

Incidence and Spectrum of Congenital Heart Disease in Neonatal Intensive Care Unit at High Altitude in China

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Introduction: Our previous study on echocardiography screening asymptomatic newborns for congenital heart disease (CHD) at high altitude showed a high incidence (30%) consisting solely of simple forms. This study evaluated the incidence and spectrum of CHD in neonatal intensive care unit(NICU) in order to depict a truer picture of CHD at high altitude.

Methods: We reviewed charts of 4,214 neonates in the Women and Children's Hospital in Xining(2,260m), Qinghai in 2015-2016. Echocardiography was performed in 1,943 babies(aged 10 minutes to 2 months; 1,220 boys; altitude ranged 1,800 to 4,300m, median 2,526m) when CHD was suspected based on heart murmur, cyanosis or pneumonia.

Results: These babies were hospitalized because of pneumonia(62.6%), asphyxia(13.2%), or hyperbilirubinemia(7.3%). The incidence of CHD was 26.0%(1,096; 658 boys). Mild and moderate CHD accounted for 97.6%(1,070), including 580(52.9%) secundum atrial septal defect, 224(20.4%) patent ductus arteriosus, 18(1.6%) ventricular septal defect, 248(22.6%) multiple defects with left to right shunt, 1(0.1%) bicuspid aortic valve, 7(0.6%) pulmonary stenosis, 2(0.2%) aortic stenosis, 6(0.5%) atrioventricular septal defect. Critical CHD accounted for 2.4%(26), including 5(0.5%) complete transposition of the great arteries (TGA), 6(0.5%) hypoplastic right heart, 3(0.3%) hypoplastic left heart, 3(0.3%) double outlet right ventricle, 3(0.3%) tetralogy of Fallot, 2(0.2%) truncus arteriosus, 2(0.2%) total anomalous pulmonary venous connection, 2(0.2%) severe aortic stenosis, 2(0.2%) severe pulmonic stenosis. Among those with CHD, pulmonary arterial hypertension occurred in 2.8%(54/1,943)(systolic pressure 69 ± 24 mmHg). By 2-12 months follow-up in 26 patients with critical CHD, 17 died before cardiac surgery, 1 of the 4 survivors had corrective operation of TGA, and 5 lost track.

Conclusions: The incidence of CHD in NICU at high altitude is about 20 folds higher than that at low altitude, with substantially less incidence of critical CHD but with high mortality. Routine echocardiography and follow-up should be implemented in all NICU patients to provide early intervention.