Nationaal nascholingscongres anesthesiologie

Thema: Long

9 november 2016

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A&I

Dr D Reis Miranda

Anesthesioloog-intensivist
Intensive Care Volwassenen, ErasmusMC

Geen belangenverstrengeling

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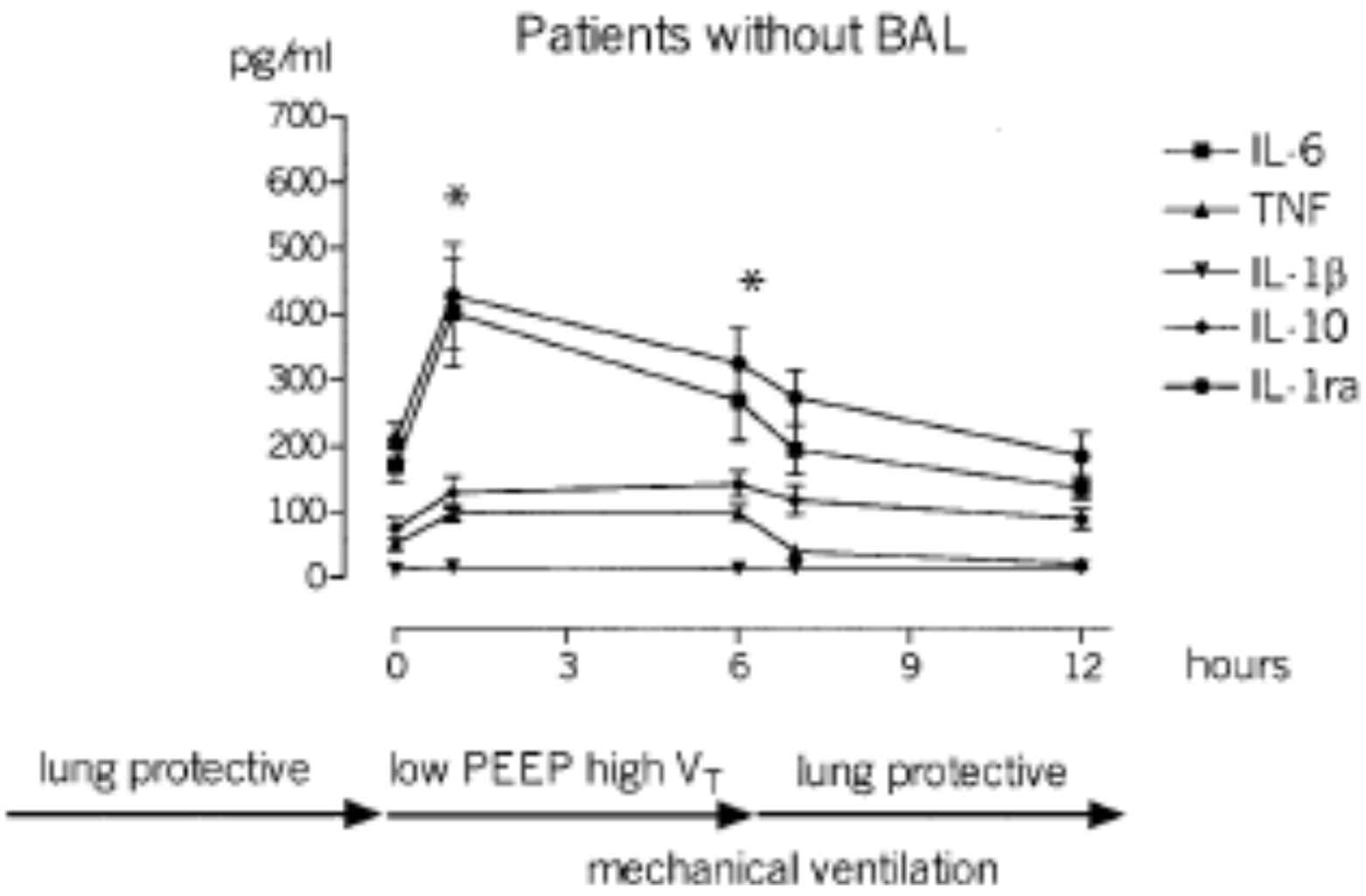

Stuber, Intensive Care Med 2002;28:834-841

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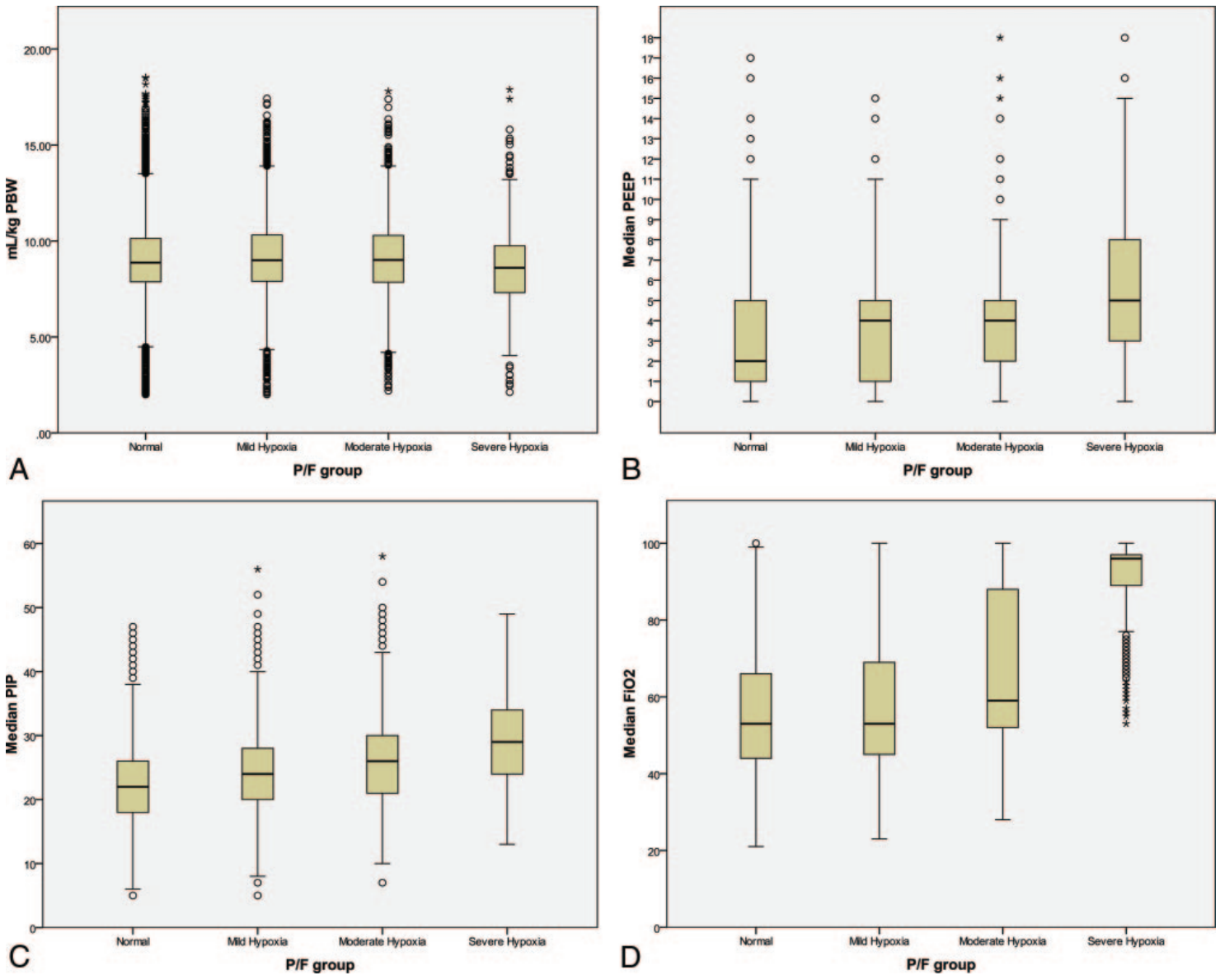

