Göğüs Kalp Damar Anestezi ve Yoğun Bakım Derneği
23. ULUSAL KONGRESİ
25-28 Mayıs 2017
Marriot Hotel Asia
İSTANBUL

Kalp ve göğüs cerrahisi anestezisi sırasında mekanik ventilasyon

Mert Şentürk

İSTANBUL ÜNİVERSİTESİ
İSTANBUL TIP FAKÜLTESİ

Dear Mert, soon surgery. Any meaning to come Friday evening or Saturday morning for my planned lecture if permitted by the surgeon? I feel awful having caused this mess

Sorry Mert, but I have been “ordered” by the surgeon to rest at home at least a week. Since this was my second surgery…

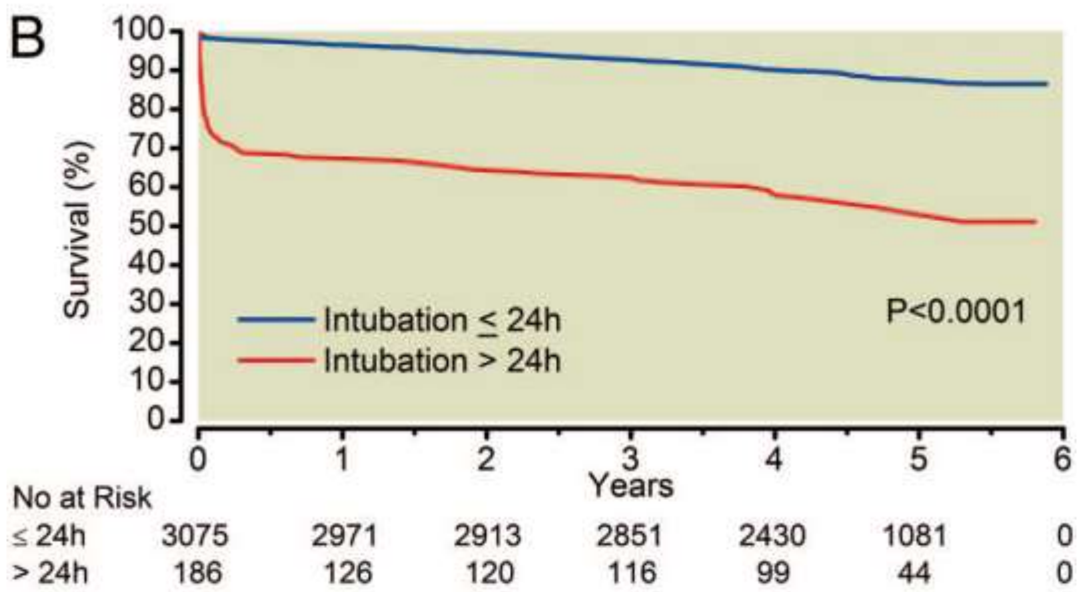
Ajanda

- Önemli mi?
- Koruyucu ventilasyon
  - FiO_2
  - CPAP
  - RM
- Koruyucu ventilasyon ile ilgili tartışmalar

Önemli mi?

- Atelektazi ve hipoksemi, en sık ve en önemli solunumsal komplikasyon

% 60-90 Scherer 2009; Figureiredo 2008



Lellouche 2012

Niçin oluşuyor? #1

- Akciğer volümlerindeki değişiklikler (FRK)

Kompresyon atelektazisi

- Gaz bileşimindeki değişikler (O2)

Rezorpsiyon atelektazisi

- Diğer faktörler :
  - HPV inhibisyonu
  - Sürfaktan kaybı vb

Niçin oluşuyor? #2

- Ekstrakorporeal dolaşım
- Plevral kavitede manuplasyon
- Farklı ventilasyon *alışkanlıkları*
  - FiO2
  - PEEP
  - TV

Apostolakis et al. Journal of Cardiothoracic Surgery 2010, 5:1
http://www.cardiothoracicsurgery.org/content/5/1/1

JOURNAL OF CARDIOTHORACIC SURGERY

REVIEW Open Access

Strategies to prevent intraoperative lung injury during cardiopulmonary bypass

Efstratios E Apostolakis[1], Efstratios N Koletsis[1], Nikolaos G Baikoussis[1,2*], Stavros N Siminelakis[2], Georgios S Papadopoulos[3]

Off-pump
Yeni EKD devreleri
Ultrafiltrasyon
Lökosit deplesyonu
Farmakolojik önlemler
EKD sırasında ventilasyon

Stratégie ventilatoire peropératoire en chirurgie cardiaque : vers une approche multimodale

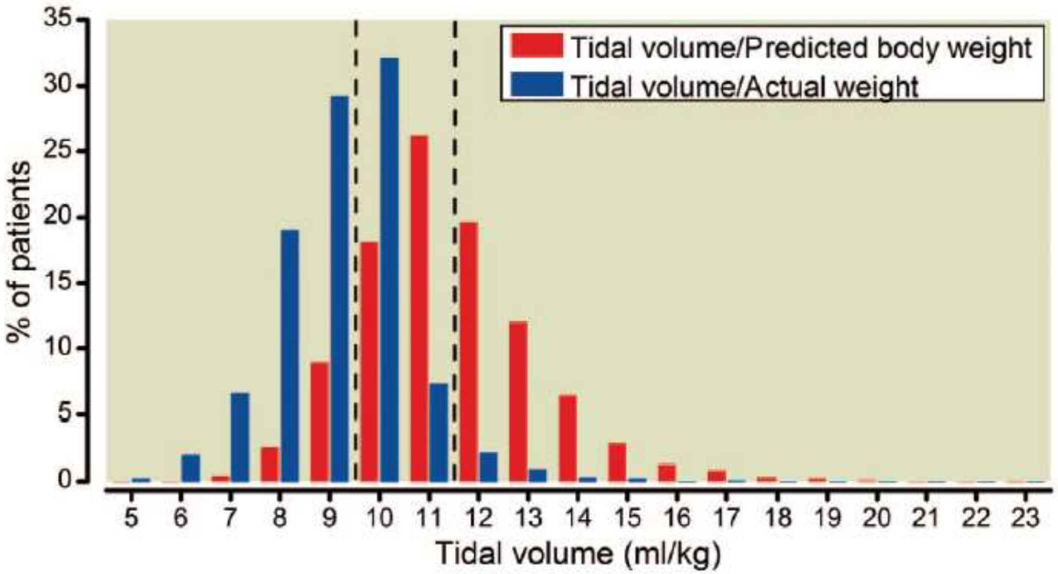
Intraoperative ventilatory strategy in cardiac surgery: towards a multimodal approach

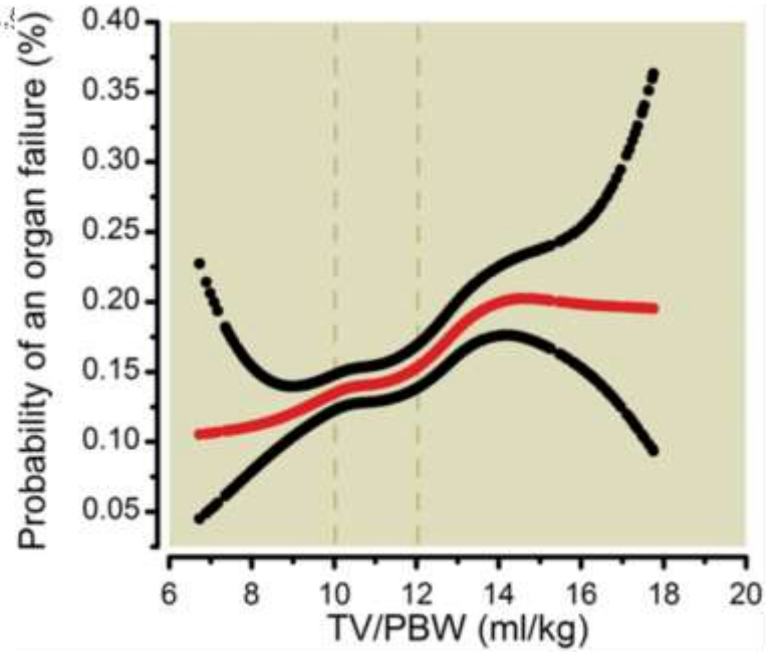
A. Ouattara[a, b, c*], P. Sarrabay[a, b]

Annales Françaises d'Anesthésie et de Réanimation 31 (2012) S2-S4

High Tidal Volumes in Mechanically Ventilated Patients Increase Organ Dysfunction after Cardiac Surgery

François Lellouche, M.D., Ph.D.,* Stéphanie Dionne,† Serge Simard, M.Sc.,‡ Jean Bussières, M.D.,§ François Dagenais, M.D.§





High Tidal Volumes in Mechanically Ventilated Patients Increase Organ Dysfunction after Cardiac Surgery

François Lellouche, M.D., Ph.D.,* Stéphanie Dionne,† Serge Simard, M.Sc.,‡ Jean Bussières, M.D.,§
François Dagenais, M.D.§

	Tidal Volumes (ml/kg of PBW)			
	Less Than 10 (n = 724)	10–12 (n = 1,567)	More Than 12 (n = 1,143)	*P* Value
Any organ failure, n (%)	82 (11)	230 (15)	206 (18)	<0.001 (†)
Multiple organ failure, n (%)	21 (2.9)	74 (4.7)	70 (6.1)	0.006 (†)
ICU length of stay (days)	1.0 (1.0–2.2)	1.2 (0.9–2.6)	1.8 (1.0–3.0)	<0.001 (†, ‡)
ICU length of stay more than 24 h, n (%)	478 (20)	1,036 (45)	814 (35)	0.003 (†, ‡)
ICU length of stay more than 48 h, n (%)	225 (31)	518 (33)	447 (39)	<0.001 (†, ‡)
ICU length of stay more than 7 d, n (%)	19 (16)	46 (38)	57 (47)	0.005 (†, ‡)
Hospital length of stay (days)	6 (5–8)	6 (5–8)	7 (5–9)	0.06
ICU mortality, n (%)	13 (1.8)	30 (1.9)	29 (2.5)	0.44
Hospital mortality, n (%)	22 (3.0)	49 (3.1)	43 (3.8)	0.59
Hospital and late mortality, n (%)	91 (13)	208 (13)	154 (13)	0.85
Outcome Data				
Duration of mechanical ventilation (hours)	6.0 (5–12)	6.5 (4.5–13)	7.4 (4.8–14.9)	<0.001 (†)
Reintubation, n (%)	25 (3.5)	72 (4.6)	64 (5.6)	0.10
Intubation more than 24 h, n (%)	31 (4.3)	84 (5.4)	87 (7.6)	0.006 (†)
Intubation more than 48 h, n (%)	11 (1.5)	46 (2.9)	44 (3.9)	0.01 (†)
Intubation more than 7 d, n (%)	3 (0.4)	9 (0.6)	11 (1.0)	0.30
Hemodynamic instability, n (%)	39 (5.4)	124 (7.9)	115 (10.1)	0.001 (†)
Renal failure, n (%)	57 (7.9)	163 (10.4)	145 (12.7)	0.004 (†)
Hemodialysis, n (%)	9 (1.2)	47 (3.0)	36 (3.2)	0.02 (*, †)

