

Cardiopulmonary developmental characteristics in healthy children at high altitudes in China

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Objectives. Altitude-hypoxia induces pulmonary arterial hypertension and altered cardiac morphology and function, which is little known in healthy children at high altitude. We compared the cardiopulmonary measurements between the healthy children at 16m and those at 3700 m in China, and further compared these measurements between the Han and Tibetans at 3700 m

Methods. Echocardiography was assessed in 477 children (15 day-14 years) including 220 at 16m and 257 at 3700m. Children were divided into 7 age groups (<1m-6m-1y-3-6y-10y-14y). The dimensions of the right and left were measured. Systolic and diastolic function included ejection fraction and fractional shortening of RV and LV and cardiac output (CI). Diastolic function included of E and A waves and E wave declaration time of tricuspid and mitral valves (EDTTV and EDTMV), isovolumic relaxation time of d RV and LV (RIRT and LIRT). Mean pulmonary arterial pressure (mPAP) was estimated.

Results. As compared to the 16 m group, children at 3700m had higher mPAP, increasing dilatation of the right heart, and slower decrease in RV hypertrophy in 14 years ($p<0.05$). The left heart morphology was not different ($p>0.20$). Systolic and diastolic function of both ventricles significantly reduced, but CI was higher ($p<0.0001$). There was no difference in any measurement between the Han and Tibetans ($p>0.05$).

Conclusions. The cardiopulmonary developmental values in the Han and Tibetan children at high altitude provide references for the care of healthy children and the sick ones with cardiopulmonary diseases at high altitude.