A Description of Intraoperative Ventilator Management and Ventilation Strategies in Hypoxic Patients

James M. Blum, MD,* Douglas M. Fetterman, MD,* Pauline K. Park, MD,† Michelle Morris, MS,* and Andrew L. Rosenberg, MD*

(Anesth Analg 2010;110:1616–22)

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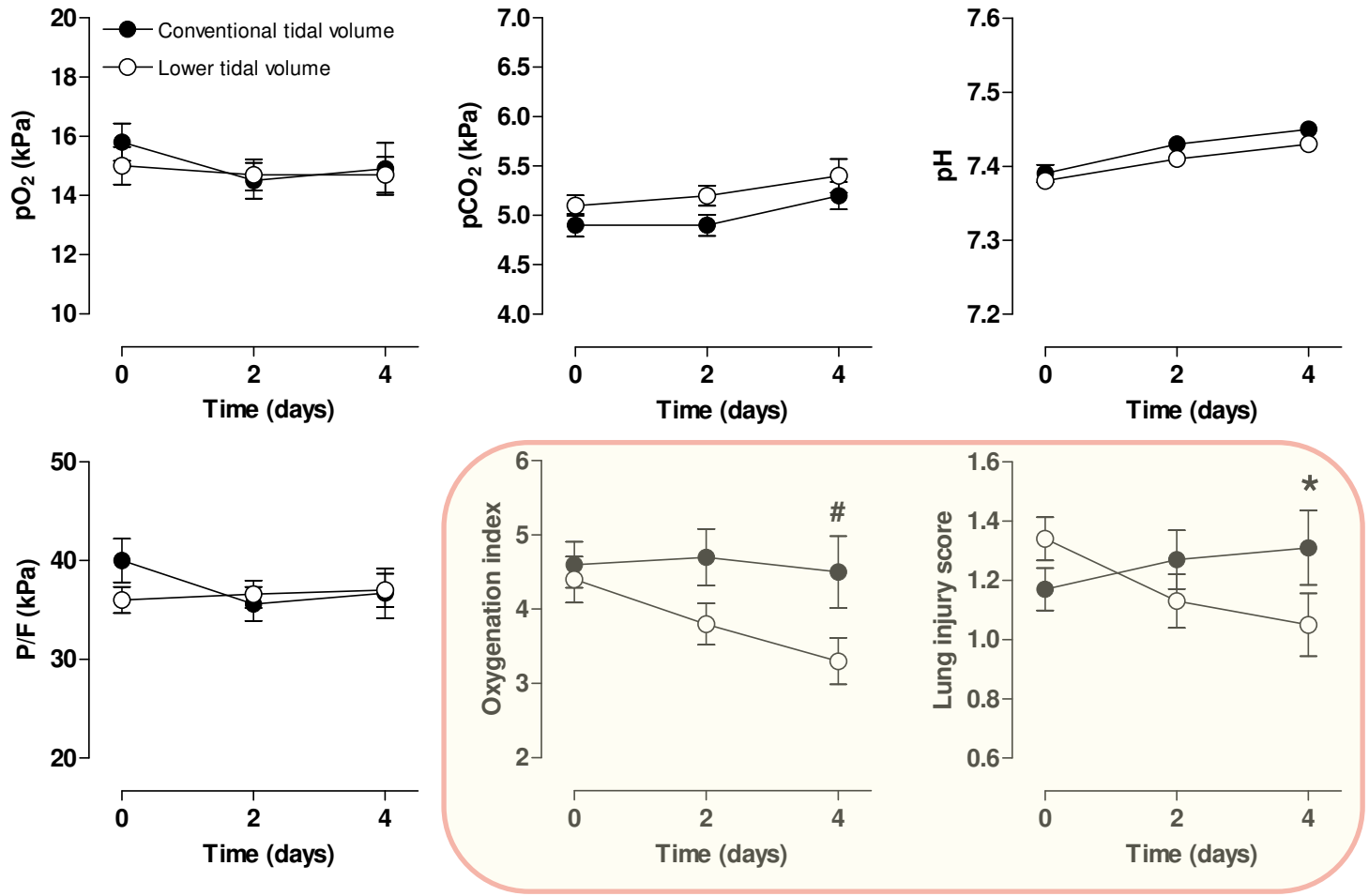

Figure 3 Serial data on respiratory values and lung-injury score of patients ventilated with conventional tidal volume (solid circles) or lower tidal volumes (open circles). Pa_{O_2} partial pressure of arterial oxygen; PaC_{O_2} partial pressure of arterial carbon dioxide; PF = ratio of Pa_{O_2} to fraction of inspired oxygen; LIS lung injury score. The number of patients was 74 *versus* 76 (conventional *versus* lower tidal volumes), 55 *versus* 63, and 34 *versus* 34, respectively, at T = 0, T = 2, and T = 4 days. *$P < 0.05$; #$P = 0.06$ (Interaction time × Group).

RESEARCH Open Access

Ventilation with lower tidal volumes as compared with conventional tidal volumes for patients without acute lung injury: a preventive randomized controlled trial

Rogier M Determann[1,2], Annick Royakkers[3,4], Esther K Wolthuis[1,5], Alexander P Vlaar[1], Goda Choi[1,2], Frederique Paulus[1], Jorrit-Jan Hofstra[1,4], Mart J de Graaff[1], Johanna C Korevaar[6] and Marcus J Schultz*[1,7]

Determann *et al. Critical Care* 2010, **14**:R1
http://ccforum.com/content/14/1/R1

150 patients

PaO_2/FiO_2 > 300 mmHg

High Vt (10 ml/kg PBW)
vs
Low Vt (6 ml/kg PBW)