BJA Advance Access published March 12, 2014

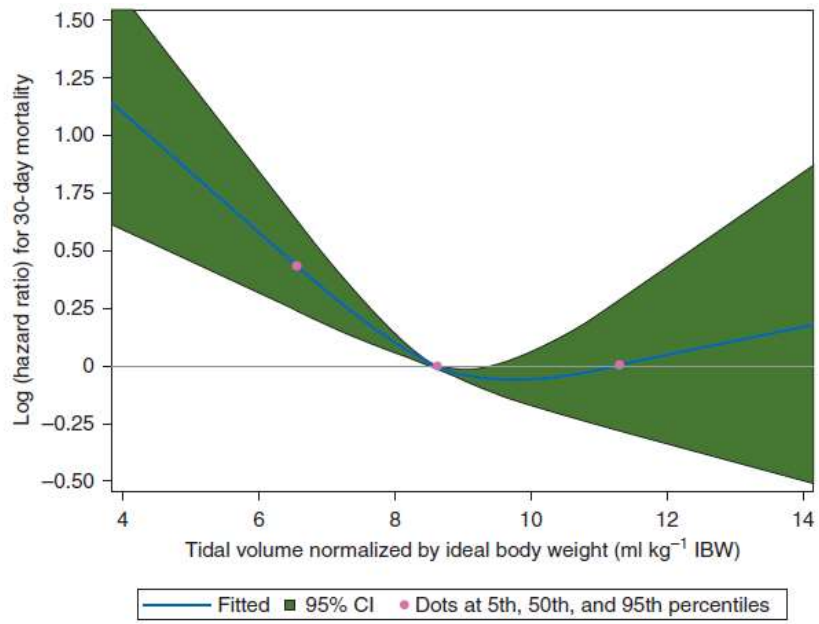
British Journal of Anaesthesia Page 1 of 12
doi:10.1093/bja/aeu054

BJA

Low intraoperative tidal volume ventilation with minimal PEEP is associated with increased mortality

M. A. Levin[1], P. J. McCormick[1], H. M. Lin[1,2], L. Hosseinian[1] and G. W. Fischer[1,3*]

Retrospektif
Median TV: 8.6 ml/kg
Azalma eğilimi
PEEP: 4 cmH20

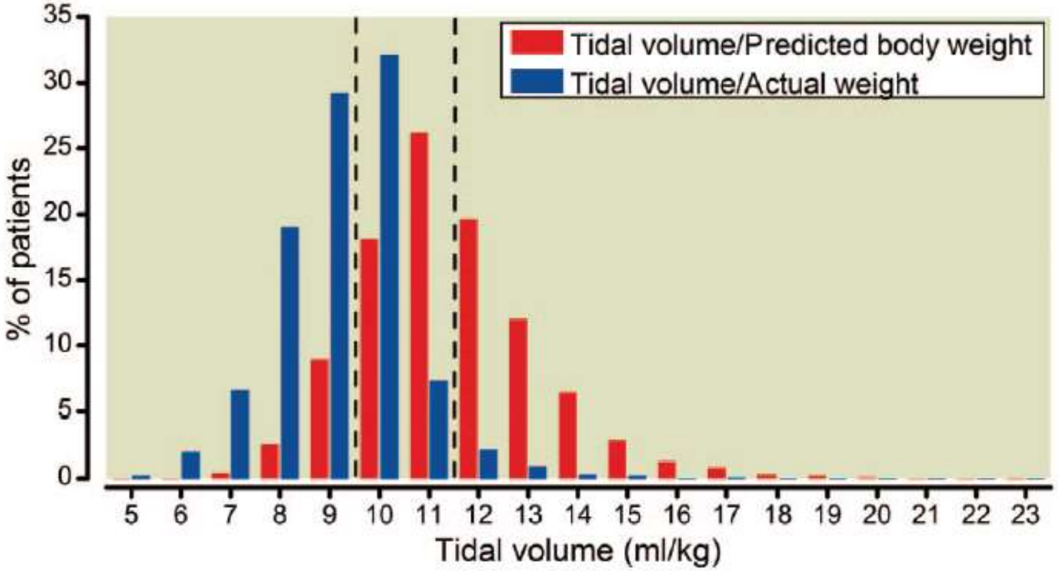


Limitasyonlar
Retrospektif
Plato basıncı?
Gaz değişimi?
Ventilasyon modu

High Tidal Volumes in Mechanically Ventilated Patients Increase Organ Dysfunction after Cardiac Surgery

 Anesthesiology 2012; 116:1072–82

François Lellouche, M.D., Ph.D.,* Stéphanie Dionne,† Serge Simard, M.Sc.,‡ Jean Bussières, M.D.,§
François Dagenais, M.D.§



rate usually set at 10 breaths/min, the positive end-expiratory pressure (PEEP) at 5 cm H_2O, and fraction of inspired oxygen (F_{IO_2}) ranged from 70 to 100%, as recommended in anesthesiology textbooks.[14,15] Patients were managed using

THE LANCET
Infectious Diseases

Volume 16, No. 12, e288–e303, December 2016

New WHO recommendations on intraoperative and postoperative measures for surgical site infection prevention: an evidence-based global perspective

Adult patients undergoing general anaesthesia with endotracheal intubation for surgical procedures should receive
80% fraction of inspired oxygen
intraoperatively and, if feasible, in the immediate postoperative period for 2–6 h

CPAP

- (sadece) Kısa dönemde oksijenizasyon daha iyi; FiO2’den bağımsız. Berry BJA 1993
- Sadece CPAP için yeterli kanıt YOK.

  (!!!: eski çalışmalar)
- “De-airing” için uygun olabilir
- Perfüzyonu devam ettirmek düşünülebilir.

The Effect of Different Lung-Protective Strategies in Patients During Cardiopulmonary Bypass: A Meta-Analysis and Semiquantitative Review of Randomized Trials

Journal of Cardiothoracic and Vascular Anesthesia, Vol 26, No 3 (June), 2012: pp 448-454

Jan-Uwe Schreiber, MD, PhD,* Marcus D. Lancé, MD,* Marcel de Korte, MD,* Thorsten Artmann, BS,†
Ivan Aleksic, MD, PhD, FETCS,‡ and Peter Kranke, MD, PhD, MBA†

Study or Subgroup	VCM Mean	VCM SD	VCM Total	Control Mean	Control SD	Control Total	Weight	Mean Difference IV, Random, 95% (
Murphy 2001	148	13	20	167	16	20	43.7%	−19.00 [−28.03, −9.9
Muslu 2003	117	8	11	153	14	11	42.8%	−36.00 [−45.53, −26.4
Tschernko 2002	177	46	12	211	35	12	13.4%	−34.00 [−66.70, −1.3
Total (95% CI)			**43**			**43**	**100.0%**	**−28.30 [−42.13, −14.4**

Heterogeneity: $Tau^2 = 92.59$; $Chi^2 = 6.61$, $df = 2$ ($P = 0.04$); $I^2 = 70\%$
Test for overall effect: $Z = 4.01$ ($P < 0.0001$)

Mean Difference

1. İyileşme kısa süreli (muhtemelen)
2. Cerrahi konforu bazuyor (1 çalışma)
3. Yüksek FiO2 gerekli değil

Study or Subgroup	Experimental Mean [PaO2/FiO2]	Experimental SD [PaO2/FiO2]	Experimental Total	Control Mean [PaO2/FiO2]	Control SD [PaO2/FiO2]	Control Total	Weight	Mean Difference IV, Random, 95% CI [PaO2/FiO2]
Figueiredo 2008	352	79	15	379	140	15	10.8%	-27.00 [-108.35, 54.35]
Loeckinger 2000	222	89	7	276	97	7	8.6%	-54.00 [-151.52, 43.52]
Total (95% CI)			**134**			**129**	**100.0%**	**-46.69 [-81.52, -11.85]**

Heterogeneity: $Tau^2 = 1206.05$; $Chi^2 = 18.32$, $df = 5$ ($P = 0.003$); $I^2 = 73\%$
Test for overall effect: $Z = 2.63$ ($P = 0.009$)

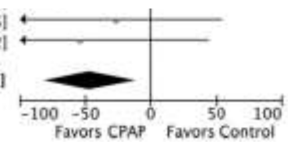


Fig 3. A forest plot for CPAP, 5 to 10 cmH_2O ($F_iO_2 = 0.21$-0.5), during CPB showing the effect on $AaDO_2$ immediately after weaning from bypass.

1. Postop dönem etkisi gösterilememiş.
2. Daha çok çalışmaya ihtiyaç var

Study or Subgroup	Experimental Mean [mmHg]	Experimental SD [mmHg]	Experimental Total	Control Mean [mmHg]	Control SD [mmHg]	Control Total	Weight	Mean Difference IV, Random, 95% CI [mmHg]	Year
Berry 1993	182	85	22	215	86	22	20.4%	−33.00 [−83.53, 17.53]	1993
Loeckinger 2000	94	26	7	141	46	7	23.8%	−47.00 [−86.14, −7.86]	2000
Ayad 2003	220	48	20	290	63	20	25.1%	−70.00 [−104.71, −35.29]	2003
Altmay 2006	96	36	60	97	30	60	30.8%	−1.00 [−12.86, 10.86]	2006
Total (95% CI)			**109**			**109**	**100.0%**	**−35.78 [−73.92, 2.37]**	

Heterogeneity: $Tau^2 = 1194.99$; $Chi^2 = 17.77$, $df = 3$ ($P = 0.0005$); $I^2 = 83\%$
Test for overall effect: $Z = 1.84$ ($P = 0.07$)

