

Lung protective mechanical ventilation in paediatric cardiac surgery

Thierry V. Scohy

Department of Anesthesia and Intensive Care, Amphia Hospital, Breda, The Netherlands

General anaesthesia is known to promote atelectasis, which leads to reductions in lung volume, lung compliance and arterial oxygenation [1]. The goal of mechanical ventilation is to establish an acceptable level of gas exchange, while preventing ventilator induced lung injury (VILI). Atelectotrauma, causing VILI is avoided by preventing repetitive re-opening of atelectatic lung areas and thus by decreasing alveolar stress [2]. Optimizing alveolar recruitment by alveolar recruitment strategy (ARS) and maintaining lung volume with adequate positive end-expiratory pressure (PEEP) prevents lung injury by decreasing alveolar stress [3-5]. In our previous study we proved that ARS + PEEP of 8 cm H₂O significantly decreased ventilation perfusion mismatch and improved dynamic compliance of the respiratory system (Crs), oxygenation and end-expiratory lung volume (EELV), in children under general anaesthesia [6].

However, in children after cardiac surgery for congenital heart disease it has been shown that mechanical ventilation with PEEP levels above 6 cm H₂O decreased pulmonary blood flow [7] and cardiac output [8,9].

In adult patients, it has been shown that a lung protective ventilation strategy does not increase RV outflow impedance after cardiac surgery [10,11]. RV outflow impedance can be assessed by the mean acceleration (Ac_{mean}) of the pulmonary artery flow [11]. This, together with the fact that PEEP has its most beneficial effects when Crs is maximized [12], proved that a lung protective ventilation strategy after a recruitment strategy did not increase RV outflow impedance compared to ZEEP, in paediatric patients undergoing cardiac surgery.

According to our results lung protective mechanical ventilation can safely been applied in children.

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