

Efek perbedaan volume tidal ventilasi mekanik perioperatif terhadap rasio PaO₂/FiO₂ pascaoperasi kraniotomi elektif = Effect of tidal volume in perioperative mechanical ventilation to postoperative PaO₂/FiO₂ ratio in elective craniotomy patients

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Abstrak

[ABSTRAK

Latar Belakang: Kraniotomi elektif memiliki insidens komplikasi paru pascaoperasi (25%) dan mortalitas (10%) yang tinggi. Pemakaian volume tidal rendah sebagai bagian dari teknik proteksi paru diketahui menurunkan komplikasi paru pascaoperasi. Penelitian ini berusaha mengetahui efek volume tidal 6 mL/kg dan 10 mL/kg terhadap rasio PaO₂/FiO₂ pascaoperasi pada kraniotomi elektif.

Metoda: Uji klinis acak ini dilakukan di satu rumah sakit pendidikan di Indonesia. Lima puluh dua pasien kraniotomi elektif (usia 18-60 tahun, durasi bedah >4 jam, paru normal) dirandomisasi ke dalam 2 kelompok intervensi: ventilasi mekanik perioperatif dengan volume tidal 6 mL/kg (VT-6) atau 10 mL/kg (VT-10).

Hipotesis penelitian ini adalah rasio PaO₂/FiO₂ kelompok VT-6 lebih tinggi dibandingkan VT-10. Analisis gas darah dilakukan pada 1 jam pascainduksi, akhir operasi, 24 jam pascainduksi dan 48 jam pascainduksi. Komplikasi paru (atelektasis, pneumonia, ARDS, gagal napas) dan komplikasi ekstraparau (SIRS, sepsis, sepsis berat) diobservasi sampai hari ke-7 dan mortalitas pada hari ke-28.

Hasil: Rasio PaO₂/FiO₂ kelompok VT-6 dan VT-10 secara berurutan adalah: pada 1 jam pascainduksi adalah $413,7 \pm 113,4$ mmHg dan $401,5 \pm 106,3$ mmHg ($p = 0,69$); pada akhir operasi, $466,6 \pm 94,6$ mmHg dan $471,1 \pm 89,0$ mmHg ($p = 0,86$); pada 24 jam pascainduksi, $418,8 \pm 108,8$ mmHg dan $448,5 \pm 119,6$ mmHg ($p = 0,35$); pada 48 jam pascainduksi, $414,9 \pm 88,1$ mmHg dan $402,5 \pm 100,7$ mmHg ($p = 0,63$). Pneumonia ditemukan pada 1 pasien (3,8%) di kelompok VT-6 dan pada 2 pasien (7,6%) di kelompok VT-10. SIRS ditemukan pada 1 pasien (3,8%) di kelompok VT-6 dan pada 2 pasien (7,6%) di kelompok VT-10. Tidak ditemukan komplikasi paru/ekstraparau lain dan mortalitas dalam penelitian ini.

Simpulan: Ventilasi mekanik perioperatif dengan volume tidal 6 mL/kg tidak menghasilkan rasio PaO₂/FiO₂ yang lebih tinggi pada 1 jam pascainduksi, akhir operasi, 24 jam pascainduksi, dan 48 jam pascainduksi dibandingkan volume tidal 10 mL/kg pada pasien kraniotomi elektif dengan paru sehat. Insidens komplikasi paru/ekstraparau pascaoperasi dan mortalitas serupa di antara kedua kelompok.

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ABSTRACT

BACKGROUND: Elective craniotomy is associated with high incidence of postoperative pulmonary complications/PPC (25%) and mortality (10%). Low tidal volume as part of lung protective strategy is known to decrease PPC. We determined to study the effect of low tidal volume solely to postoperative PaO₂/FiO₂ ratio (PF ratio) in elective craniotomy.

METHODS: This was a randomised control trial in one university hospital in Indonesia. Fifty two patients underwent elective craniotomy (age 18-60 years, duration of surgery >4 hours, normal lung) were ventilated with tidal volume 6 mL/kg (VT-6) or 10 mL/kg (VT-10) perioperatively. We hypothesized that

postoperative PaO₂/FiO₂ ratio in VT-6 is higher than VT-10. Blood gas analysis were measured at 1 hour postinduction, at end of surgery, at 24 hours postinduction and 48 hours postinduction. Postoperative pulmonary complications (atelectasis, pneumonia, ARDS, respiratory failure) were observed on day 7 and mortality on day 28.

RESULTS: PaO₂/FiO₂ ratio of VT-6 and VT-10 respectively: at 1 hour postinduction, 413.7 ± 113.4 mmHg and 401.5 ± 106.3 mmHg ($p = 0.69$); at end of surgery, 466.6 ± 94.6 mmHg and 471.1 ± 89.0 mmHg ($p = 0.86$); at 24 hours postinduction, 418.8 ± 108.8 and 448.5 ± 119.6 mmHg ($p = 0.35$); at 48 hours postinduction, 414.9 ± 88.1 mmHg and 402.5 ± 100.7 mmHg ($p = 0.63$). Pneumonia were found in 1 (3.8%) patient in group VT-6 and 2 (7.6%) patients in group VT-10. SIRS were found in 1 (3.8%) in group VT-6 and 2 (7.6%) in group VT-10. No other pulmonary/extrapulmonary complications and mortality were found in this study.

CONCLUSION: Perioperative mechanical ventilation with lower tidal volume (6 mL/kg) does not result in higher postoperative PaO₂/FiO₂ ratio compared to higher tidal volume (10 mL/kg) in healthy lung patients undergone elective craniotomy. Incidence of postoperative pulmonary/extrapulmonary complications and mortality were similar between both groups. , **BACKGROUND:** Elective craniotomy is associated with high incidence of postoperative pulmonary complications/PPC (25%) and mortality (10%). Low tidal volume as part of lung protective strategy is known to decrease PPC. We determined to study the effect of low tidal volume solely to postoperative PaO₂/FiO₂ ratio (PF ratio) in elective craniotomy.

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