



Recrutement alvéolaire au cours du SDRA

Alain Mercat

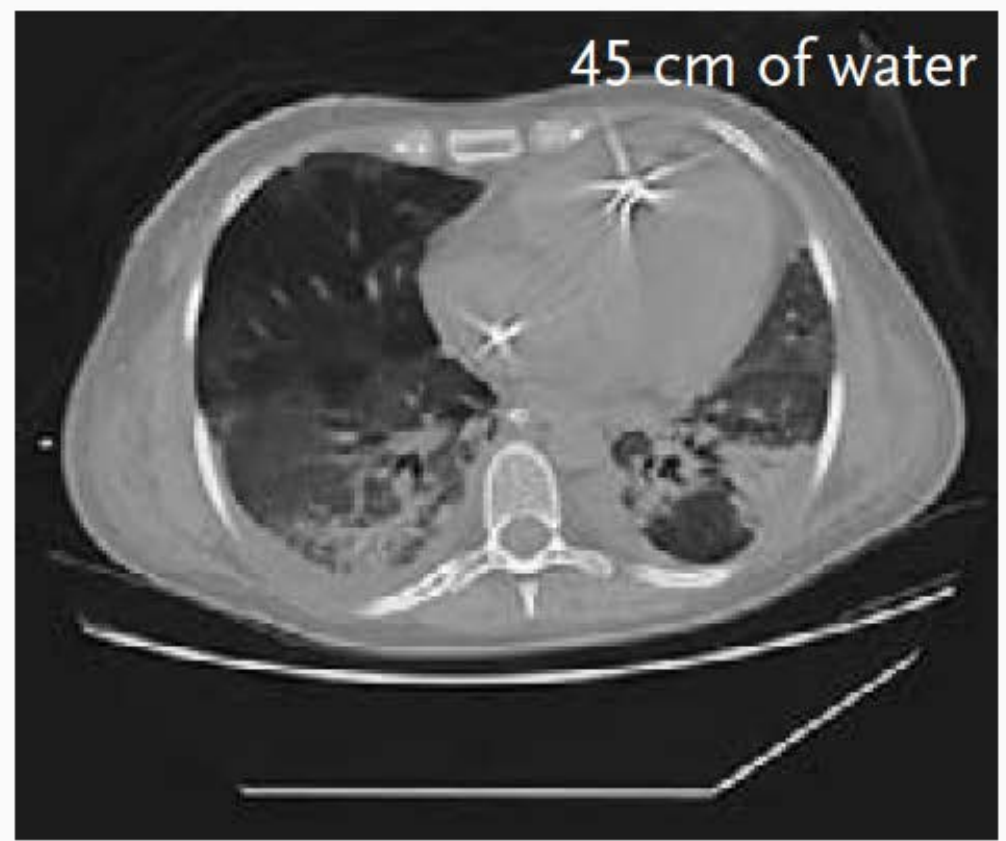
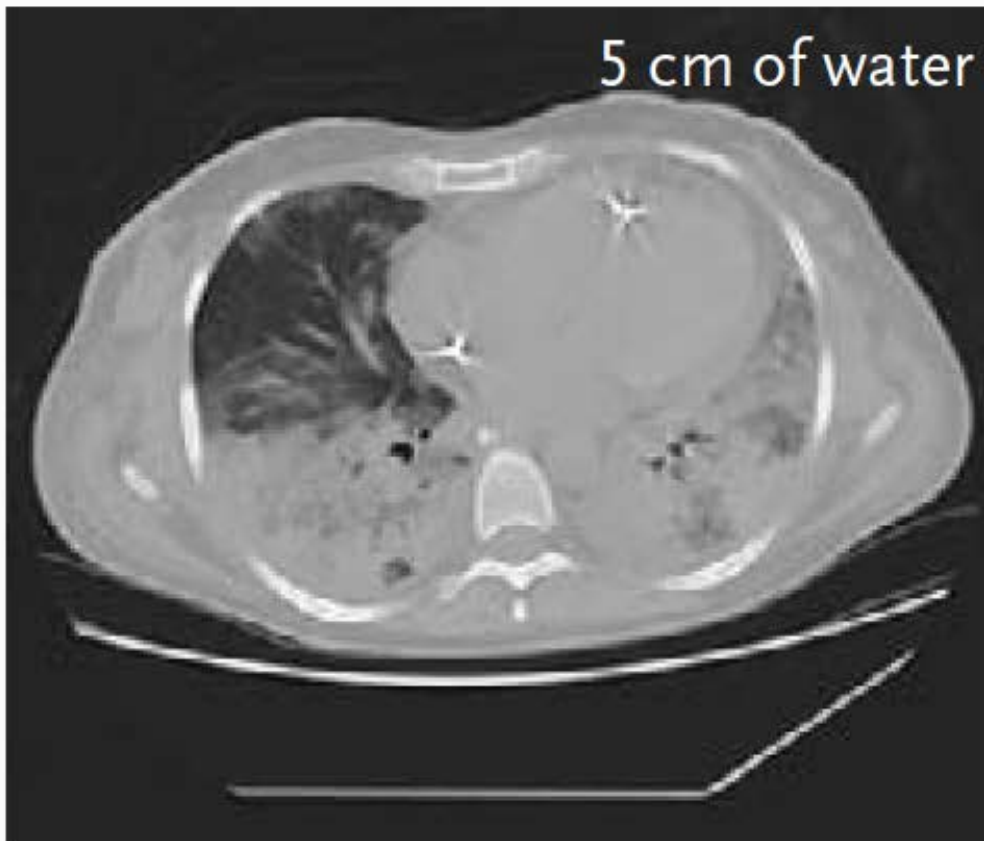