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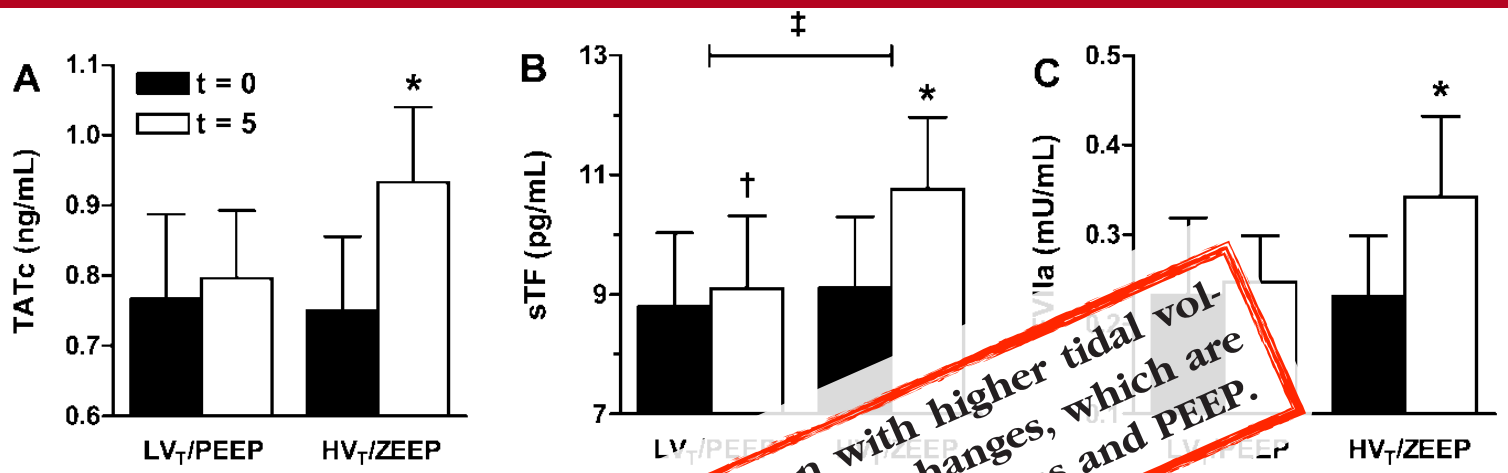
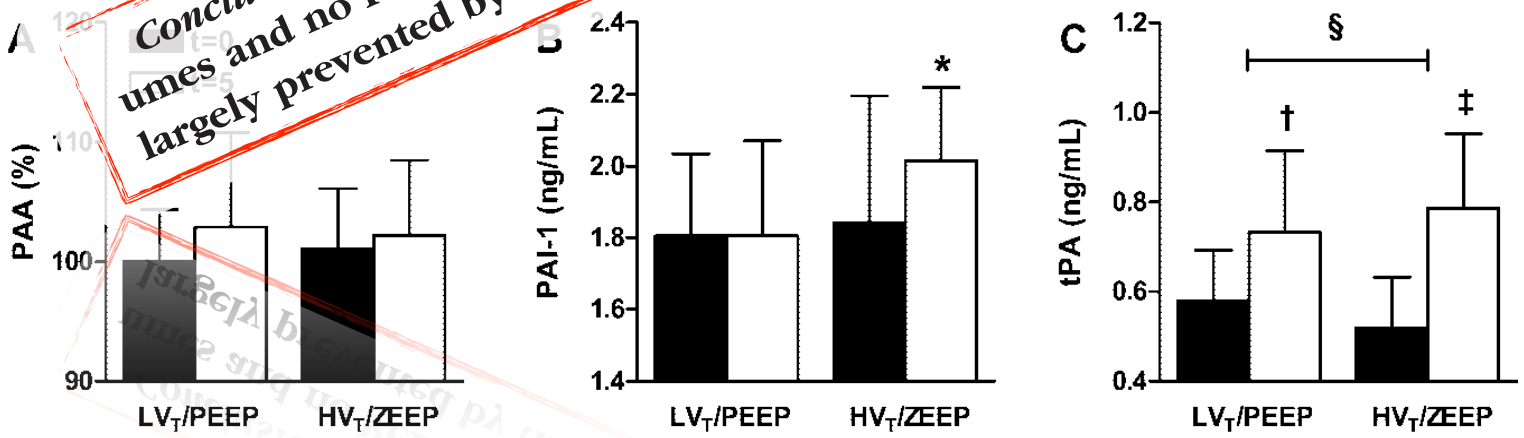


Conclusions: Mechanical ventilation with higher tidal volumes and no PEEP promotes procoagulant changes, which are largely prevented by the use of lower tidal volumes and PEEP.



Mechanical Ventilation with Lower Tidal Volumes and Positive End-expiratory Pressure Prevents Alveolar Coagulation in Patients without Lung Injury

Goda Choi, M.D., Esther K. Wolthuis, M.D.,† Paul Bresser, M.D., Ph.D.,‡ Marcel Levi, M.D., Ph.D.,§ Tom van der Poll, M.D., Ph.D.,‖ Misa Dzoljic, M.D., Ph.D.,# Margreeth B. Vroom, M.D., Ph.D.,** Marcus J. Schultz, M.D., Ph.D.††*

Anesthesiology 2006; 105:689–95

46 patients
undergoing elective surgery >5 hrs

12 ml/kg ZEEP
vs
6 ml/kg 10 cm H_2O PEEP

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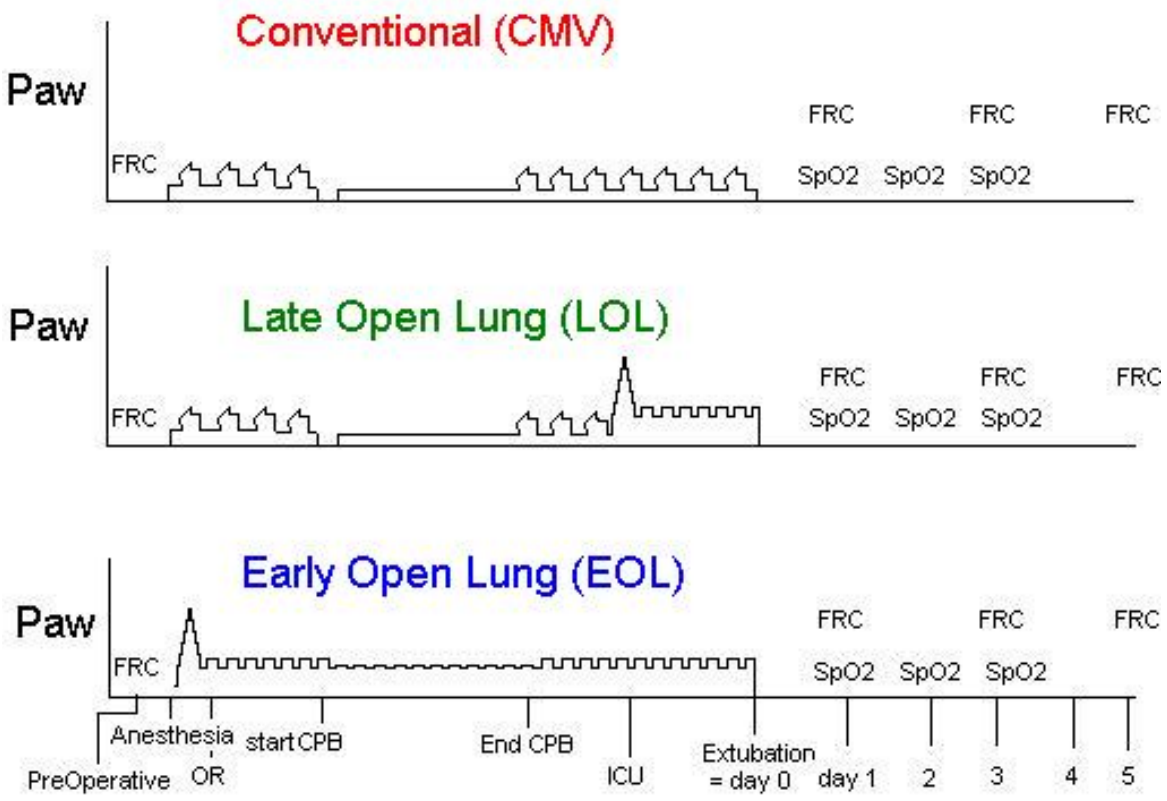

Open lung ventilation improves functional residual capacity after extubation in cardiac surgery*

