Strategies to maintain oxygenation in OLV: protective ventilation of the dependent lung versus CPAP to the nondependent lung

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Background

Studies suggest that lung-protective ventilation strategies maintain adequate oxygenation and minimize the mechanical injury during one lung ventilation (OLV).

Recruitment maneuvers (RMs) are effective in improving oxygenation and ventilatory mechanics during OLV and the effect is more evident when an individualized positive end-expiratory pressure (PEEP) is applied.

Applying a continuous positive airway pressure (CPAP) with 100% oxygen to the nondependent lung is another common strategy described to avoid desaturation during OLV.

Methods

We compared the arterial oxygenation in an historical control (22 thoracotomy lobectomies) with a group treated with the actual protective ventilation strategies (10 mininvasive lobectomies). In the first group (CPAP group) a 5 cmH2O CPAP was applied to the nondependent lung, in the second group (RM group) a low tidal volume was associated with RM and PEEP.

In 6 patients of the RM group, we set a standard 5 cmH2O PEEP. In 4 patients, after a decremental trial, we applied the PEEP associated with the lowest driving pressure.

Arterial gas analysis were performed at comparable timepoints.

Results

Considering oxygenation (studied as PaO2/FiO2), RMs were not inferior to CPAP during OLV (inferiority limit -25%, p=0.03).

Furthermore, the patients with a titrated PEEP in the RM group had better alveolar-arterial oxygen gradient up to 70 min after RM (p=0.038).

Conclusions

Our data suggest that a protective ventilation strategy is as effective as CPAP to maintain oxygenation during OLV. This could be useful in mininvasive surgery, where a 5cmH2O CPAP could interfere with the surgical field-of-view.

Moreover, a protective ventilation strategy is believed to reduce postoperative lung injury and,

according to our data, an individualized PEEP after RMs seems to improve the ventilation-perfusion mismatch.

Further data are needed to assess if a protective ventilation strategy could improve intra- and postoperative oxygenation and lung function in thoracic surgery.