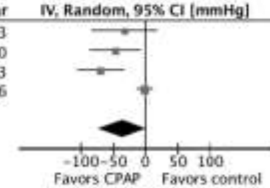
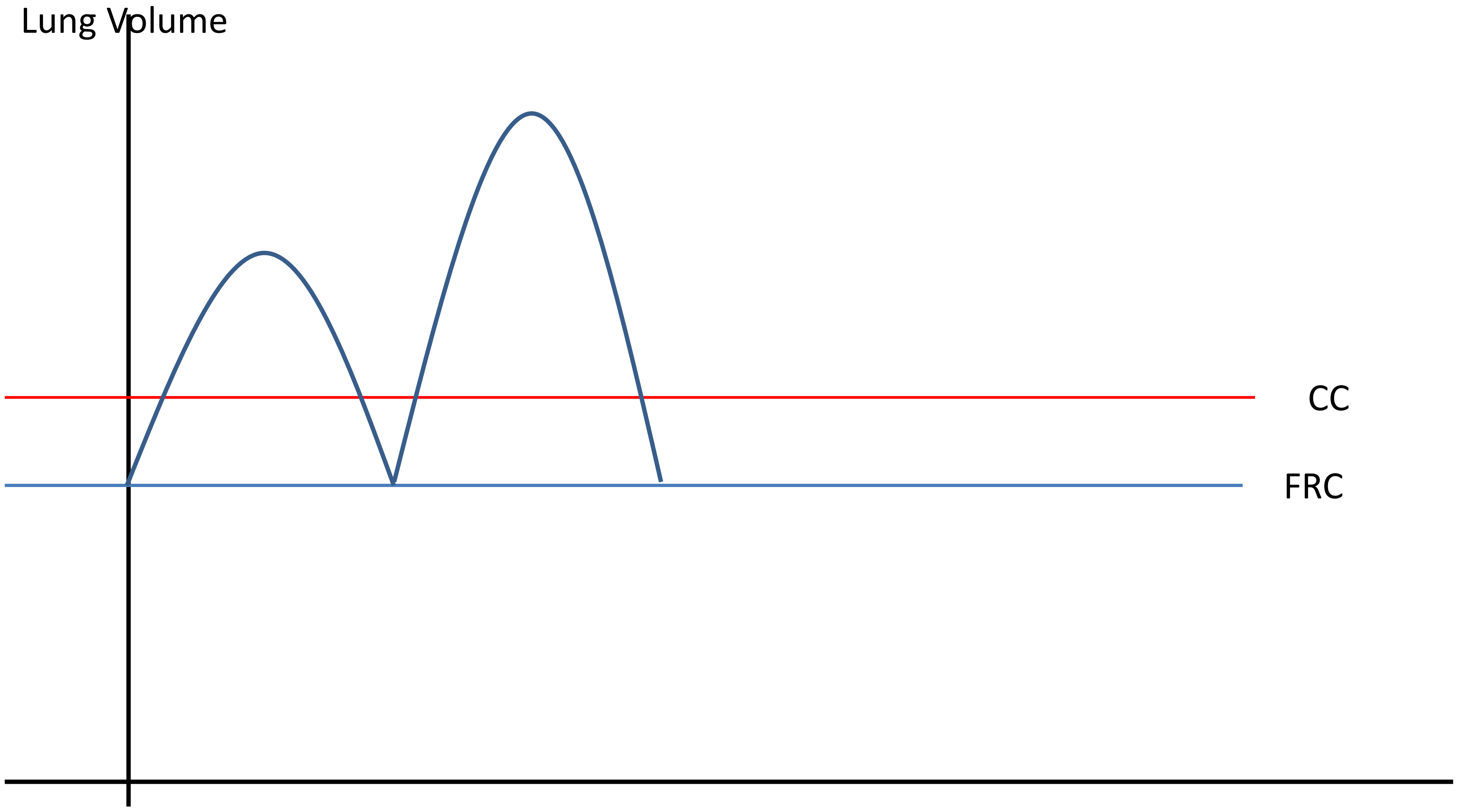
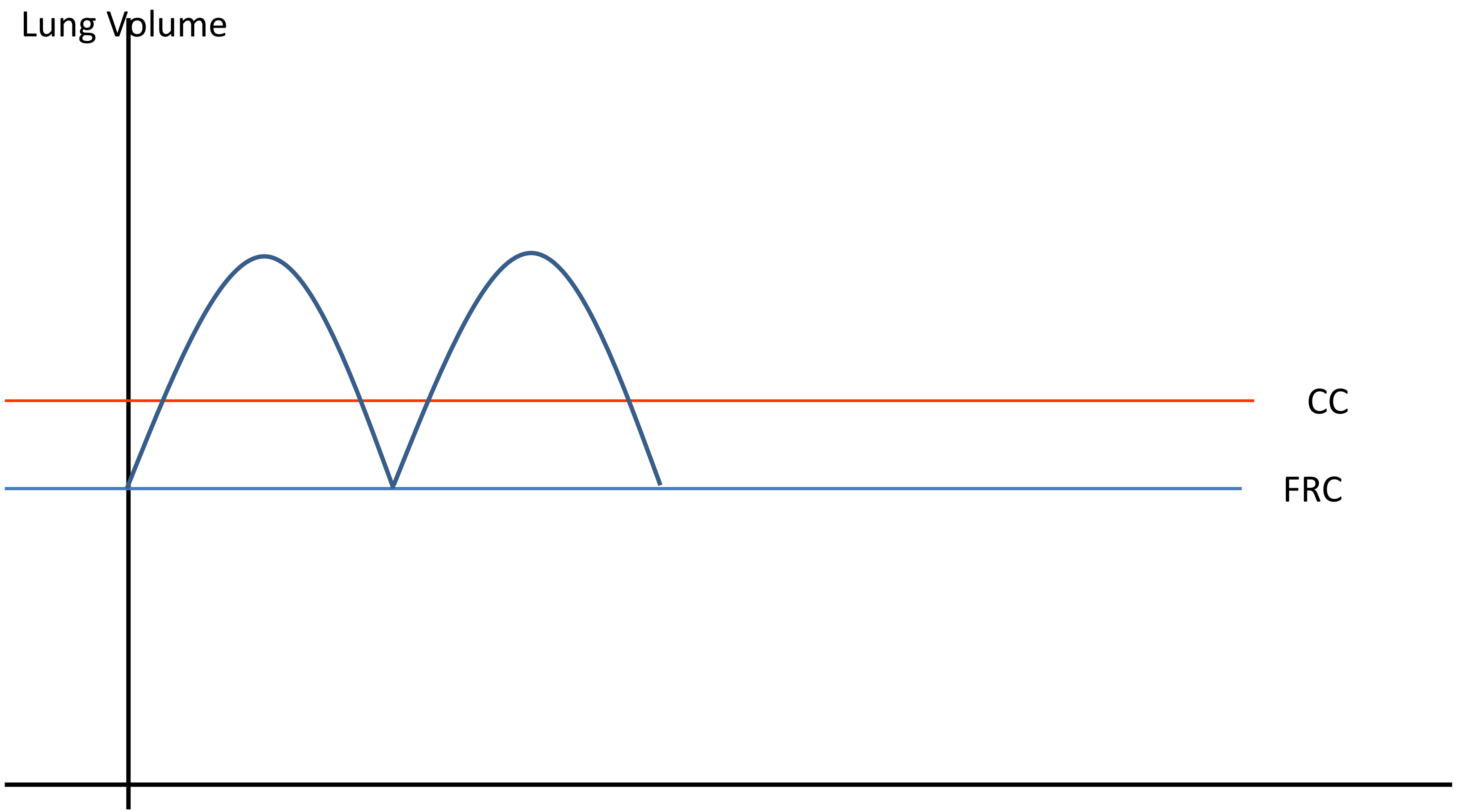


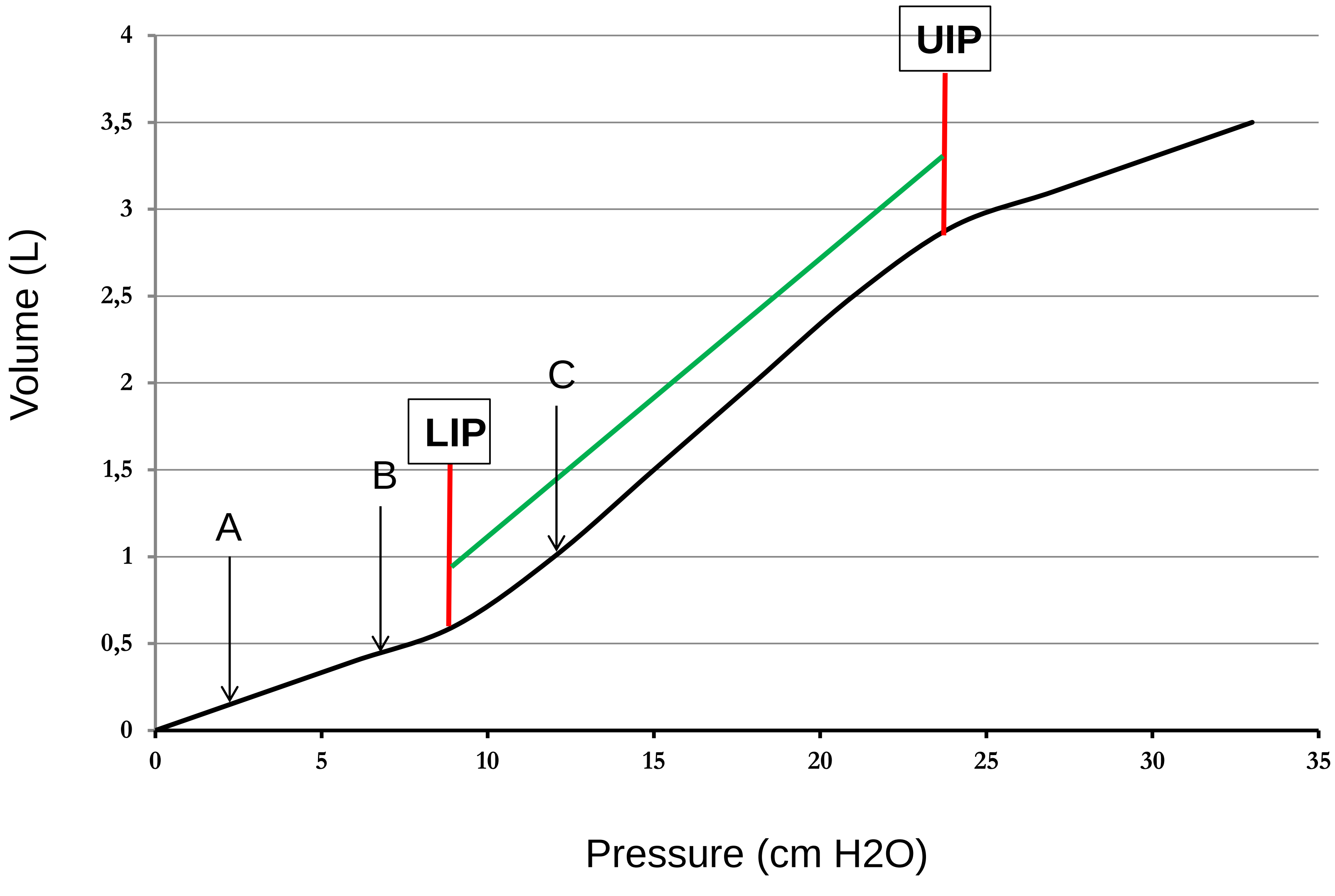
Fig 4. A forest plot for CPAP, 5 to 10 cmH_2O ($F_iO_2 = 0.21$-0.5), during CPB showing the effect on $AaDO_2$ 4 hours after weaning from bypass.

Pompa sonrası ventilasyon (operasyon sırasında ve sonrasında)

- Mod: **PCV** vs VCV
- Tidal volüm: **Düşük** vs yüksek
- **PEEP** vs ZEEP
- FiO2: **Düşük** vs Yüksek
- **ARM**


Lung Volume
CC
FRC


Lung Volume
CC
FRC



UIP
LIP
A
B
C
Volume (L)
Pressure (cm H2O)
0
0,5
1
1,5
2
2,5
3
3,5
4
0
5
10
15
20
25
30
35

Setting Individualized Positive End-Expiratory Pressure Level with a Positive End-Expiratory Pressure Decrement Trial After a Recruitment Maneuver Improves Oxygenation and Lung Mechanics During One-Lung Ventilation

Carlos Ferrando, MD, PhD,* Ana Mugarra, MD,* Andrea Gutierrez, MD,* Jose Antonio Carbonell, MD,*
Marisa García, MD,* Marina Soro, MD, PhD,* Gerardo Tusman, MD,† and
Francisco Javier Belda, MD, PhD*

March 2014 • Volume 118 • Number 3

TLV OLVpre OLV20 OLVend TLVend

Table 4. Ventilatory Variables

	Bilateral-lung ventilation	One-lung ventilation, prerecruitment maneuver	One-lung ventilation 20 min after PEEP	End one-lung ventilation	End bilateral-lung ventilation
Static compliance (mL·cm·H_2O^{-1})					
Control	53 (21)	33 (7)[b]	35 (7)[a]	33 (6)[a]	49 (24)
Study	49 (13)	33 (8)[b]	50 (11)[c]	48 (10)[c]	56 (19)
P-value	0.60	0.96	<0.001	<0.001	0.39
Physiologic dead-space volume/tidal volume					
Control	0.63 (0.4)	0.65 (0.8)	0.62 (0.8)	0.65 (0.8)	0.65 (0.9)
Study	0.65 (0.4)	0.69 (0.5)	0.64 (0.5)	0.64 (0.5)	0.66 (0.5)
P-value	0.10	0.06	0.10	0.27	0.55
Alveolar dead-space volume/alveolar tidal volume					
Control	0.31 (0.2)	0.32 (0.5)	0.31 (0.4)	0.33 (0.4)	0.33 (0.4)
Study	0.32 (0.2)	0.34 (0.2)	0.31 (0.1)[c]	0.31 (0.1)[c]	0.32 (0.1)
P-value	0.11	0.14	0.81	0.56	0.79
Peak inspiratory pressure (cm·H_2O)					
Control	21 (4)	26 (4)[b]	26 (6)	26 (6)	24 (6)
Study	19 (4)	26 (5)[b]	27 (6)	27 (6)	26 (9)
P-value	0.16	0.67	0.31	0.41	0.53
Tidal volume (mL)					
Control	8 (0)	6.7 (0.4)[b]	6.8 (0.4)	6.8 (0.4)	7.8 (0.4)
Study	8 (0)	6.7 (0.5)[b]	6.4 (0.8)	6.4 (0.8)	7.6 (0.7)
P-value		0.72	0.09	0.05	0.34
Ventilatory rate (breaths/min)					
Control	13(1)	15(1)[b]	16(1)	16(1)	15(1)
Study	13(1)	15(2)[b]	17(2)	17(2)	15(3)
P-value	0.69	0.27	0.53	0.47	0.62
Airway resistance (cm·H_2O L^{-1}·s^{-1})					
Control	11(3)	20(3)[b]	23(6)	23(6)	13(4)
Study	10(3)	19(5)[b]	19(6)	19(7)	12(3)
P-value	0.19	0.37	0.06	0.07	0.18

Data are presented as mean (SD). $P < 0.05$ in all groups.
PEEP = positive end-expiratory pressure.
[a]Control versus study.
[b]Bilateral versus one-lung ventilation, prerecruitment maneuver.
[c]One-lung ventilation prerecruitment maneuver versus 20 minutes after peep during one-lung ventilation, and end one-lung ventilation, *P* value for control versus study difference.

