

# European Respiratory Society Annual Congress 2012

Abstract Number: 4347

Publication Number: P1086

**Abstract Group:** 7.1. Paediatric Respiratory Physiology

**Keyword 1:** Lung mechanics **Keyword 2:** Pulmonary hypertension **Keyword 3:** Interaction

**Title:** Changes in respiratory mechanics following surgical repair of mitral valve insufficiency in children

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**Body:** RATIONALE: Postcapillary pulmonary hypertension (PHT) such as observed with mitral valve insufficiency (MVI) is associated with lung function impairment. We assessed airway resistance (Raw) and total respiratory elastance (Ers) before and after surgical repair of MVI in children to verify whether vascular engorgement is responsible for the increase in airway tone and stiffness of the respiratory tissues. METHODS: The input impedance of the respiratory system during spontaneous breathing was measured in 16 children, aged 12.3±2.5 years (mean±SD), with congenital or post rheumatic mitral valve insufficiency preoperatively, and within 5 days and 3 weeks after mitral valve repair surgery. Raw was estimated by calculating the average resistance values between 4 and 26 Hz, while Ers was assessed from the respiratory reactance data by model fitting. RESULTS: Raw decreased significantly 5 days after the surgery (5.5±1.6 to 4.3±1.0 cmH<sub>2</sub>O.s/l, p<0.001). It remained lowered 3 weeks later in 8 children (4.5±1.4 cmH<sub>2</sub>O.s/l, p=0.003). Conversely, Ers exhibited no significant changes postoperatively (70±10, 58±6 and 77±9 cmH<sub>2</sub>O/l, before and 5 and 21 days after the surgery, respectively, p=0.4) CONCLUSIONS: Decreasing vascular engorgement after surgical reparation of MVI in children results in a fast and sustained improvement in airway function. The lack of concomitant beneficial changes in the Ers suggests that mechanical interdependence between the airways and pulmonary vasculature is responsible for this finding. Supported by SNSF grant 3200B0-118231.