Dinis Reis Miranda, MD; Ard Struijs, MD, PhD; Peter Koetsier, MD; Robert van Thiel, MD; Ronald Schepp, MD; Wim Hop, PhD; Jan Klein, MD, PhD; Burkhard Lachmann, MD, PhD; Ad J. J. C. Bogers, MD, PhD; Diederik Gommers, MD, PhD

Crit Care Med 2005 Vol. 33, No. 10

- **Prospective, single center randomized study**
- **69 patients CABG and/or valve surgery**
- **CMV or OLC early and late**
  - **CMV: Vt 6-8 ml/kg, PEEP guided by ARDS network**
  - **OLC: Vt 4-6 ml/kg, PEEP guided by PaO_2/FiO_2**

CMV: PEEP 5 mbar, PIP 24 mbar

OLC: PEEP 14 mbar, PIP 24 mbar

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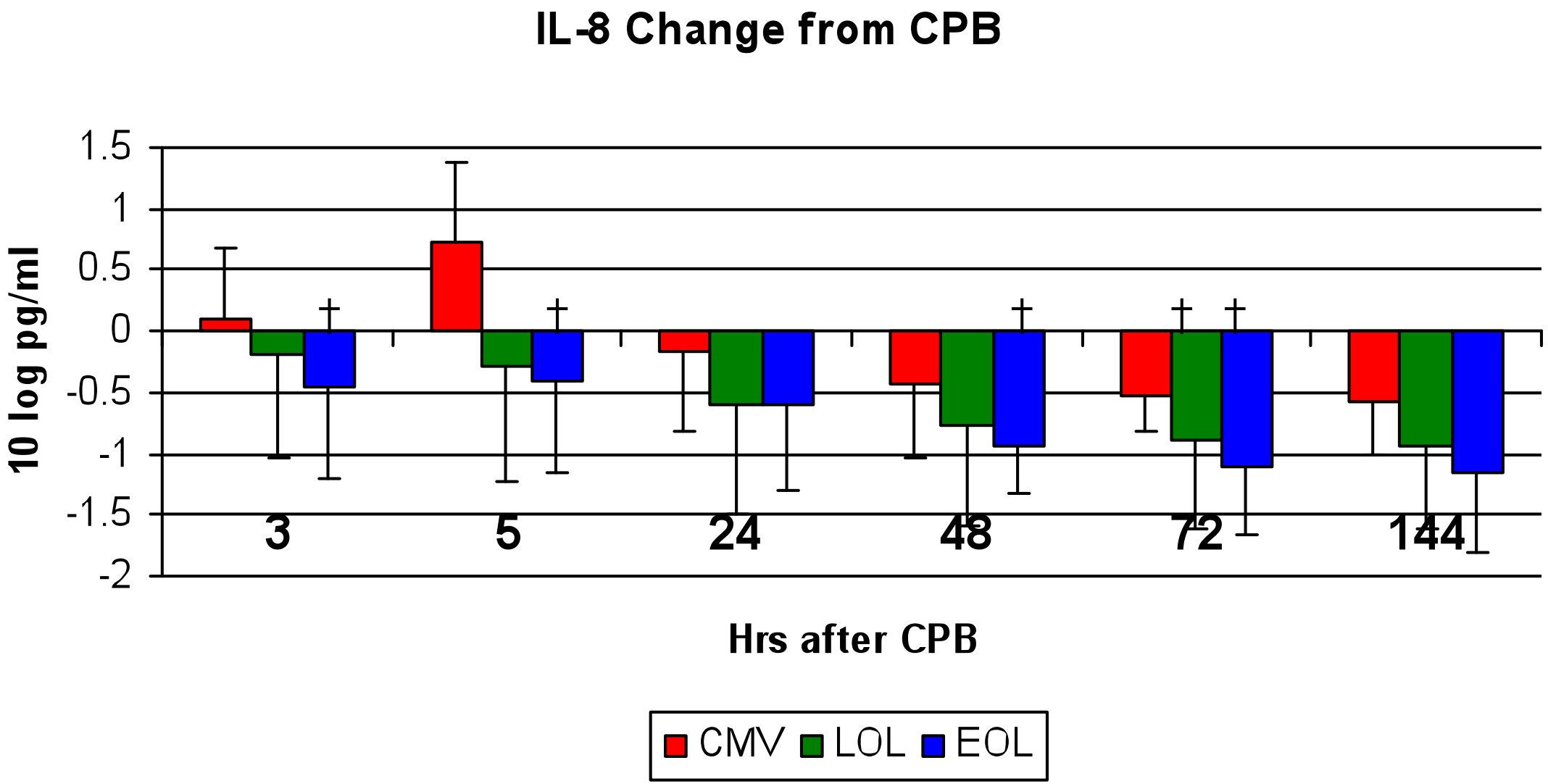

D. Reis Miranda, Eur J Cardiothorac Surg 2005;28:889-895

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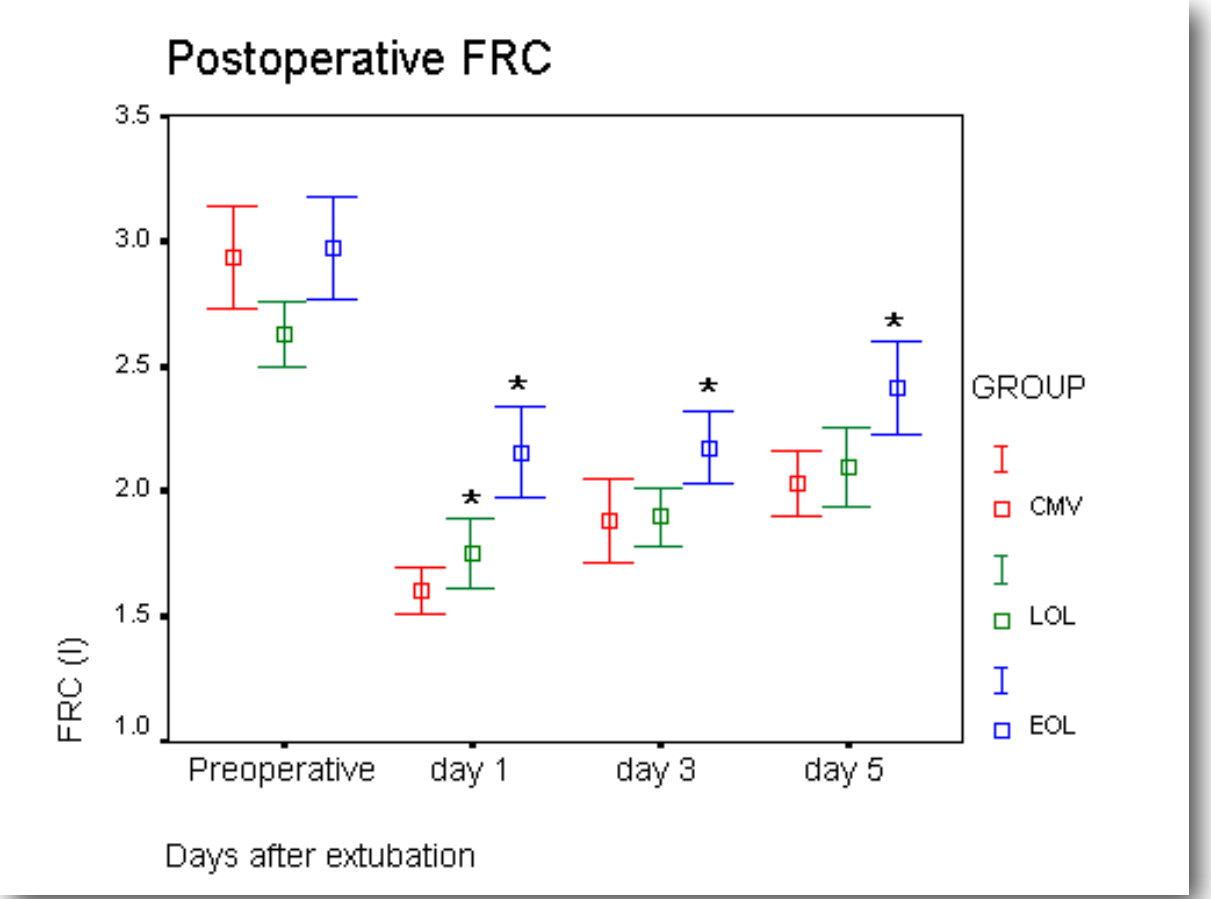