Ann Thorac Cardiovasc Surg Advance Published Date: October 3, 2013

doi: 10.5761/atcs.cr.13-0006

Case Report

Effects of Positive End-Expiratory Pressure on Mechanical Ventilation Duration after Coronary Artery Bypass Grafting: A Randomized Clinical Trial

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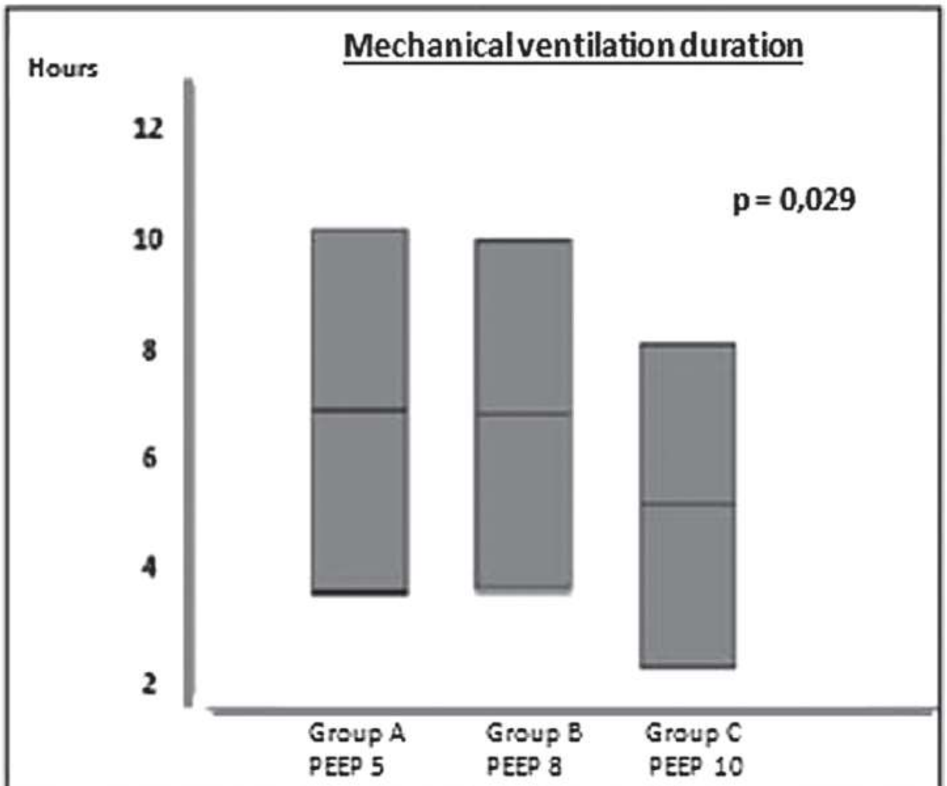
Thiago Eduardo Pereira Baldez, PT,[1] Marina de Albuquerque Gonçalves Costa, PT,[1]
Natália Pereira dos Santos, PT,[1] Ilka Mendes Lima, PT,[1]
and Josimary Lima da Silva Lula, Psy[3]



Comparison of Positive End-Expiratory Pressure of 8 versus 5 cm H2O on Outcome After Cardiac Operations.
Hansen ve ark 2014; J Intensive Care med

8 PEEP ile sadece hastanede kalış süresi kısalıyor; bunun da klinik olarak anlamlı olmadığı düşünülüyor.

The Pulmonary and Hemodynamic Effects of Two Different Recruitment Maneuvers After Cardiac Surgery

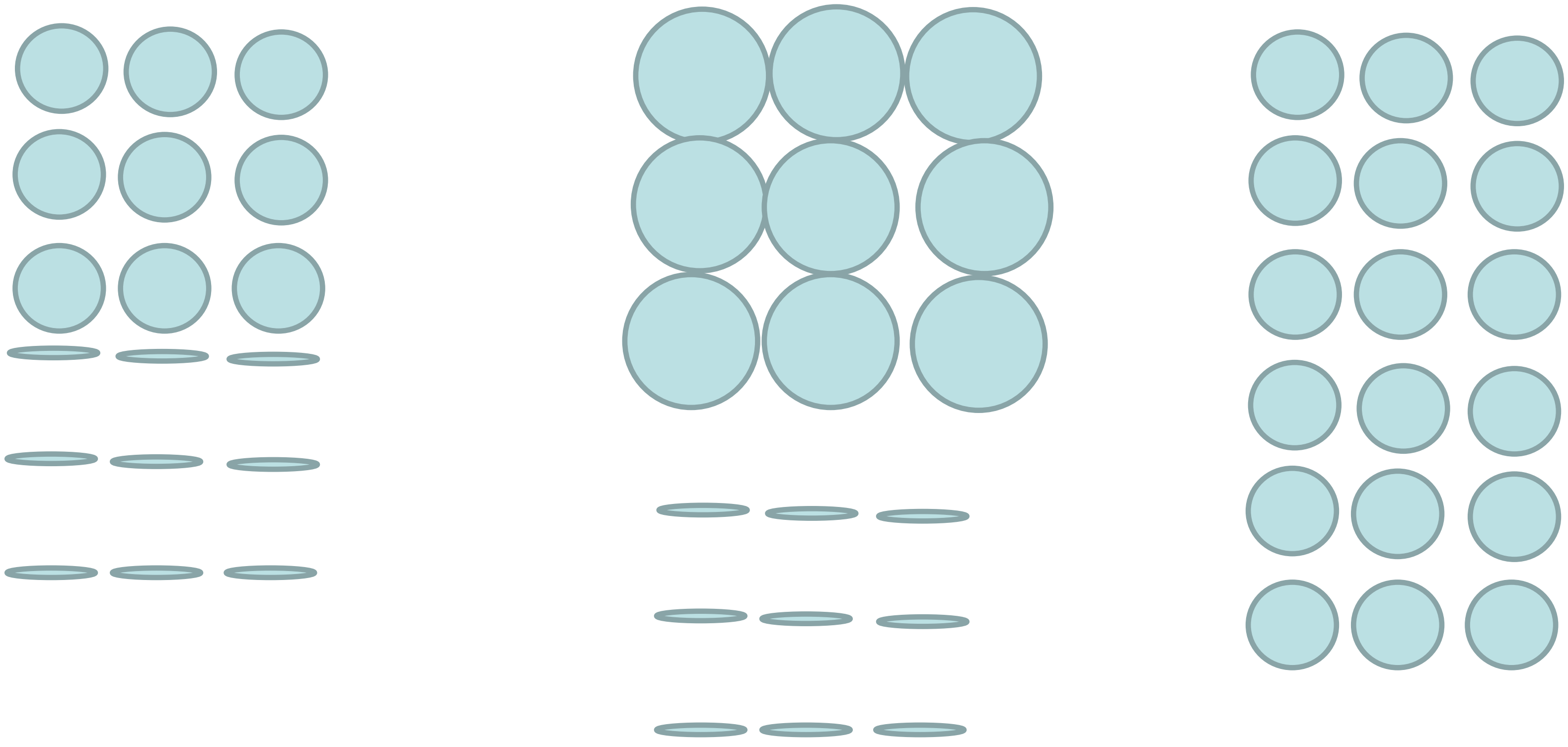
Serdar Celebi, MD*
Özge Köner, MD†
Ferdi Menda, MD*
Kubilay Korkut, MD‡
Kaya Suzer, MD‡
Nahit Cakar, MD§

BACKGROUND: The aim of our study was to evaluate the pulmonary and hemodynamic effects of two different recruitment maneuvers after open heart surgery.
METHODS: Sixty patients undergoing coronary artery bypass surgery were randomized into three groups after operation: recruitment maneuver with continuous positive airway pressure (CPAP) (CPAP-40 group, $n = 20$), recruitment by positive end-expiratory pressure (PEEP) (PEEP-20 group, $n = 20$), and 5 cm H_2O PEEP (PEEP-5 group, $n = 20$). In the CPAP-40 group, 40 cm H_2O peak inspiratory pressure was applied for 30 s, then PEEP was reduced to 20 cm H_2O and ventilation was continued with baseline variables with PEEP decreased until the best Pa_{O_2} was achieved. In the PEEP-20 group, 20 cm H_2O PEEP was set for 2 min, tidal volume was adjusted to achieve a peak inspiratory airway pressure of 40 cm H_2O during the maneuver, then PEEP was decreased until the best Pa_{O_2} had been achieved. In the PEEP-5 group, 5 cm H_2O PEEP was applied postoperatively.
RESULTS: The mean arterial blood pressure of the CPAP-40 group was lower than that of the PEEP-20 ($P < 0.01$) and PEEP-5 groups ($P < 0.01$) during the interventions. Oxygenation was higher in both recruitment groups than in the PEEP-5 group during the mechanical ventilation period. There was no significant difference among the groups beyond that period. The atelectasis score of the PEEP-5 group (1.3 ± 0.9) on postoperative day 1 was higher than that of the CPAP-40 (0.65 ± 0.6; $P = 0.01$) and PEEP-20 (0.65 ± 0.5; $P = 0.01$) groups.
CONCLUSIONS: The recruitment techniques with postmaneuver PEEP increased oxygenation and decreased atelectasis equally, whereas PEEP-20 provided more stable hemodynamic conditions than the CPAP maneuver.
(Anesth Analg 2007;104:384–90)

Pulmonary Effects of Noninvasive Ventilation Combined with the Recruitment Maneuver After Cardiac Surgery

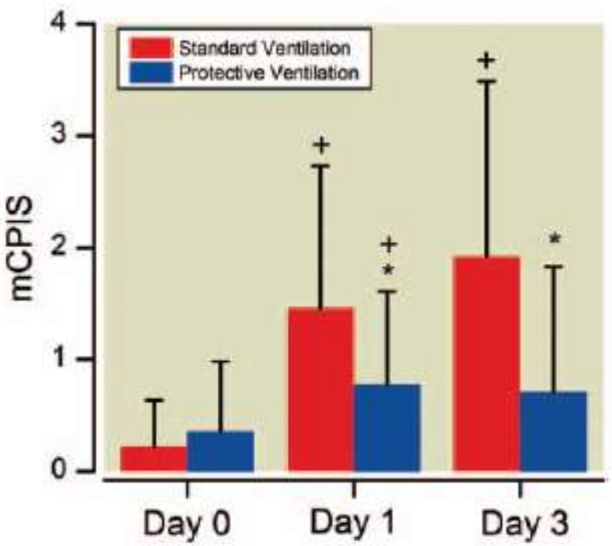
Serdar Celebi, MD*
Özge Köner, MD†
Ferdi Menda, MD†
Oğuz Omay, MD‡
İlhan Günay‡
Kaya Suzer, MD§
Nahit Cakar, MD||

