

# Left Ventricular Mechanics in Preterm Infants with Chronic Lung Disease

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**Background:** There is increased recognition of right ventricular dysfunction in infants with chronic lung disease (CLD) but little is known about left ventricle (LV) mechanics. We aimed to assess LV normal (longitudinal) and shear (rotational) strain mechanics in preterm infants with CLD and compare them to preterm infants without CLD.

**Methods:** 117 preterm infants (<29 weeks and <1500 grams at birth) were enrolled in a prospective longitudinal study through the Prematurity and Respiratory Outcomes Program (U01 HL10179). LV strain was measured from the three apical views; and basal and apical rotations were measured from the parasternal short axis view at the appropriate levels at 36 weeks post-menstrual age (PMA). LV global longitudinal strain (GLS), systolic strain rate (SRs), LV twist (°) and LV torsion, twist normalized against LV length (°/cm) were calculated by offline analysis. Data was adjusted for weight, gestational age at birth, heart rate, and blood pressure. CLD was defined as the need for any respiratory support at 36 weeks PMA.

**Results:** LV GLS and GLSRs remained similar between infants with CLD (n=69, 59%) and those without CLD (n=48, 41%) (-20.5 ± 2.8 vs. -20.3± 2.5, p=0.70). In both groups, basal rotation was clockwise with an initial counterclockwise component; and apical rotation was counterclockwise with an initial clockwise component. Accordingly, twist and torsion were both similar between groups.

**Conclusions:** LV mechanics (longitudinal strain and rotational) remained preserved in preterm infants, irrespective of gestational age, at birth, change in postnatal weight, and presence of CLD, suggesting relatively preserved LV function with maturation.

**Table 1: Left ventricular rotational mechanics in preterm infants at 36 weeks post menstrual age with and without chronic lung disease**

	Uncomplicated Cohort N=48	Preterm infants w/ CLD N=69	P -Value
<i>Basal Rotation (°)</i>			
Initial counterclockwise	2.1 ± 2.0	3.0 ± 2.1	0.09
Clockwise	-7.2 ± 5.0	-6.4 ± 3.5	0.51
<i>Apical Rotation (°)</i>			
Initial clockwise	-1.4 ± 1.6	-0.9 ± 1.9	0.30
Counterclockwise	9.2 ± 4.0	9.6 ± 3.3	0.71
Twist (°)	15.4 ± 6.6	14.2 ± 3.8	0.38
Length (cm)	2.8 ± 0.2	2.8 ± 0.3	0.85
Torsion (°/cm)	5.5 ± 2.5	5.0 ± 1.4	0.34

Data is presented as means (standard deviation); CLD, chronic lung disease  
Clockwise (-); Counterclockwise (+)