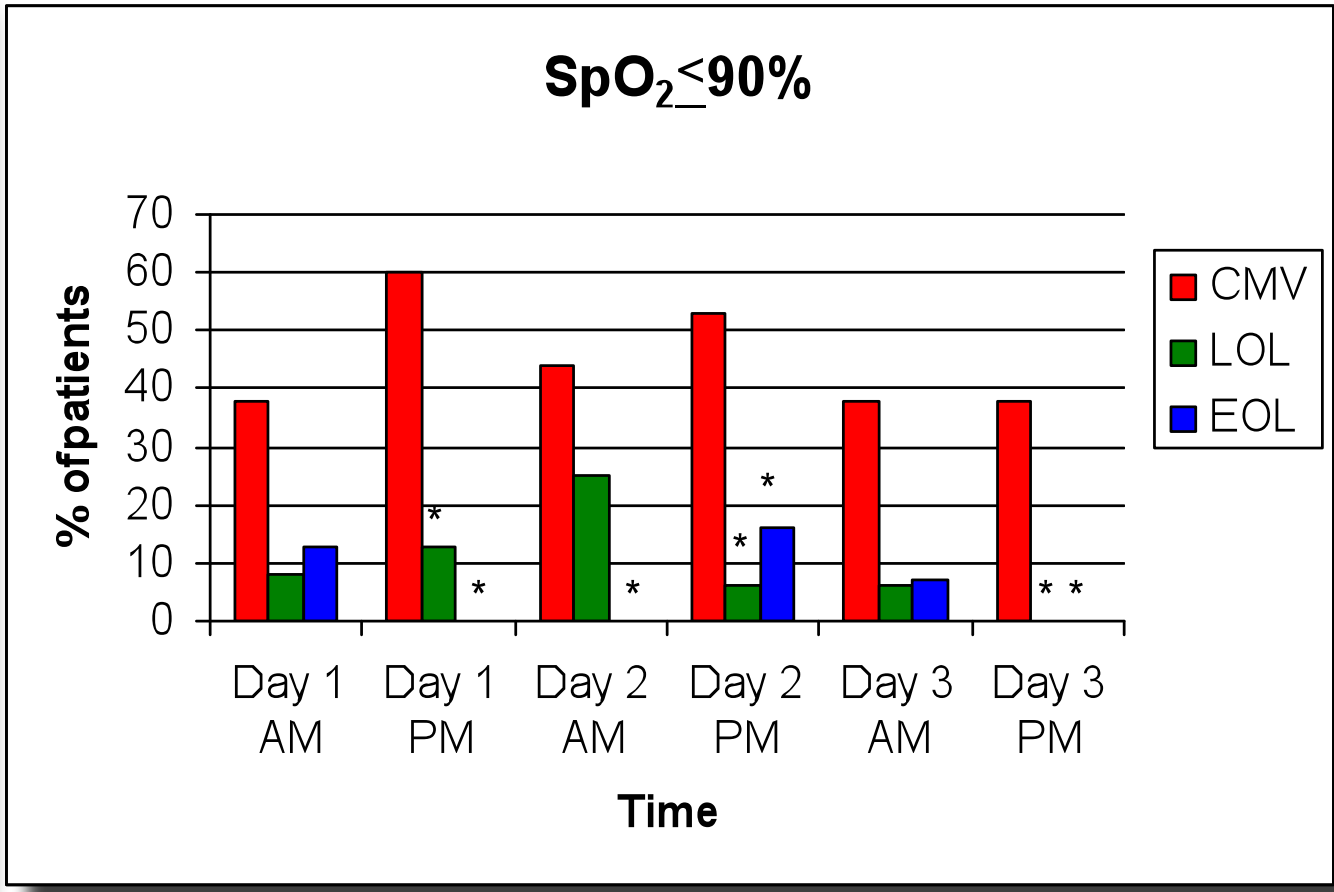

D Reis Miranda, Crit Care Med 2005

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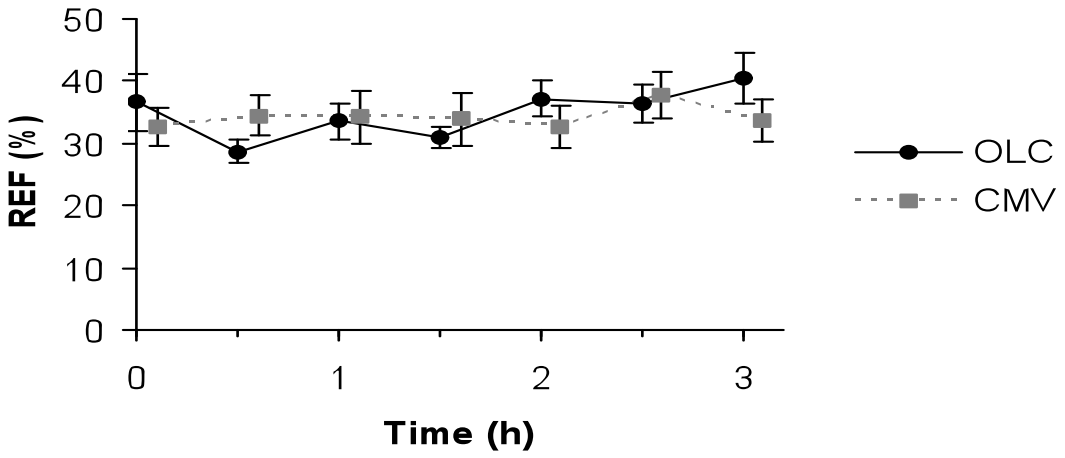

