

Physiologic effects of a short course of CPAP after major open vascular surgery: a prospective case-crossover study

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Argomento: Insufficienza respiratoria acuta e ventilazione meccanica

Introduction: While non-invasive continuous positive airway pressure (CPAP) has an established role in treating hypoxaemic respiratory failure in the postoperative period, its routine preventive use is debated. We aimed to investigate the physiologic effects of a short course of postoperative CPAP in patients undergoing major open vascular surgery. We hypothesised that CPAP persistently improved oxygenation and reduced work of breathing.

Methods: We screened for inclusion intermediate or high-risk patients (ARISCAT score > 26) undergoing major open vascular surgery. Esophageal pressure was recorded throughout the study (Nutrivent, Sidam, Mirandola, Italy). Within 2 hours from extubation we administered a course of high-flow CPAP 7.5 cmH₂O with FIO₂ 0.3 for 2 hours delivered through a full-face mask (DiMax Zero, Dimar, Mirandola, Italy). High flow oxygen mask with FIO₂ of 0.3 was administered before and after CPAP. We collected the following parameters before CPAP (baseline), at the end of CPAP, then after 1 and 2 hours: blood gas analysis, esophageal pressure swings (Δ Pes) as surrogate of the work of breathing, lung ultrasound (LUS) aeration score. Differences from baseline were sought with Friedman's test with Dunn's post-hoc.

Results: We enrolled 10 patients aged 71 ± 8 years, 90% male, ASA class III, ARISCAT 34 ± 5 . Compared to baseline, PaO₂/FIO₂ ratio was higher at the end of CPAP (436 ± 70 vs. 285 ± 62 mmHg, $p < 0.001$), but not at 1h (302 ± 48 mmHg, $p > 0.99$) nor 2h (339 ± 36 mmHg, $p = 0.82$). Similarly, Δ Pes was lower at the end of CPAP (8 ± 4 vs. 12 ± 4 cmH₂O, $p = 0.006$), but not at 1h (12 ± 5 cmH₂O, $p > 0.99$) nor 2h (9 ± 6 cmH₂O, $p = 0.20$). LUS score and PaCO₂ did not change across time-points ($p = 0.10$ and $p = 0.43$, respectively).

Conclusions: These preliminary results suggest that a short course of CPAP postoperatively increases transiently oxygenation and decreases respiratory muscle effort, but that these improvements vanish shortly after the suspension of CPAP.