Liens d'intérêts

- Financement de travaux de recherche
 - Covidien
 - General Electric
 - Fisher-Paykel
- Exposés lors de congrès
 - Medtronic
 - A Lung technologies
 - Fisher-Paykel
 - Dräger
- Activité d'expertise
 - Faron Pharmaceuticals
 - Air Liquide Medical Systems


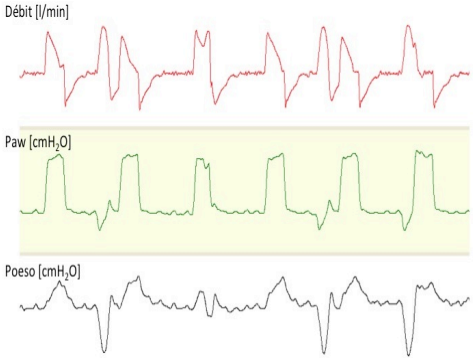

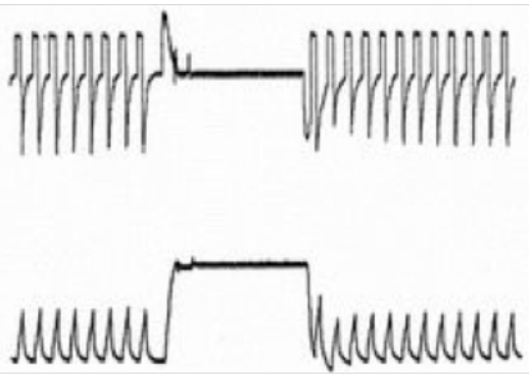
Recrutement alvéolaire

- Ré-aération de territoires préalablement non aérés



Recrutement alvéolaire

- Amélioration de l'oxygénation (diminution du shunt)
- Diminution du « VILI » (moins de tissu exposé à l'atélectrauma)

	PEEP	VS	
	DV	RM	

Manœuvres de recrutement ?