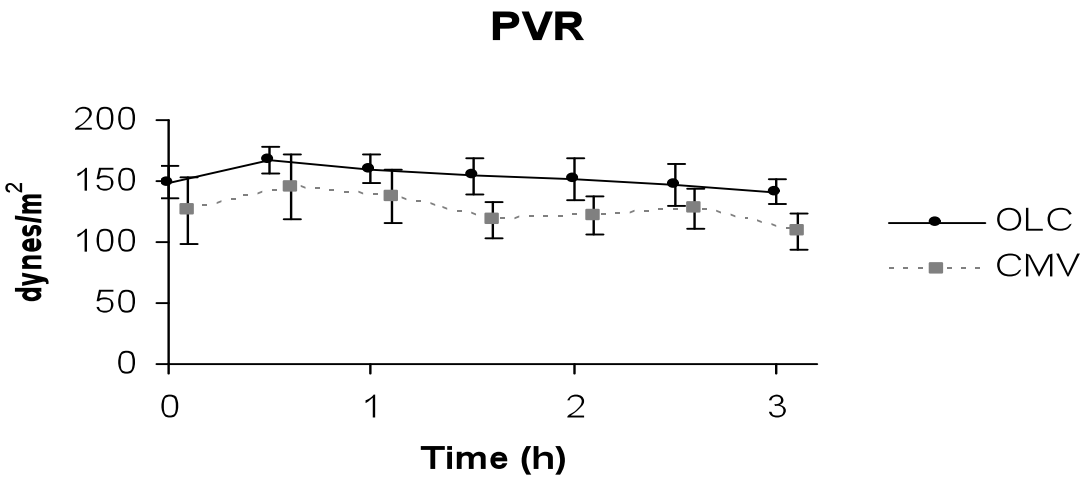

D. Reis Miranda Br J Anaesth 2004;93:327-332

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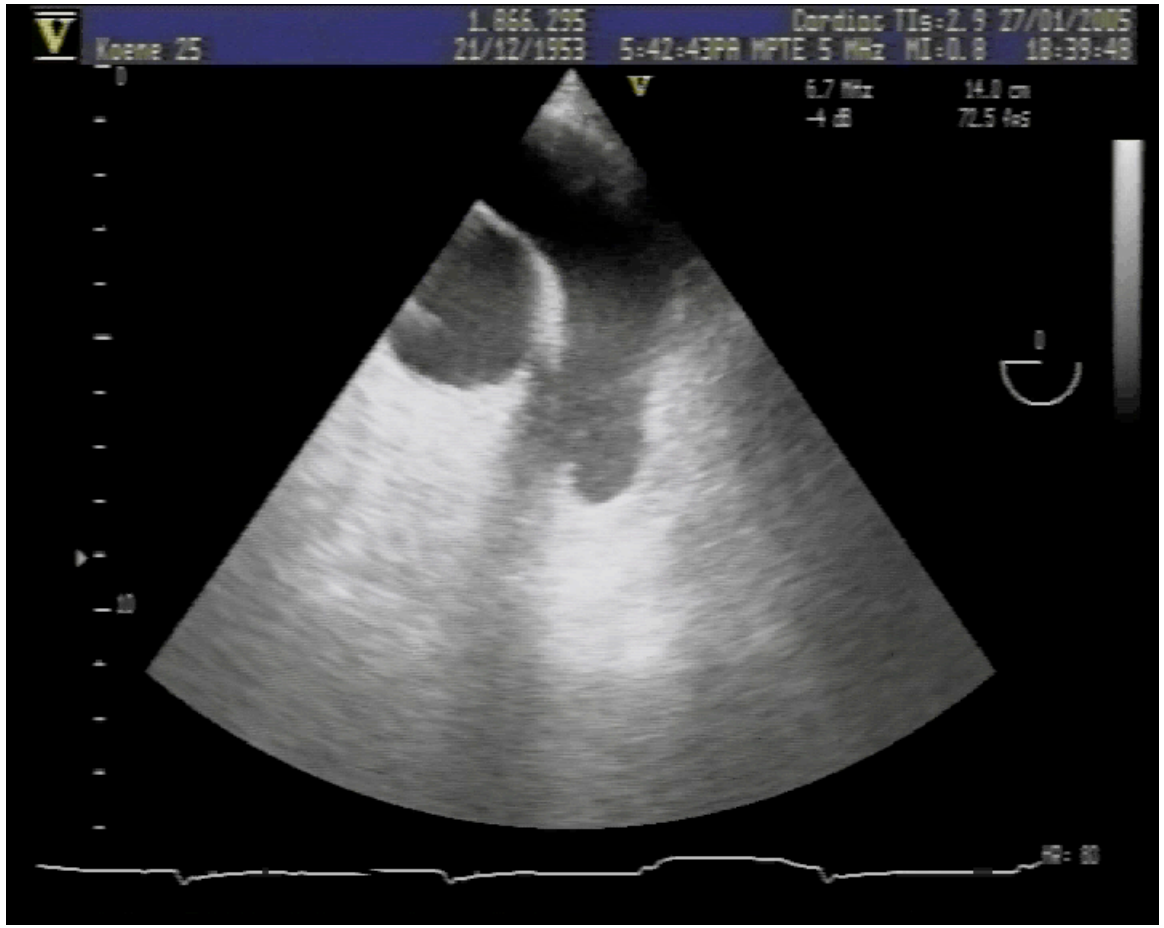
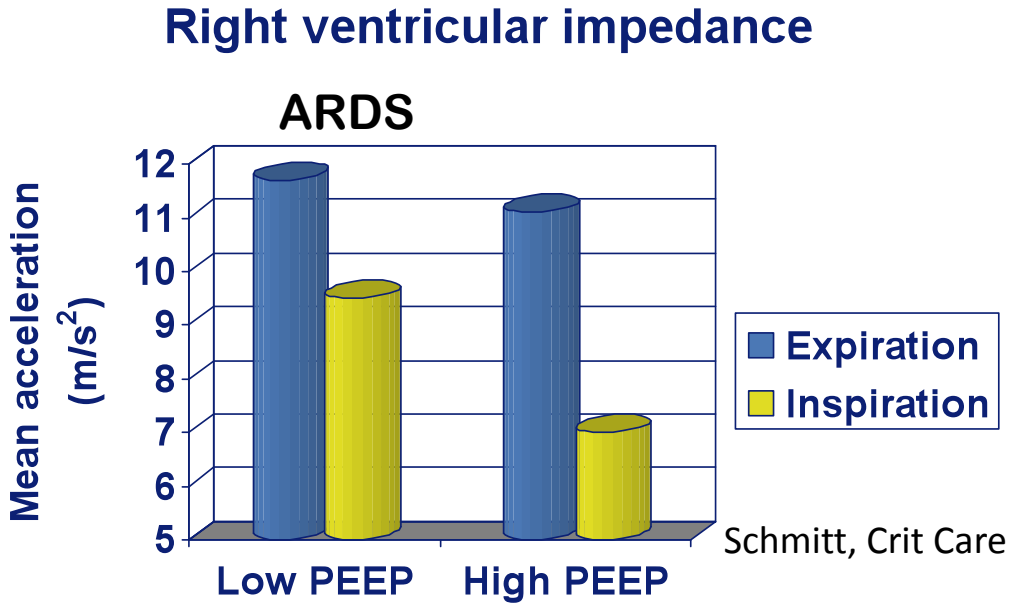
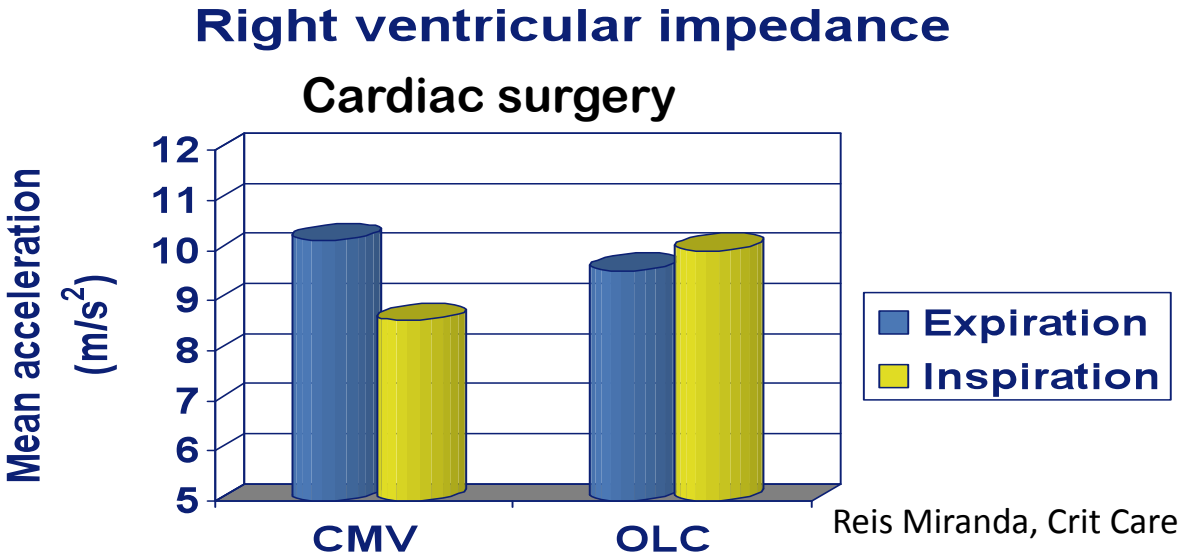