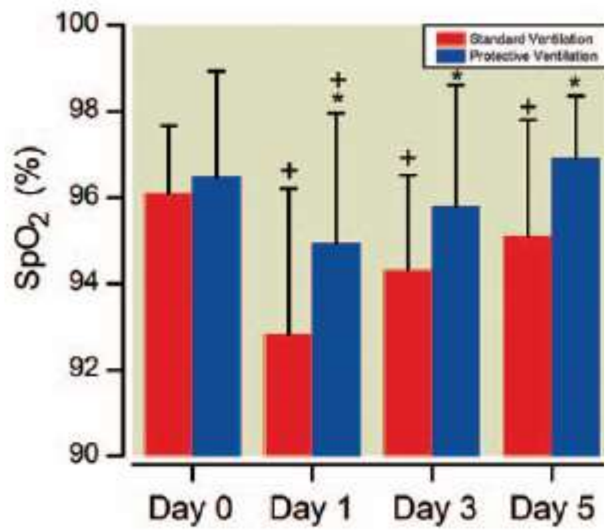
BACKGROUND: The aim of our study was to evaluate the pulmonary effects of noninvasive ventilation (NIV) with or without recruitment maneuver (RM) after open heart surgery.
METHODS: One-hundred patients undergoing coronary artery bypass surgery were randomized into four groups after the operation: 1) RM with sustained inflation during mechanical ventilation postoperatively (RM group, $n = 25$); 2) RM combined with NIV applied for 1/2-h periods every 6 h in the first postoperative day after tracheal extubation (RM-NIV group, $n = 25$); 3) NIV after tracheal extubation (NIV group, $n = 25$); and 4) a control group consisting of patients receiving neither RM nor NIV (control group, $n = 25$). Pulmonary function tests, oxygenation index, and atelectasis on chest radiograph were evaluated and compared among the groups.
RESULTS: RM provided higher arterial oxygen levels during mechanical ventilation and after tracheal extubation compared to other interventions. Oxygenation was better in the RM-NIV and NIV groups than in the control group ($P = 0.02$ and $P = 0.008$, respectively) at the end of the study. The postoperative atelectasis score of the control group (median: 1) was higher than those of the RM (1; $P = 0.03$), RM-NIV (0; $P < 0.01$) and NIV (0; $P < 0.01$) groups. Pulmonary function of the NIV groups on postoperative day 2 was better than in the other groups, whereas the tests were similar among the groups on postoperative day 7.
CONCLUSIONS: NIV associated with RM provided better oxygenation both during and after the mechanical ventilation period. NIV either alone or in combination with RM provided lower atelectasis scores and better early pulmonary function tests compared to the control group, without a significant difference regarding the duration of mechanical ventilation, intensive care unit stay, and the length of hospitalization. NIV combined with RM is recommended after open heart surgery to prevent postoperative atelectasis and hypoxemia.
(Anesth Analg 2008;107:614–9)

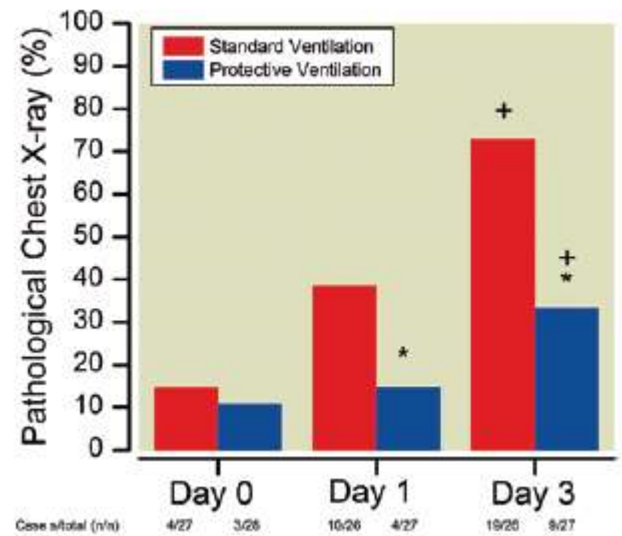


Protective Mechanical Ventilation during General Anesthesia for Open Abdominal Surgery Improves Postoperative Pulmonary Function

Paolo Severgnini, M.D.,* Gabriele Selmo, M.D.,* Christian Lanza, M.D.,* Alessandro Chiesa, M.D.,*
Alice Frigerio, M.D.,* Alessandro Bacuzzi, M.D.,* Gianlorenzo Dionigi, M.D., Ph.D.,‡
Raffaele Novario, P.H.,§ Cesare Gregoretti, M.D.,|| Marcelo Gama de Abreu, M.D., Ph.D.,#
Marcus J. Schultz, M.D., Ph.D.,** Samir Jaber, M.D., Ph.D.,†† Emmanuel Futier, M.D.,‡‡
Maurizio Chiaranda, M.D., Ph.D.,§§ Paolo Pelosi, M.D.,||||



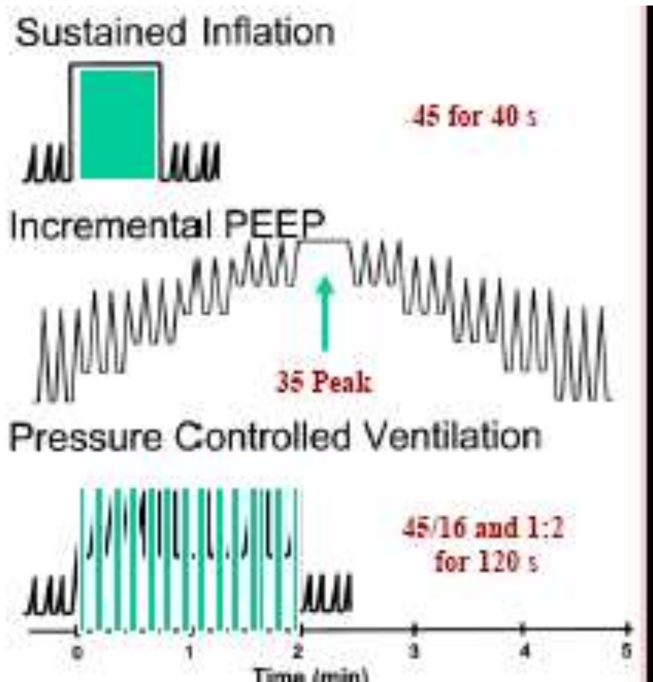


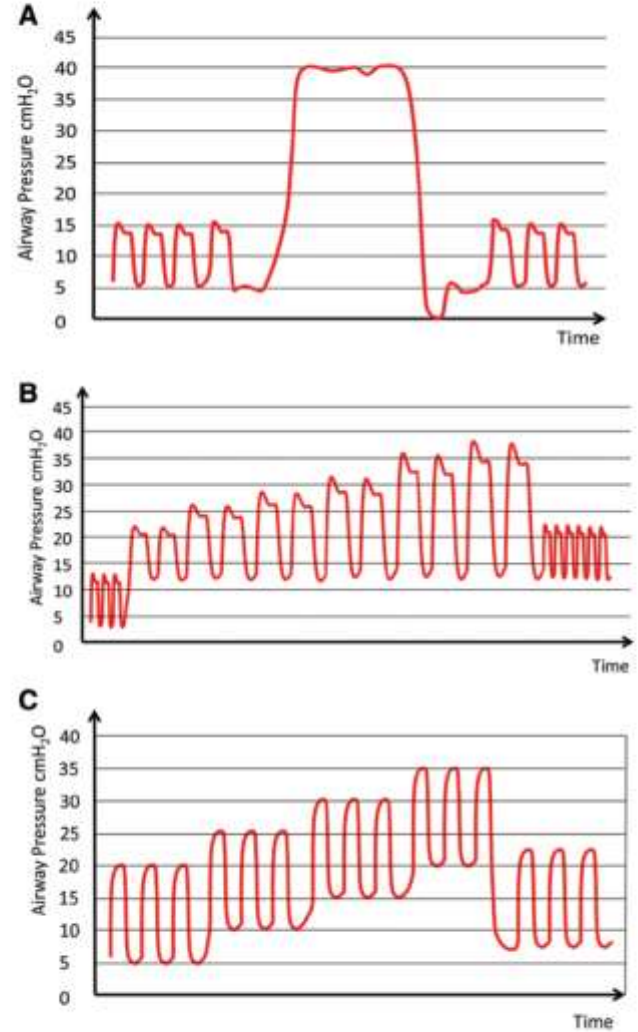


56 Hasta
Standard: TV: 9 ml/kg; ZEEP
Protektif: TV: 7 ml/kg; 10 PEEP; RM

Recruitment

- Ko
- KO
- Al... erken di... ve...
- Na...
- Ne sıklıkla?
- Her akciğerde işe yarar mı?



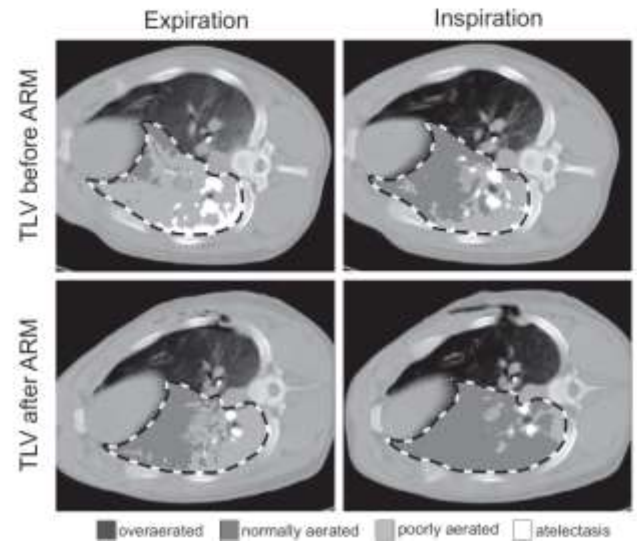


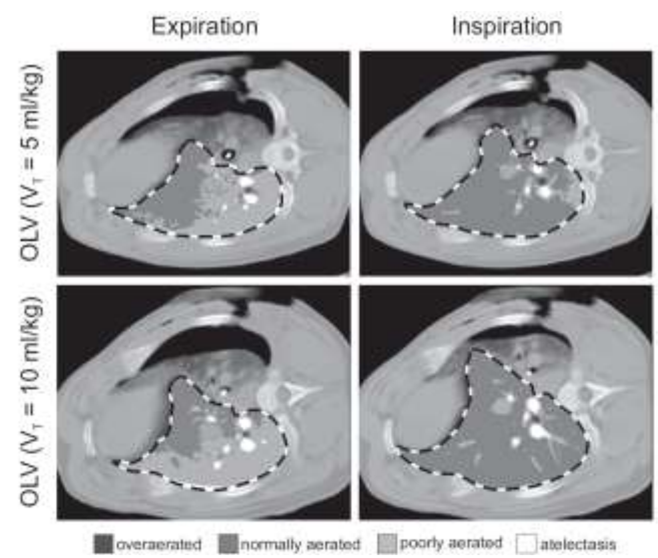
Ventilatory Protective Strategies during Thoracic Surgery

Effects of Alveolar Recruitment Maneuver and Low-tidal Volume Ventilation on Lung Density Distribution