- Augmentation transitoire de la Paw
- Objectif : Ré-aération des territoires potentiellement recrutables

Open up the lung and keep the lung open

B. Lachmann

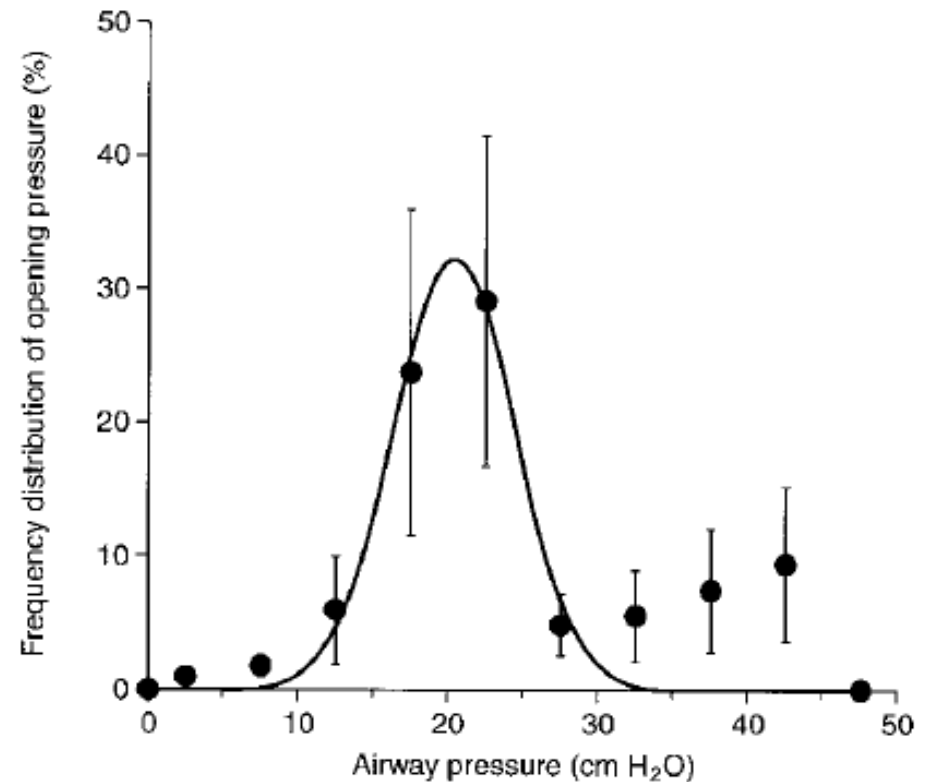
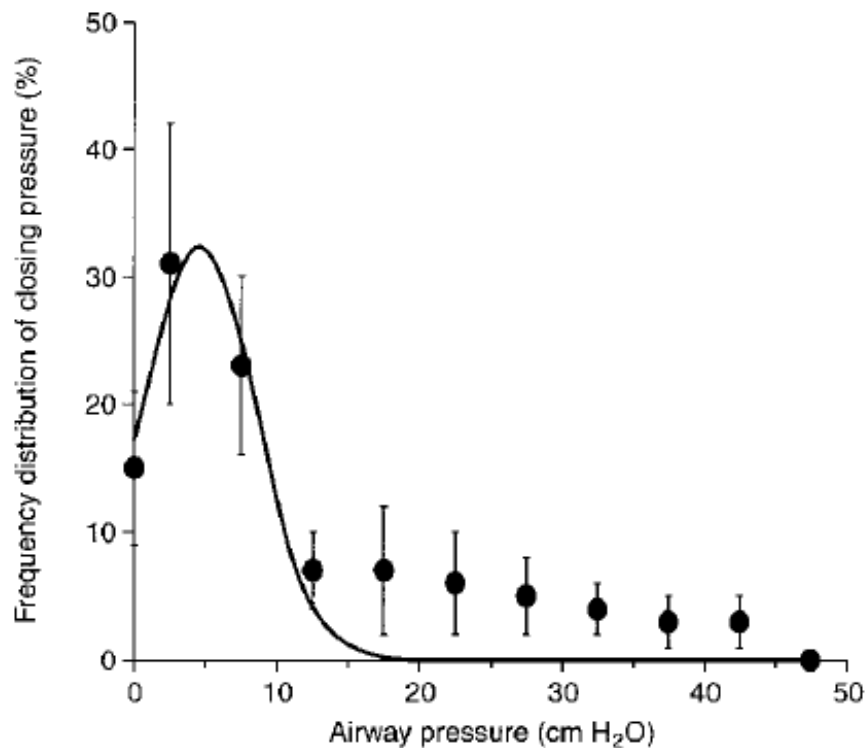
Intensive Care Med (1992) 18:319–321

