

Reversible Pulmonary Artery Banding for Left Ventricular-DCM with preserved RV function: effect on BNP biomarker and MRI-imaging

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Background: dilated cardiomyopathy (DCM) in childhood has a considerable morbidity, mortality and high incidence of heart transplantation (HTX). Recently we published our initial experience with reversible pulmonary artery banding (rPAB) as an additional strategy in children with LV-DCM and preserved-RV-function instead HTX. Purpose of the current paper is to demonstrate the course of BNP-serum levels with focus on the pre-PAB medical treatment effect as well as MRI-data during further follow-up.

Methods: retrospective single center observational study. Since April 2006 24 children with LV-DCM (age <3y) were treated by rPAB, thereof 18 without associated open heart surgery.

Anti-congestive/anti-remodeling treatment with highly specific long acting β 1-blocker Bisoprolol, with angiotensin-converting-enzyme inhibitor Lisinopril (goal dosages 0.1-0.2mg/kg/d) and spironolactone (2mg/kg/d) represent cornerstones of pharmacotherapy; optionally digitalis was used for heart rate modulation. Except for present lung edema furosemide therapy was abandoned. Milrinone (1 μ g/kg/min) and levosimendan (0.1-0.2 μ g/kg/min) were administered routinely one day before rPAB; milrinone was post-operatively stopped when oral anticongestive therapy was re-established for long term treatment. Laboratory monitoring on the basis of BNP-serum levels was routinely performed pre- and post-operatively and continued in long-term follow-up. A Siemens 3-tesla cardiac machine performed MRI imaging during pre- and post-operative follow-up.

Results: there was no hospital mortality. Except for three cases all patients show clinical improvement. The pressure gradient across the PAB increased significantly correlating with the RV-function. The MRI-LV-EF increased from a median of 15% pre-PAB to 43% at discharge home and to 47% 3-6 months postoperatively accompanied by functional class improvement ($p > 0.001$); the median LVEDD / Z-score decreased ($p > 0.001$) respectively. Plasma BNP-levels dropped significantly after establishing the initial anti-congestive therapy with β -blocker and ACE-inhibitor; immediately after surgical rPAB BNP-levels rose to their peak-level to decline again continuously in all rPAB-responders, even partly to BNP-levels of health population, if transcatheter de-banding was successful.

Conclusions: rPAB improves LV-DCM if reactive hypertrophy of right ventricle can be observed. The amelioration of ventriculo-ventricular interaction can be best followed by MRI-imaging. The clinical course of patients with rPAB in LV-DCM correlates with BNP-levels.