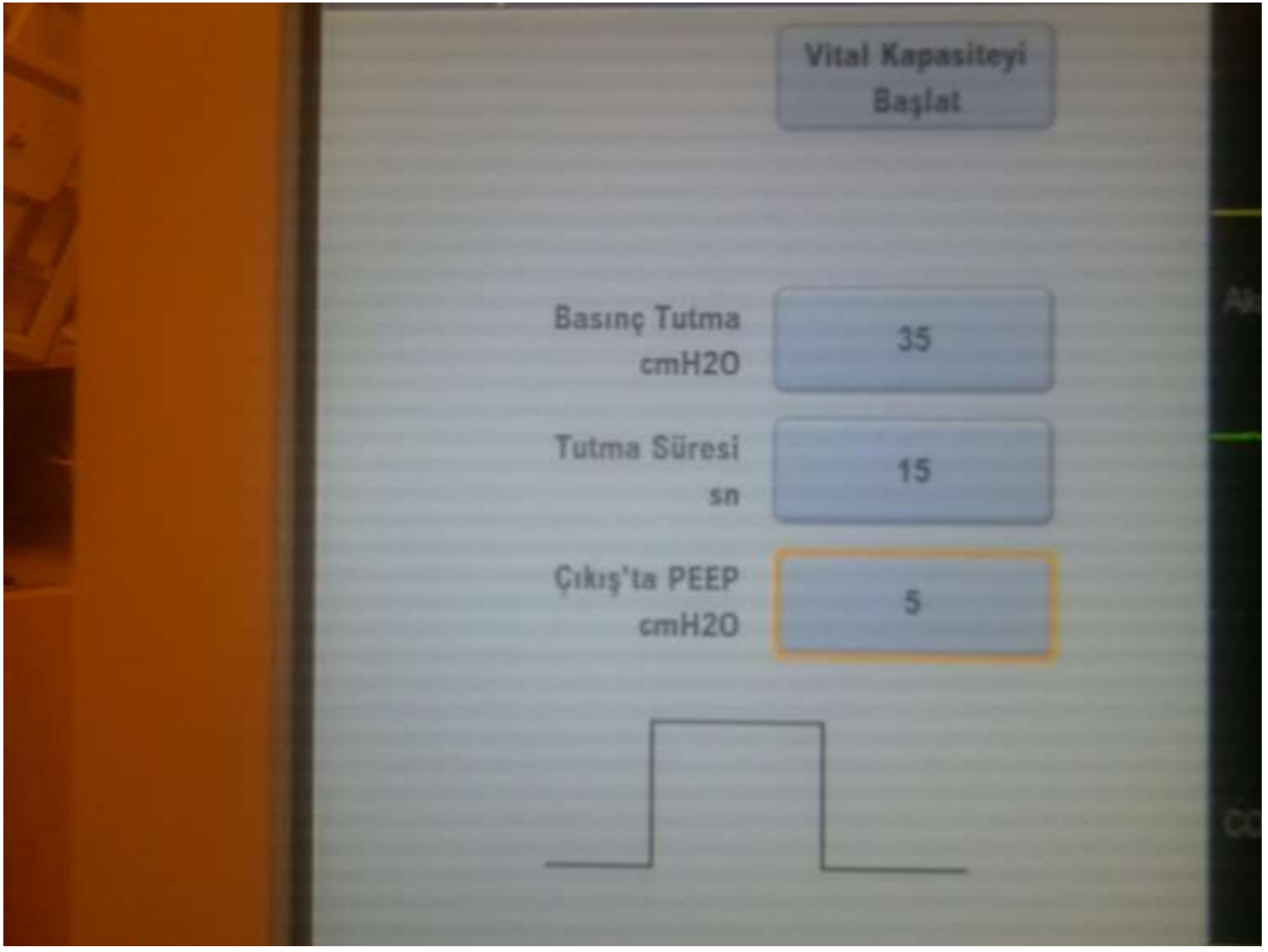
Alf Kozian, M.D., Ph.D.,* Thomas Schilling, M.D., Ph.D., D.E.A.A.,* Hartmut Schütze, Ph.D.,†
Mert Senturk, M.D.,‡ Thomas Hachenberg, M.D., Ph.D.,§ Göran Hedenstierna, M.D., Ph.D.‖

- 8 piglets
- RM before OLV
- TV during OLV: 5 mL/kg vs 10 ml/kg
- Distribution of aeration

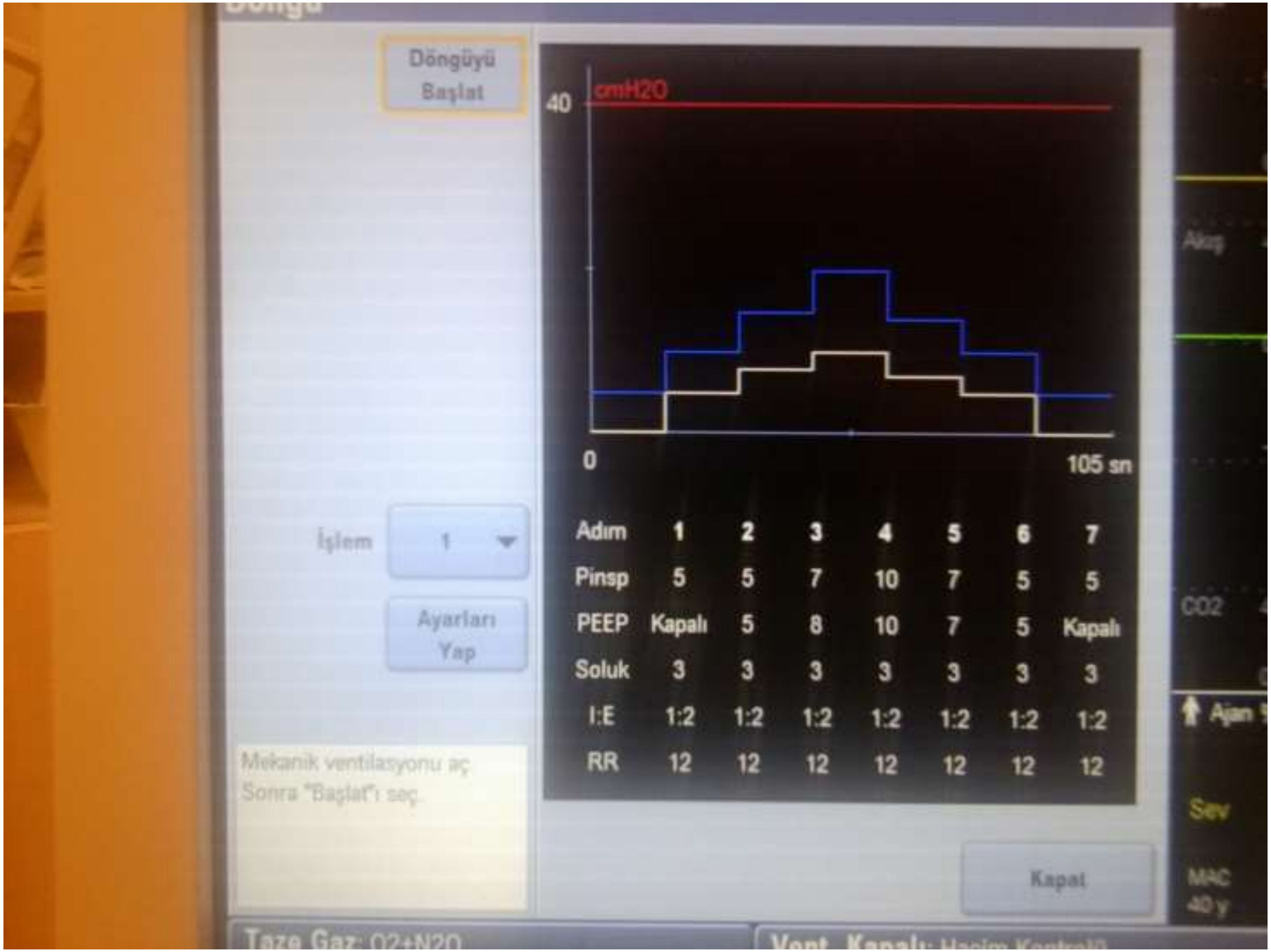




Recruitment: Vital kapasite



Recruitment: Aşamalı yükselme

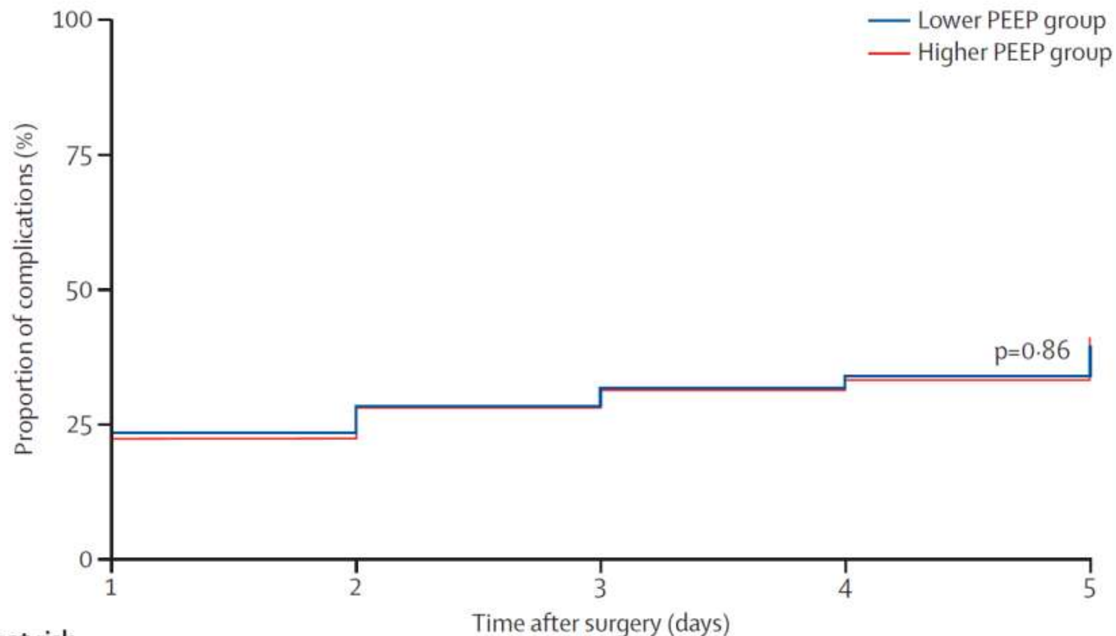


High versus low positive end-expiratory pressure during general anaesthesia for open abdominal surgery (PROVHILO trial): a multicentre randomised controlled trial