Schmitt, Crit Care Med 2001



Reis Miranda, Crit Care Med 2006

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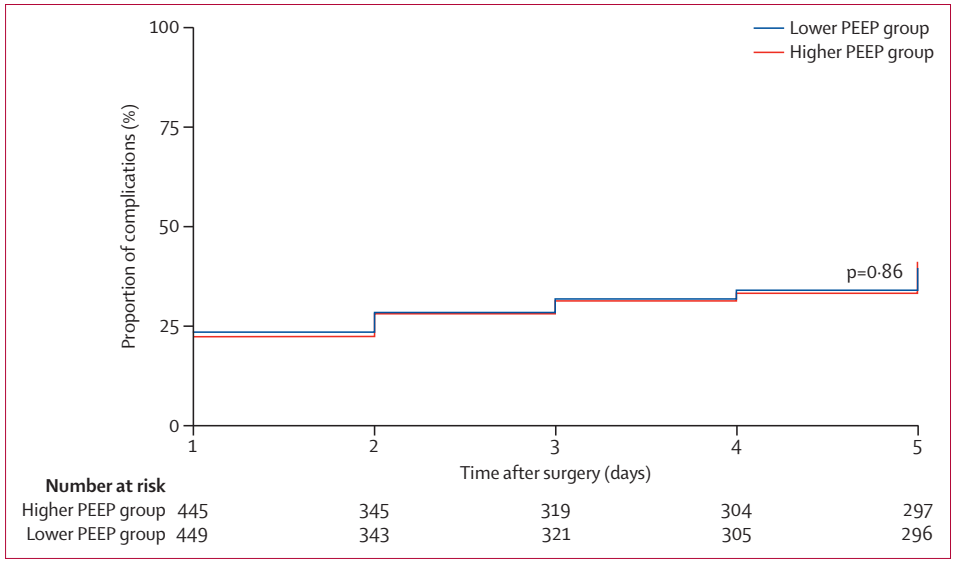

Figure 2: **Kaplan-Meier curve showing the probability of postoperative pulmonary complications by postoperative day 5**

	Higher PEEP group (n=445)	Lower PEEP group (n=449)	Relative risk (95% CI)	p
(Continued from previous page)				
Follow-up				
Impaired wound healing‡‡	71/444 (16%)	58/446 (13%)	1·23 (0·89–1·70)	0·21
Need for new or continued mechanical ventilation	18/437 (4%)	24/443 (5%)	0·77 (0·42–1·40)	0·74
Admission to intensive-care unit	106/442 (24%)	104/452 (23%)	1·03 (0·81–1·32)	0·79
Length of hospital stay (days)	10 (7–14)	10 (7–14)	..	0·24
Hospital-free days, at day 90	79 (71–83)	79 (70–82)	..	0·33
Mortality by day 5	2/443 (<1%)	1/448 (<1%)	2·02 (0·18–22)	0·56
In-hospital mortality	7/ 438 (2%)	7/442 (2%)	1·01 (0·36–2·85)	0·99

High versus low positive end-expiratory pressure during general anaesthesia for open abdominal surgery (PROVHILO trial): a multicentre randomised controlled trial

The PROVE Network Investigators for the Clinical Trial Network of the European Society of Anaesthesiology*

***Lancet* 2014; 384: 495–503**

High PEEP group: Recruitment + 12 mbar PEEP
n=445

Low PEEP group: No recruitment + <2 mbar PEEP
n=449

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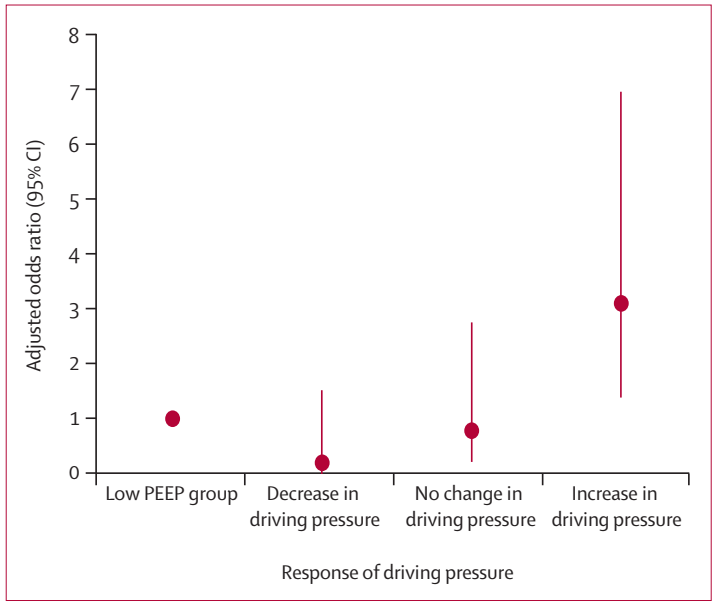

Figure 2: **Odds of postoperative pulmonary complications according to response of driving pressure after increase of PEEP**
PEEP=positive end-expiratory pressure.

	Univariate logistic regression (OR, 95% CI)	Multivariable logistic regression* (OR, 95% CI)	Mediation analysis using bootstrap* (ACME, 95% CI)
Randomisation (protective)	0·56 (0·42–0·75)	0·85 (0·05–13·50)	0·42 (0·14–1·19)
Tidal volume (mL/kg PBW)	1·14 (1·07–1·22)	1·05 (0·98–1·13)	0·91 (0·62–1·26)
PEEP (cm H_2O)	0·99 (0·95–1·02)	0·83 (0·59–1·16)	1·46 (0·88–2·36)
Driving pressure (cm H_2O)	1·06 (1·02–1·11)	1·16 (1·13–1·19)	1·27 (1·07–1·48)

OR=odds ratio. ACME=average causal mediation effect. PBW=predicted bodyweight. PEEP=positive end-expiratory pressure. *Adjusted for variables described in table 2 and using generalised linear mixed model.