Pressions d'ouverture > Pressions de fermeture

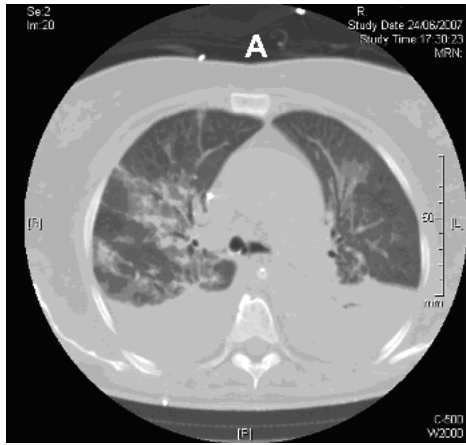
Recruitment and Derecruitment during Acute Respiratory Failure

A Clinical Study

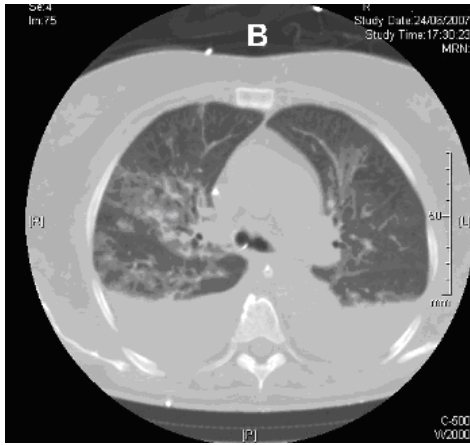
STEFANIA CROTTI, DANIELE MASCHERONI, PIETRO CAIRONI, PAOLO PELOSI, GIULIO RONZONI, MICHELE MONDINO, JOHN J. MARINI, and LUCIANO GATTINONI



