI and/or LS infusions in HF patients.
Results: The study included 27 patients aged 9.3±7.4 (0.1-26.1) years with severe HF (6 myocarditis, 13 dilated cardiomyopathy, 2 restrictive cardiomyopathy, 6 repaired congenital heart disease) needing continuous inotropic support. Overall, 21 patients received dobutamine and milrinone AI through a permanent central catheter for 1.1±0.9 (0.3-3.7) years. Additionally, 14 AI patients and the remaining 6 study patients received periodic LS infusions for 1.4±1.0 (0.1-4.2) years. Inotropes were used for 1.4-0.4 years as bridge to recovery in 6 improved myocarditis patients, who remained stable after discontinuation on follow-up. AI and or LS infusions were used as bridge to transplantation in 6 patients with only 3 survivors, in 2 of which inotropes preoperatively reversed severe combined pre and postcapillary pulmonary hypertension allowing successful heart only transplantation. Finally, inotropes were used as mainstay therapy in 15 patients for 0.3-4.2 years, mostly with good quality of life and family dynamics. Four patients died of worsening HF after 0.8-2.1 years of therapy. During 3.6±5.3 (0.3-21.3) years of follow-up, we observed 4 central line infections treated with antibiotics and 4 catheter reinsertions due to dislodgement. Parenteral inotropes were also discontinued in 1 cardiomyopathy patient who received a left ventricular assist device and is still waiting for transplant 2.5 years later.
Conclusions: AI and/or LS infusions in HF is safe and beneficial for long periods even in small infants and children, allowing stabilization, discharge from hospital and cost reduction, good quality of life. It may provide precious time for heart transplantation or myocardial remodeling, improvement and possible discontinuation even after long periods of support.