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Title: The acute effect of surgical repair of mitral valve insufficiency on airway and respiratory tissue mechanics and pulmonary hemodynamics in children

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Body: RATIONALE: Increased pulmonary blood flow and pressure were shown to be responsible for the lung function impairment in children with congenital heart diseases (Anesthesiology, 110: 1348-55, 2009). We assessed whether mitral valve insufficiency (MVI) leading to postcapillary pulmonary hypertension is reflected in the mechanical properties of the respiratory system, and whether surgical repair of MVI improves respiratory mechanics in children. METHODS: Airway resistance (Raw), respiratory tissue damping (G) and elastance (H) were obtained by forced oscillations in 8 children aged 12±2 (Mean±SD) years under general anaesthesia before and immediately after surgical repair of the MVI. Concomitantly, pulmonary arterial pressure (PAP) was directly measured in the pulmonary artery before aortic cannulation and chest closure. RESULTS: Surgical repair of MVI led to strong tendency in the mean PAP for a decrease (from 33.0±12 to 27.7±9.0 mmHg, p=0.054). These postoperative pulmonary haemodynamical changes were associated with significant decreases in Raw (5.5±1.7 to 4.4±1.1 cmH₂O.s/l, p=0.008) with no significant effects on G (11.5±5.2, 10.1±3.1 cmH₂O/l, p=0.7) and H (60.2±9.5, 65.2±13.7 cmH₂O/l, p=0.2). Postoperative changes in Raw and PAP exhibited no significant correlation. CONCLUSIONS: These findings demonstrate an immediate improvement of airway function after surgical repair of MVI in children. Further experiments are needed to clarify the role of the direct effect of the postoperative decrease in postcapillary pulmonary hypertension and vascular engorgement in this beneficial change. Supported by SNSF grant 3200B0-118231.