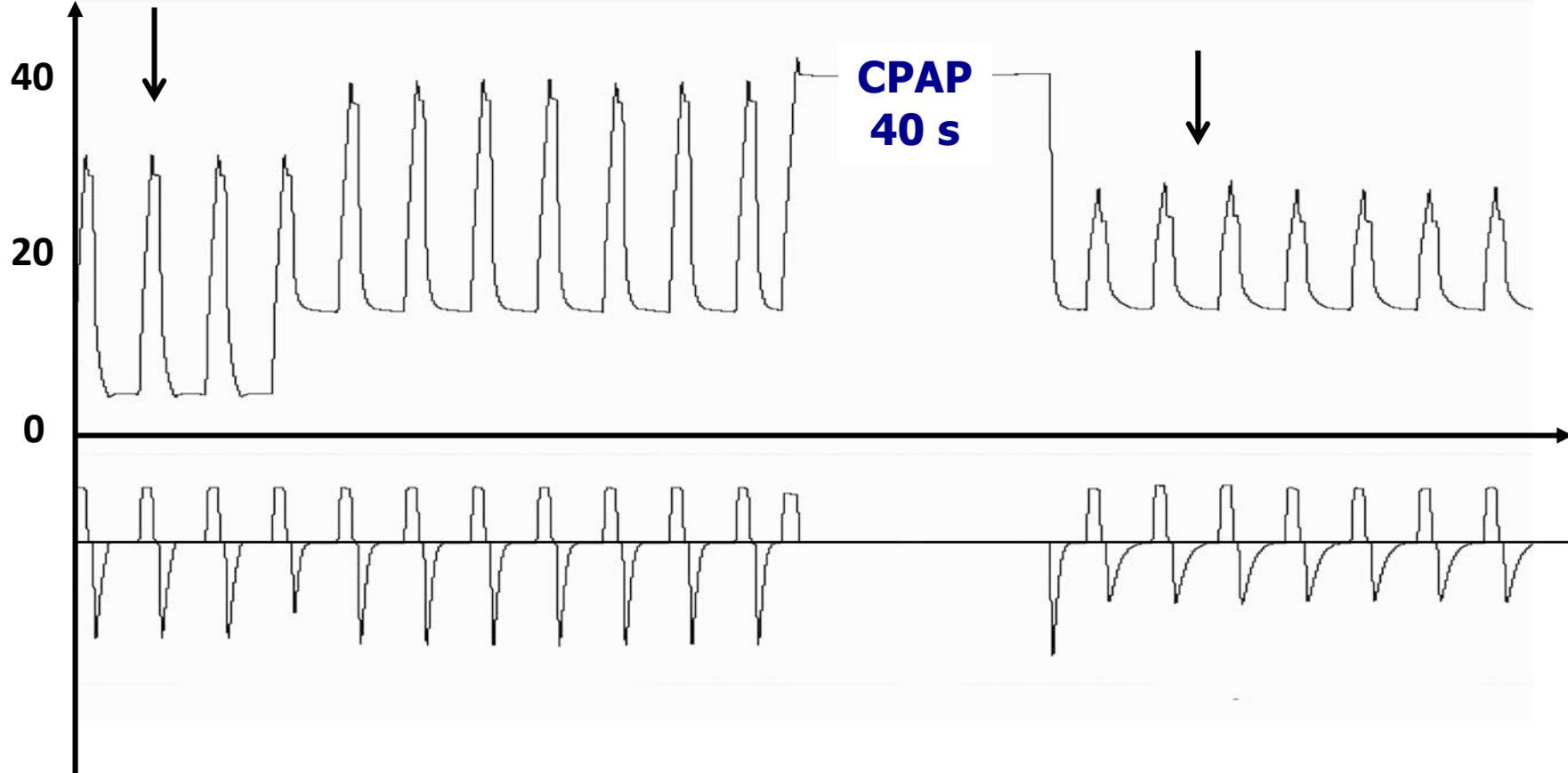
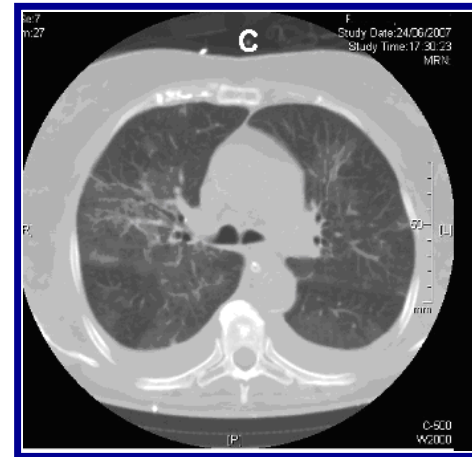
PaO₂= 88 mmHg