Table 4: **Effect of driving pressure on postoperative pulmonary complications according to three regression methods for the whole cohort of patients**

Association between driving pressure and development of postoperative pulmonary complications in patients undergoing mechanical ventilation for general anaesthesia: a meta-analysis of individual patient data

Ary Serpa Neto, Sabrine N T Hemmes, Carmen S V Barbas, Martin Beiderlinden, Ana Fernandez-Bustamante , Emmanuel Futier, Ognjen Gajic, Mohamed R El-Tahan, Abdulmohsin A Al Ghamdi, Ersin Günay, Samir Jaber, Serdar Kokulu, Alf Kozian, Marc Licker, Wen-Qian Lin, Andrew D Maslow, Stavros G Memtsoudis, Dinis Reis Miranda, Pierre Moine, Thomas Ng, Domenico Paparella, V Marco Ranieri , Federica Scavonetto, Thomas Schilling, Gabriele Selmo, Paolo Severgnini, Juraj Sprung, Sugantha Sundar, Daniel Talmor, Tanja Treschan, Carmen Unzueta, Toby N Weingarten, Esther K Wolthuis, Hermann Wrigge, Marcelo B P Amato, Eduardo L V Costa, Marcelo Gama de Abreu, Paolo Pelosi, Marcus J Schultz, for the PROVE Network Investigators

Lancet Respir Med **2016; 4: 272–80**

2250 patienten in 17 studies

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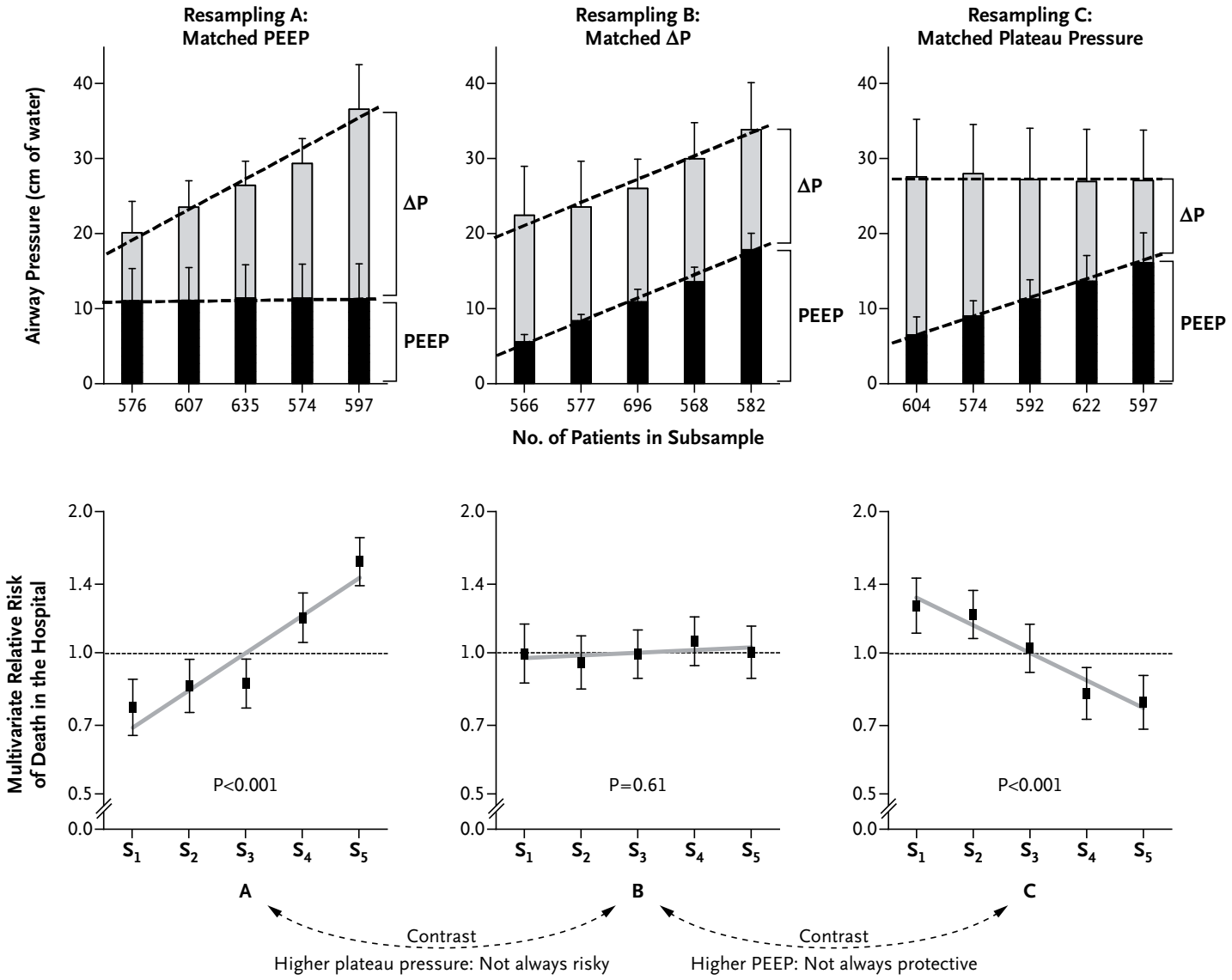
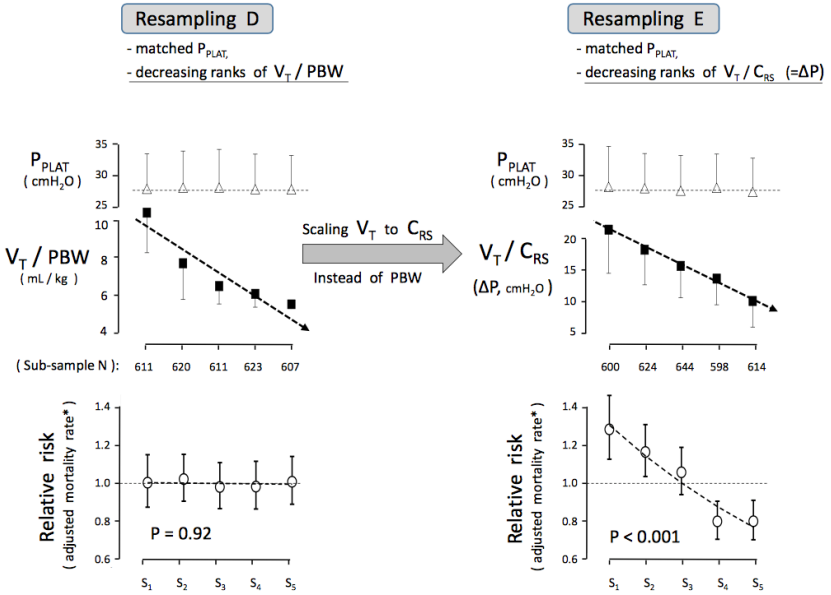


SPECIAL ARTICLE

Driving Pressure and Survival in the Acute Respiratory Distress Syndrome

Marcelo B.P. Amato, M.D., Maureen O. Meade, M.D., Arthur S. Slutsky, M.D., Laurent Brochard, M.D., Eduardo L.V. Costa, M.D., David A. Schoenfeld, Ph.D., Thomas E. Stewart, M.D., Matthias Briel, M.D., Daniel Talmor, M.D., M.P.H., Alain Mercat, M.D., Jean-Christophe M. Richard, M.D., Carlos R.R. Carvalho, M.D., and Roy G. Brower, M.D.

N Engl J Med 2015;372:747-55.



Longprotectief beademen wordt waarschijnlijk gekenmerkt door een zo laag mogelijke delta P (<15 mbar)

In onze ervaring kan recruitment en hogere PEEP settings helpen om delta P te verlagen