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Does reversed apical or basal left ventricular rotation recover following medical therapy in children with dilated cardiomyopathy? A two-dimensional speckle tracking imaging study.

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Objectives: Reversed left ventricular (LV) rotation and loss of LV twist have been associated with a more advanced disease stage in adults with dilated cardiomyopathy (DCM). If standard heart failure therapy induce recovery of reversed LV twist mechanics in these patients is unknown. This study 1) assessed if reversed LV rotation mechanics can be identified in children with DCM, and 2) to study the effect of standard heart failure treatment on reversed LV twist during follow-up.

Methods: We performed a retrospective review of our echocardiographic database to identify all children (aged < 18 years) with DCM seen at our institution from 2009 to 2010. Patients were included when reversed LV rotation was present before initiation of standard heart failure therapy with diuretics, carvedilol, and angiotensin converting enzyme (ACE) inhibitor. Patients with muscular dystrophy, mitochondrial or metabolic disorders, and tachycardia-induced cardiomyopathy or poor image quality were excluded. LV twist was assessed using two-dimensional speckle tracking echocardiography. Normal LV twist demonstrates counterclockwise apical rotation and clockwise basal rotation as viewed from LV apex.

Results: During this study period, 14 children presented with DCM. Reversed rotational mechanics were observed in 6/14 children (43%, all male, median age 16 years, range 2 to 18 years). Three different patterns of reversed rotation were identified: reversed apical rotation (n = 3), reversed basal rotation (n = 2), and mirror-image rotation (n = 1, counterclockwise basal and clockwise apical rotation).

All patients received standard heart failure therapy for a median of 10 months, range 2 weeks to 18 months. During this period, reversed rotation normalized in 2/6 patients. Heart failure deteriorated in 2 patients, requiring heart transplantation or cardiac resynchronization therapy, or both. In 2 other patients, LV twist remained reversed during follow-up. Only patients with reversed basal rotation demonstrated recovery of LV twist mechanics.

Conclusion: Reversed LV rotation with loss of LV twist can be identified in children with DCM using speckle tracking echocardiography. Reversed LV twist may normalize in a subset of patients following standard heart failure treatment. Lack of LV twist recovery may identify patients at high risk for adverse clinical outcome.