www.thelancet.com Published online June 1, 2014

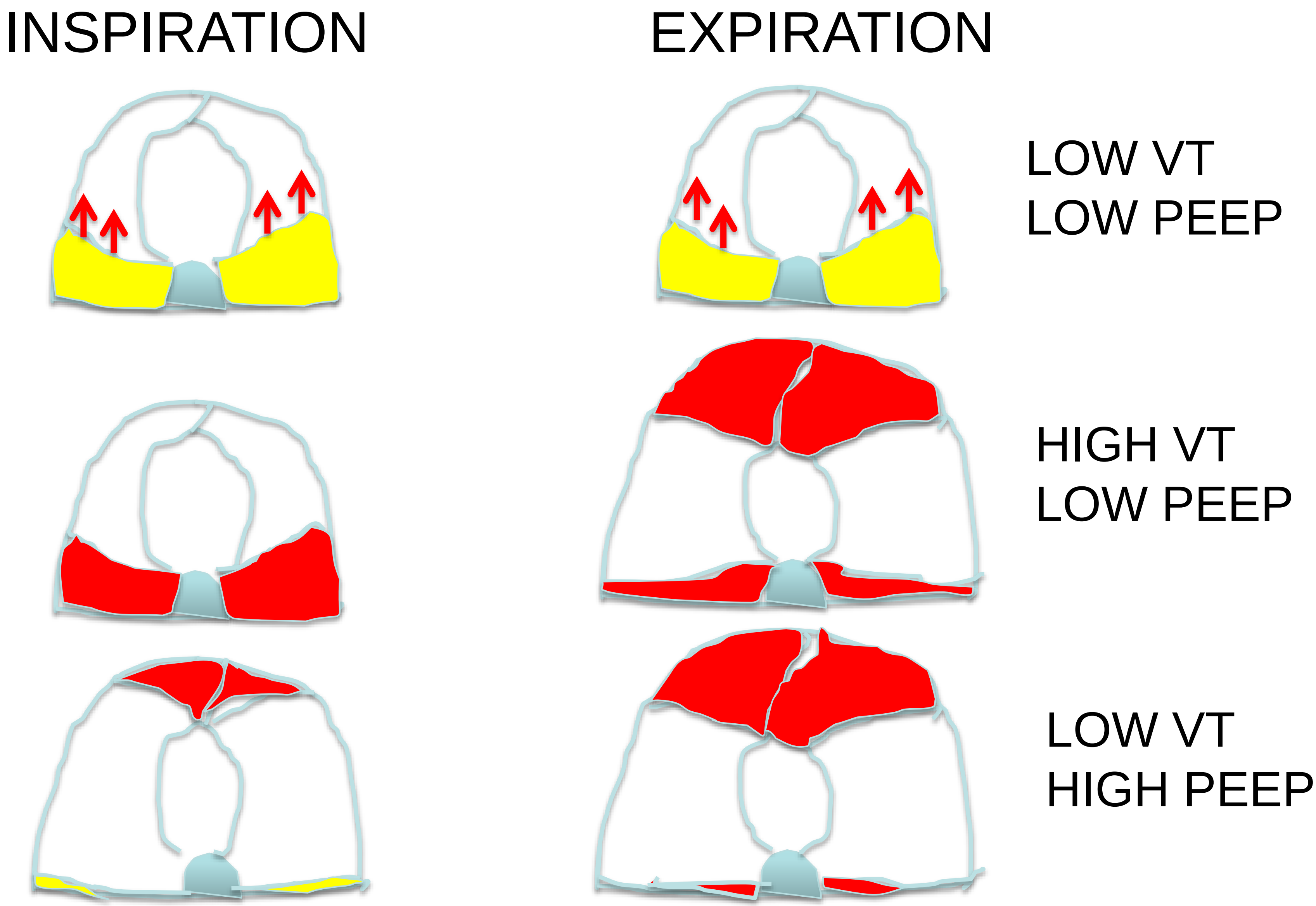
The PROVE Network Investigators for the Clinical Trial Network of the European Society of Anaesthesiology*

447 vs 453 Pt
High PEEP: **12 cmH2O + RM**
Low PEEP: **≤ 2 cmH20, no RM**



Number at risk					
Higher PEEP group	445	345	319	304	297
Lower PEEP group	449	343	321	305	296

Permissive atelectasis hypothesis



Güldner, Kiss, Serpa Neto et al., Anesthesiology; 2015


FRC ↓
Diafragmada değişiklikler
YüksekFiO2
Atelektazi
Atelektazi “tedavi” si
Hipoksemi
Akciğer hasarı

DEBATE

Is Optimal PEEP Really "Optimal"? | PELOSI vs. HEDENSTIERNA

First Round

Optimum PEEP During Anesthesia and in Intensive Care is a Compromise but is Better than Nothing

Göran Hedenstierna

Hedenstierna Laboratory, Department of Medical Sciences, Clinical Physiology, Uppsala University Hospital, Sweden

General Anesthesia Closes the Lungs: Keep Them Resting

Paolo Pelosi[1], Lorenzo Ball[1], Marcelo Gama de Abreu[2], Patricia R. M. Rocco[3]

DEBATE

Is Optimal PEEP Really "Optimal"? | PELOSI vs. HEDENSTIERNA

Second Round

Better Physiology does not Necessarily Translate Into Improved Clinical Outcome

Paolo Pelosi[1], Lorenzo Ball[1], Marcelo Gama de Abreu[2], Patricia R. M. Rocco[3]

Open is Better Than Closed

Göran Hedenstierna

Hedenstierna Laboratory, Department of Medical Sciences, Clinical Physiology, Uppsala University Hospital, Sweden

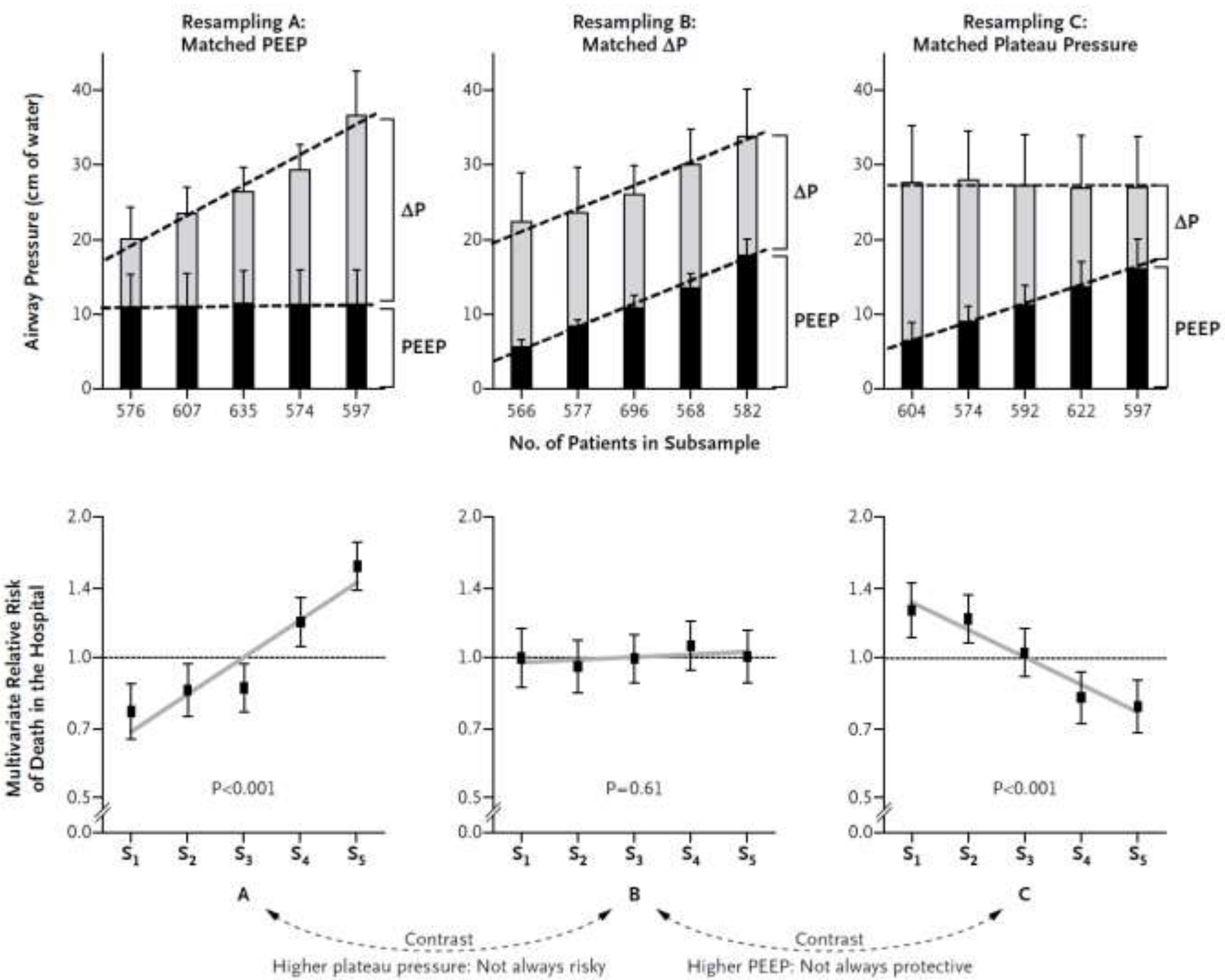
Turk J Anaesthesiol Reanim 2016; 161-68

The NEW ENGLAND JOURNAL of MEDICINE
FEBRUARY 19, 2015

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.



Prothor NE DURUMDA?

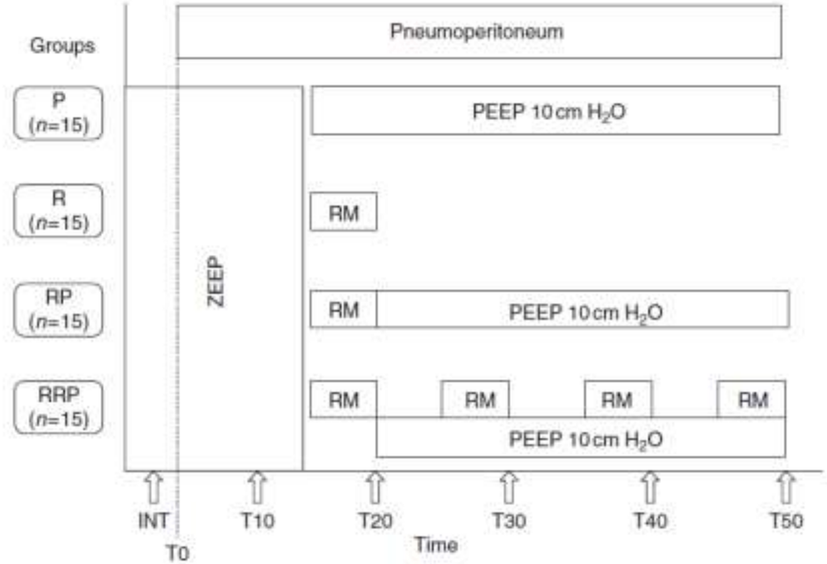
British Journal of Anaesthesia 102 (6): 862–8 (2009)
doi:10.1093/bja/aep084 Advance Access publication April 29, 2009

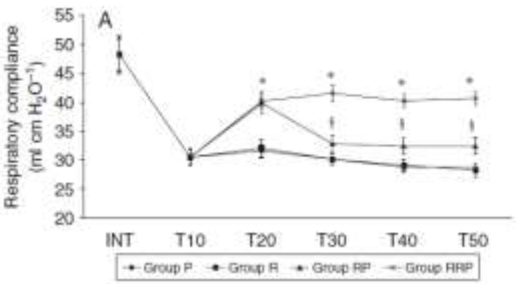
BJA

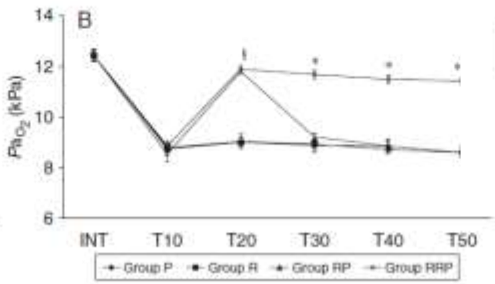
RESPIRATION AND THE AIRWAY

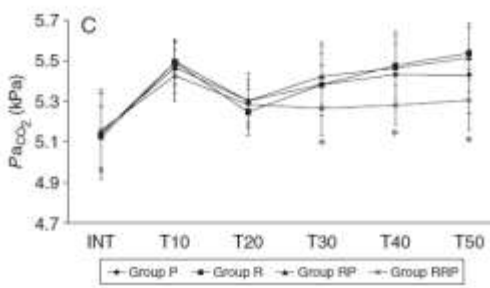
Effects of four intraoperative ventilatory strategies on respiratory compliance and gas exchange during laparoscopic gastric banding in obese patients

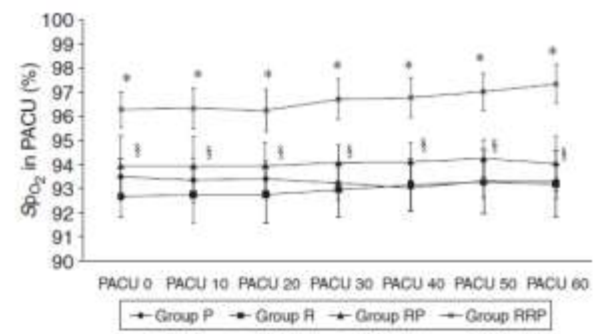
W. A. Almarakbi[1], H. M. Fawzi[1] and J. A. Alhashemi[2]*