PaO₂= 135 mmHg

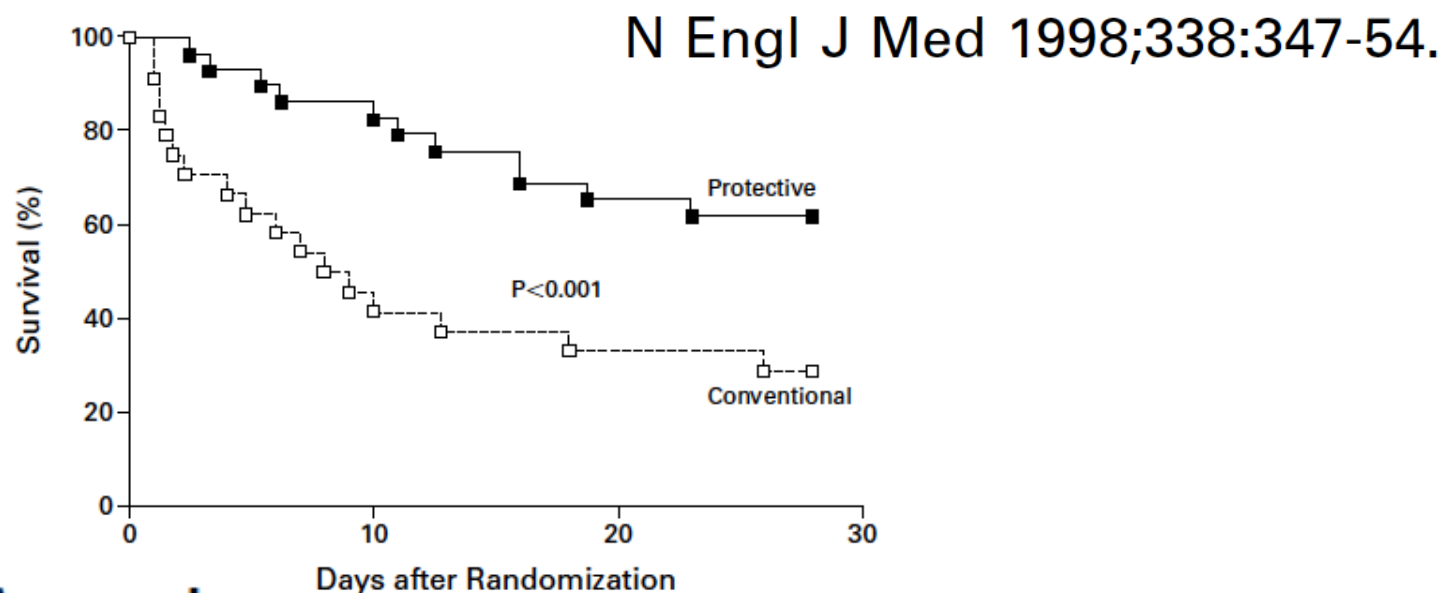


PaO₂= 365 mmHg



EFFECT OF A PROTECTIVE-VENTILATION STRATEGY ON MORTALITY IN THE ACUTE RESPIRATORY DISTRESS SYNDROME

MARCELO BRITTO PASSOS AMATO, M.D., CARMEN SILVIA VALENTE BARBAS, M.D., DENISE MACHADO MEDEIROS, M.D., RICARDO BORGES MAGALDI, M.D., GUILHERME DE PAULA PINTO SCHETTINO, M.D., GERALDO LORENZI-FILHO, M.D., RONALDO ADIB KAIRALLA, M.D., DANIEL DEHEINZELIN, M.D., CARLOS MUNOZ, M.D., ROSELAINÉ OLIVEIRA, M.D., TERESA YAE TAKAGAKI, M.D., AND CARLOS ROBERTO RIBEIRO CARVALHO, M.D.



