Echocardiographic screening for pulmonary hypertension in preterm infants with bronchopulmonary dysplasia: Is there a clinical phenotype predictive of pulmonary hypertension?

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Purpose: Bronchopulmonary dysplasia (BPD) is a common lung disease of preterm infants and is complicated by pulmonary hypertension (PH) in 18% to 37% of cases. Since 2009, we have performed screening echocardiography on all infants diagnosed with BPD to identify those with PH. However, the clinical efficiency of this screening tool across the entire spectrum of BPD severity is unclear. To date, there have been few studies that have evaluated for clinical phenotype most at risk of developing PH in this population. To refine the screening process, we sought to determine if any clinical characteristics in infants with BPD are predictive of significant PH as defined by screening echocardiogram.

Methods: In this single site retrospective chart review, clinical records and echocardiography reports of all infants born <32 weeks gestational age with a diagnosis of BPD were reviewed. Exclusion criteria included congenital heart disease (not including patent ductus arteriosus, patent foramen ovale or atrial septal defect) or congenital lung disease. Infants were evaluated for PH by echocardiogram at > 35 weeks postmenstrual age per our current standard screening process at our institution. Significant PH was defined on echocardiography by either right ventricular (RV) pressure > 50% systemic estimated by tricuspid regurgitant (TR) Doppler velocity, or if at least 4 of 5 indirect findings of PH were present (septal flattening, RV dysfunction, elevated pulmonary artery diastolic pressure or abnormal pulmonary artery Doppler flow profile). Individual logistic regression models were run to assess whether gender, birth weight or length, growth rates, BPD severity, length and type of respiratory support, maternal factors and census tract poverty rate were possible predictors of PH. For any model with a questionable fit, Fisher's Exact Test was performed. P-values of ≤ 0.05 were considered significant.

Results: We identified 74 preterm infants < 32 weeks gestational age with a diagnosis of BPD born between January 1, 2009 – October 31, 2013 that met inclusion criteria. Of those, 20 (27%) met the definition of PH as determined by echocardiography; 16/20 (80%) were diagnosed with PH by TR Doppler velocity. For those variables evaluated, there were no statistically significant associations between clinical characteristics and the presence of significant PH in our study cohort.

Conclusion: The prevalence of PH in our study cohort was significant (27%). With no significant associations noted between clinical variables and the presence of PH in our study cohort, these findings would support the continued practice of screening all preterm infants with BPD by echocardiography. Conversely, the data suggest that limited screening for certain infants with specific clinical phenotypes may be inappropriate in this population. Prospective studies may be useful in further refining screening practices for PH in infants with BPD.