

Pulmonary arterial hypertension associated with pneumonia in children living at high altitude in China

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Objectives

Pulmonary arterial hypertension (PAH) may be associated with pneumonia, but has been paid little attention due to its mild form in those at sea-level. We have recently reported an elevated pulmonary artery pressure and hypertrophied and dilated right ventricle (RV) with decreased systolic and diastolic function in healthy children born and living in Qinghai (average altitude >3000m). The degree of PAH was hypothesized to be more prominent and associated with RV morphological and functional changes in pneumonic children at high altitude.

Methods

Echocardiography was assessed in 104 children (1 month-3.5 years, median 6 months, 28 Tibetans and 79 Han who lived at 3845±490m and 2732±741m respectively, $p<0.0001$) with acute pneumonia at Women and Children's Hospital in Qinghai from 2010 to 2014. Systolic pulmonary arterial pressure (SPAP), RV outflow tract (RVOT), dimension of RV and right atrium (RA), RV anterior wall (RVAW), tricuspid E (VETV) and A (VATV) wave peak velocities, E/ATV ratio and myocardial enzymes were measured at admission and after 20±8 days at discharge.

Results

PAH was in 55 patients (51.4%), being mild (36.7±4.9 mmHg) in 40 (37.4%), moderate (62.7±7.5 mmHg) in 7 (6.5%) and high (105±25 mmHg) in 5 (4.7%), with the highest being 149 mmHg. RVAW were thicker (2.8±1.2mm, high altitude reference value was 2.0±1.0mm) and RV dilated (11.6±4.5mm, high altitude reference value was 10.0±2.0mm) respectively. E/ATV ratio was normal (1.4±0.5). Myocardial enzymes were within normal range. SPAP was not significantly correlated with altitude or ethnics ($P >0.05$) but increased with age ($p<0.0001$). RVAW and RV significantly increased with SPAP ($p<0.0001$). SPAP became normal or mild hypertensive at discharge.

Conclusions

PAH occurs in about 50% of children suffering from acute pneumonia at high altitude, and moderate to severe PAH in about 10%, with dilated right heart and RV hypertrophy. Myocardial function appeared normal. Treatment strategies should be targeted on PAH in these patients at high altitude.