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Title: Effects of anesthesia, muscle paralysis and controlled ventilation on gas exchanges evaluated by DLCO and pulmonary surfactant protein B: Preliminary results

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Body: A recent study demonstrated that patients with no evident pulmonary disease, after at least 24 hours of mechanical ventilation, show a significant worsening of pulmonary gas exchange evaluated through DLCO (diffusing capacity of the lung for carbon monoxide). This worsening may be caused by an early alteration of alveolar-capillary membrane caused by mechanical ventilation itself, as previously demonstrated on animal models. We evaluated, in patients with no pulmonary diseases undergoing elective surgery, the effect of anesthesia, muscle paralysis and invasive controlled ventilation on DLCO, and the plasmatic levels of pulmonary surfactant protein B (SPB), an alveolar-capillary membrane anatomical damage marker. To date we enrolled 11 patients. In comparison to pre-surgery data, we found, just after anesthesia and paralysis, a significant reduction of DLCO (from 15.6 ± 4.8 to 8.2 ± 2.1 mLmm Hg-1min-1, $p < 0.001$), due to a reduction of both lung volume (end-expiratory lung volume, EELV, from 2.8 ± 1.3 to 1.5 ± 0.6 L, $p < 0.001$), and the coefficient of diffusion (KCO, from 4.5 ± 0.8 to 3.7 ± 0.7 mLmm Hg-1min-1L-1, $p = 0.032$). After this point DLCO, EELV, and KCO did not change significantly at 1 and 3 hours of surgery. Our preliminary results show that anesthesia and paralysis themselves can impair gas exchange, through an alteration not only limited to lung derecruitment. The precocity of this phenomenon, however, does not support the hypothesis of a biological effect" on the alveolar-capillary membrane, but a physical effect", with no modification after 3 hours of invasive controlled ventilation. The SPB analysis is still ongoing.