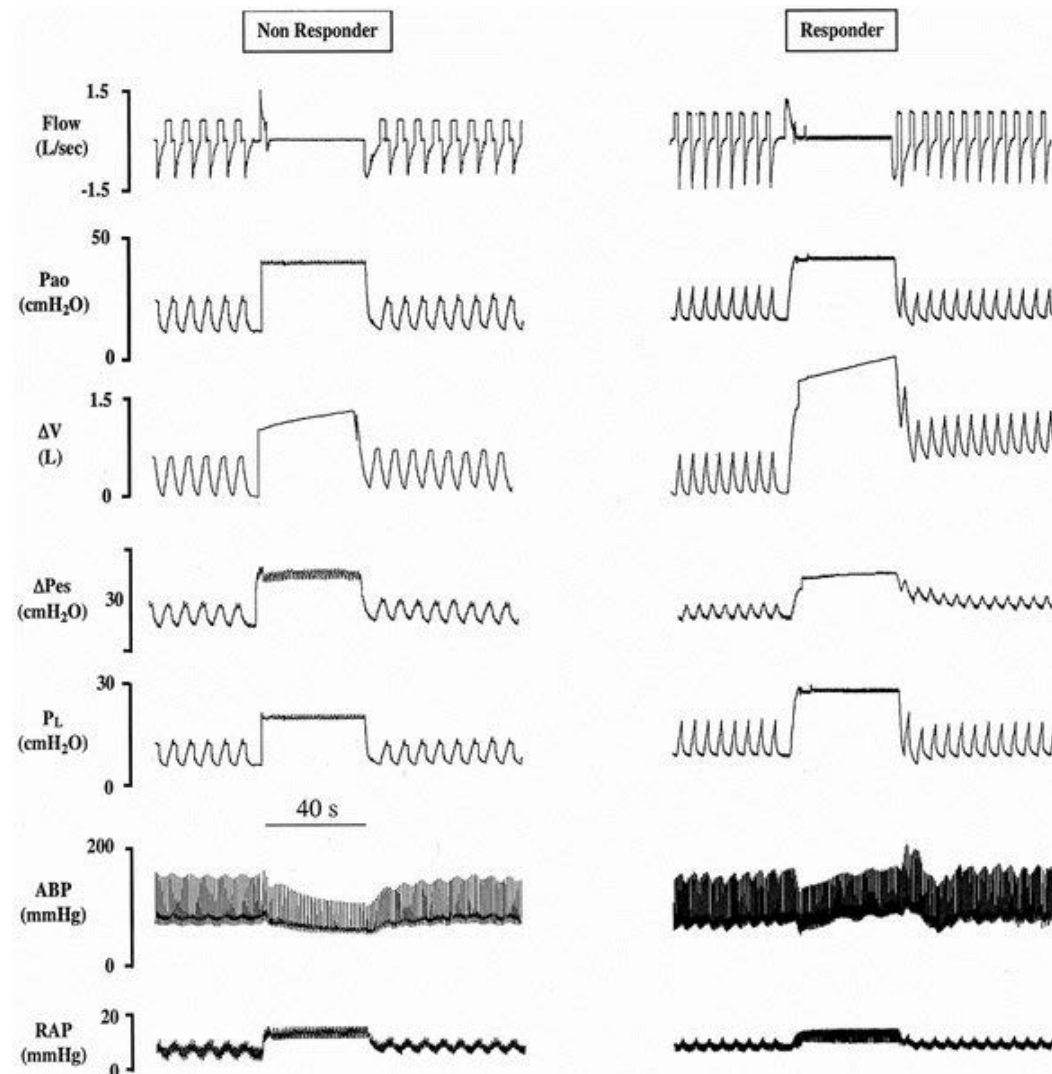
Protective Approach

...

PEEP value of 16 cm of water was used.¹⁵ Recruiting maneuvers — aimed at re-aerating alveolar units requiring very high opening pressures — were frequently used, especially after inadvertent disconnections from the ventilator. Continuous positive airway pressures of 35 to 40 cm of water were applied for 40 seconds, followed