British Journal of Anaesthesia 104 (1): 16–22 (2010)
doi:10.1093/bja/aep319 Advance Access publication November 19, 2009

BJA

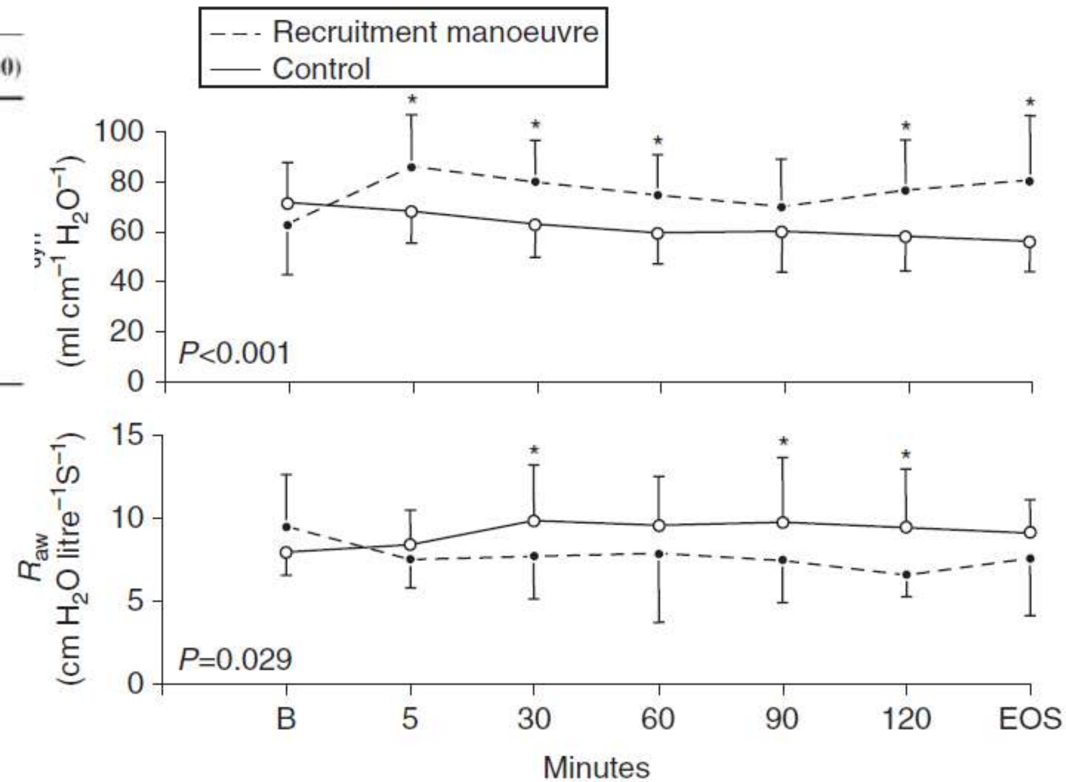
RM; 6ml/kg; 12 PEEP
RM Ø; 10 ml/kg; ZEEP

CLINICAL PRACTICE

Comparison of two ventilatory strategies in elderly patients undergoing major abdominal surgery

T. N. Weingarten[1], F. X. Whalen[1], D. O. Warner[1], O. Gajic[2], G. J. Schears[1], M. R. Snyder[3], D. R. Schroeder[4] and J. Sprung[1*]

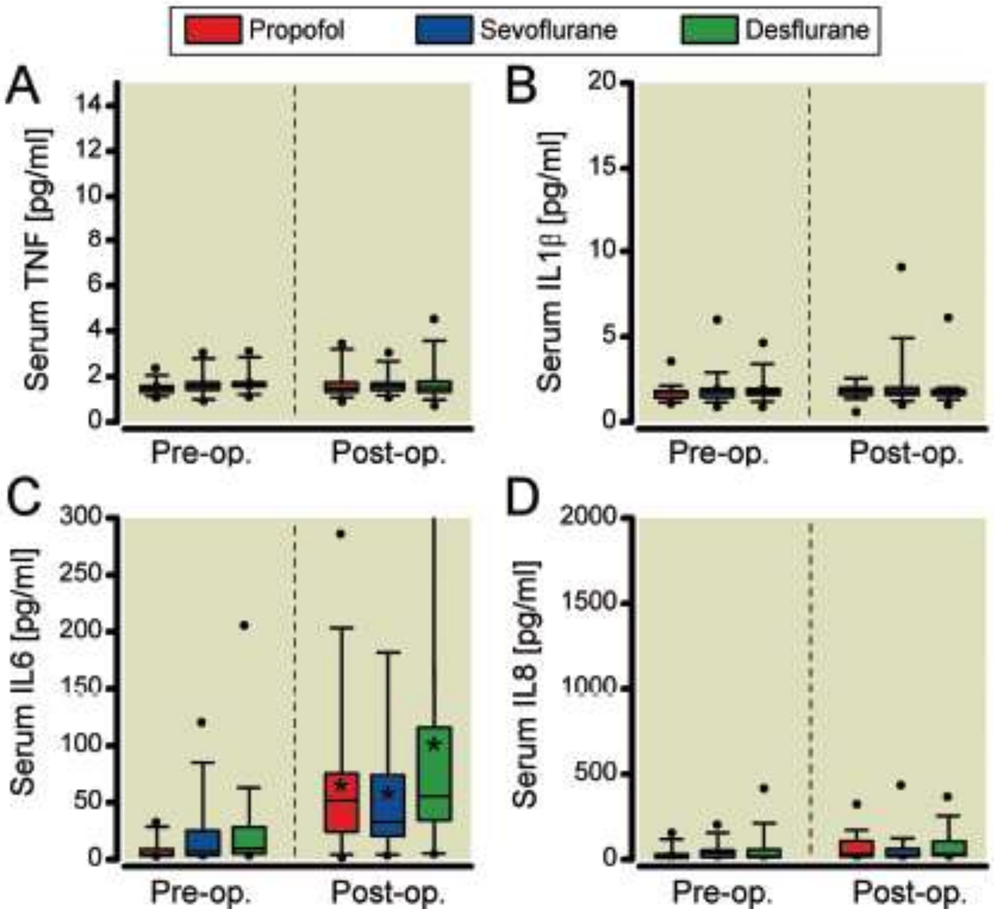
	Control (n=20)	Recruitment (n=20)
Pa_{O_2}/FI_{O_2} (kPa)		
Baseline	47.2 (13.1)	41.5 (12.8)
60 min	40.0 (12.7)†	54.5 (10.7)†,*
Recovery room	44.8 (15.7)	40.0 (7.6)
Pa_{CO_2} (kPa)		
Baseline‡	5.3 (0.6)	6.2 (0.6)*
60 min	5.4 (0.6)	6.8 (0.7)†,*
Recovery room	6.0 (0.9)†	6.4 (0.6)



*RM, iyi tolere edilmiş
- Postop PaO2 fark yok
- Mediatörlerde fark yok

Effects of Volatile and Intravenous Anesthesia on the Alveolar and Systemic Inflammatory Response in Thoracic Surgical Patients

Thomas Schilling, M.D., Ph.D., D.E.A.A.,* Alf Kozian, M.D., Ph.D.,* Mert Senturk, M.D.,† Christof Huth, M.D.,‡ Annegret Reinhold, Ph.D.,§ Göran Hedenstierna, M.D., Ph.D.,‖ Thomas Hachenberg, M.D., Ph.D.#



- 63 hasta
- BAL & serum
- TAV: proinflamauar mediatörlerin alveoler konsantrasyonunda ↑
- Volatiller lokal alveolar yanıtı supresse ediyorlar (sistemik inflamatuar yanıta etkileri yok)

Düşük ve minimal akım anestezi uygulamalarında; hasta güvenliğinden ödün vermeden, hasta için gerekli optimum O2 seviyesinin **korunmasını** ve medikal gaz ve anestezik ajan **tasarrufu** sağlar.

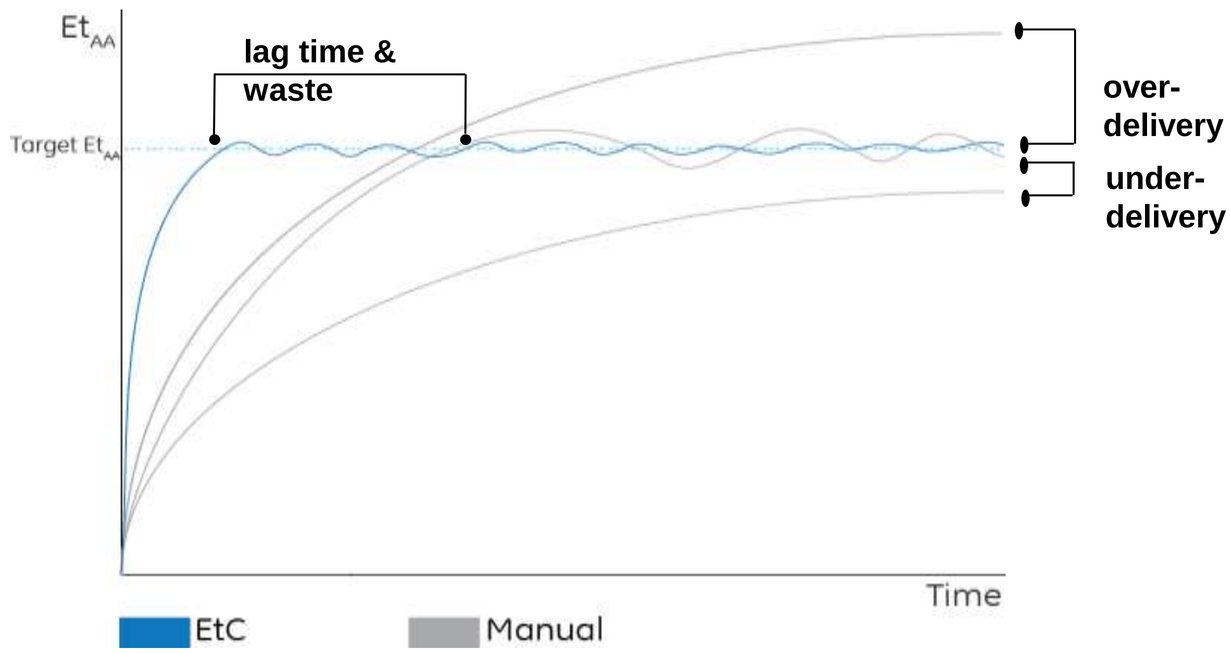
4 önemli bileşeni bulunmaktadır.

- Toplam O2 akış göstergesi
- FiO2 guard (koruması)
- Ajan kullanım ve maliyet göstegersi.
- İletilen Ajan ve O2 bilgilerinin dijital göstergeleri

Et Control‡

Hedef Kontrollü Anestezi

With Et Control the measured end-tidal O2 and volatile concentrations were within 10% of the set target for 98% of the time spent in steady state[1]



[1] Singaravelu S, Barclay P. Automated control of end-tidal inhalation anaesthetic concentration using the GE Aisys Carestation. Brit J Anaesth. Apr 2013;1 566.
Prospective study evaluating Aisys' Et Control in clinical practice by comparing agent usage and need for user input with contemporaneous controls using control of fresh gas flow rates.
[2] Tay S, Weinberg L, Peyton P, Story D, Briedis J. Financial and environmental costs of manual versus automated control of end-tidal gas concentrations. *Intens Care*. Jan 2013;41(1):95-101.

Et Control ('Et Control', 'EtC') or TCA is not available

Sonuç

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