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Title: Sevoflurane improves lung function impairment induced by cardiopulmonary bypass in cardiac surgery patients

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Body: Rationale: Although the relaxation properties of sevoflurane (SEV) against exogenous constrictor agonists have been established, the potential of SEV to reverse the compromised lung mechanics and gas exchange following cardiopulmonary bypass (CPB) has not been studied. Methods: Pulmonary input impedance (ZL) and the expiratory capnogram were measured in two groups of anaesthetized mechanically ventilated patients undergoing CPB. Measurements were made 5 min after weaning from CPB, and 5 min after SEV administrations at 1 MAC (Group S, n=56). A matched control group including patients with maintenance of iv anaesthesia (Group C, n=32) was also studied accordingly. The airway resistance (Raw), and tissue damping (G) and elastance (H) were obtained from the ZL spectra by model fitting. The third phase slope of the capnogram (S_{III}) and the arterial partial pressure of oxygen (PaO₂) were also determined. Results: CPB induced marked increases in Raw in both groups (274±40[SE]% and 308±52% in Groups S and C, respectively, p<0.001), which was significantly decreased only in Group S (-40±4%, p<0.001) while no further change was observed in Group C (1.2±7.7%). SEV also decreased G (-25±5%) and S_{III} (18±6%, p<0.05), while the Horowitz coefficient (PaO₂/FiO₂) increased (15±3%, p<0.001 for all); maintenance of iv anaesthesia in Group C did not affect these parameters. Conclusions: SEV reverses deteriorations in lung mechanics and oxygenation subsequent to CPB. Considering the cardioprotective properties of SEV, this additional beneficial pulmonary profile further advocates its use in patient with cardiac surgery involving CPB. Grant support: OTKA K81179, TÁMOP 4.2.2.A-11/1/KONV-2012-0052.