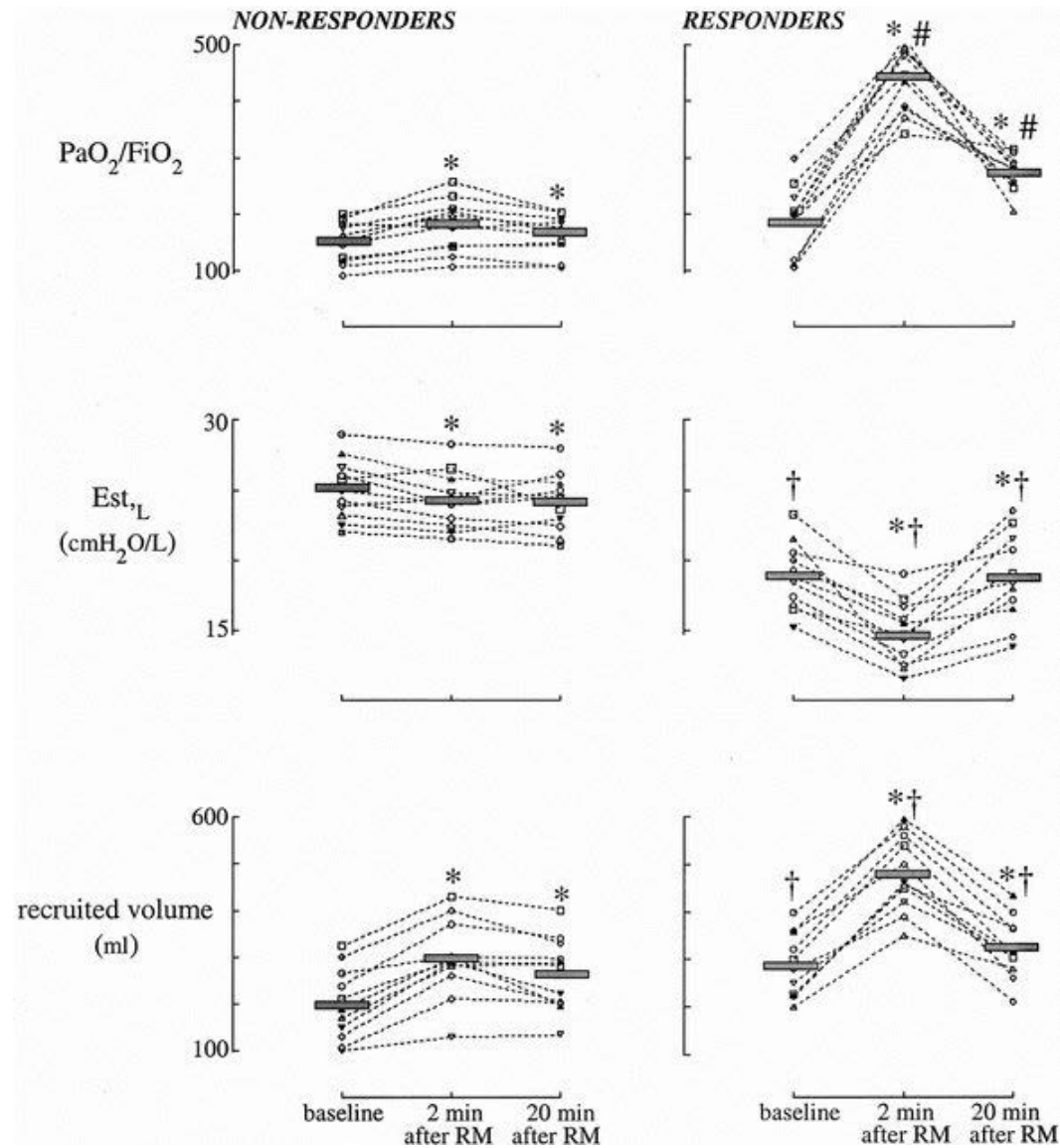
Effects of Recruiting Maneuvers in Patients with Acute Respiratory Distress Syndrome Ventilated with Protective Ventilatory Strategy

Salvatore Grasso, M.D.,* Luciana Mascia, M.D.,† Monica Del Turco, M.D.,‡ Paolo Melacarne, M.D.,‡
Francesco Giunta, M.D.,§ Laurent Brochard, M.D.,|| Arthur S. Slutsky, M.D.,# V. Marco Ranieri, M.D.**



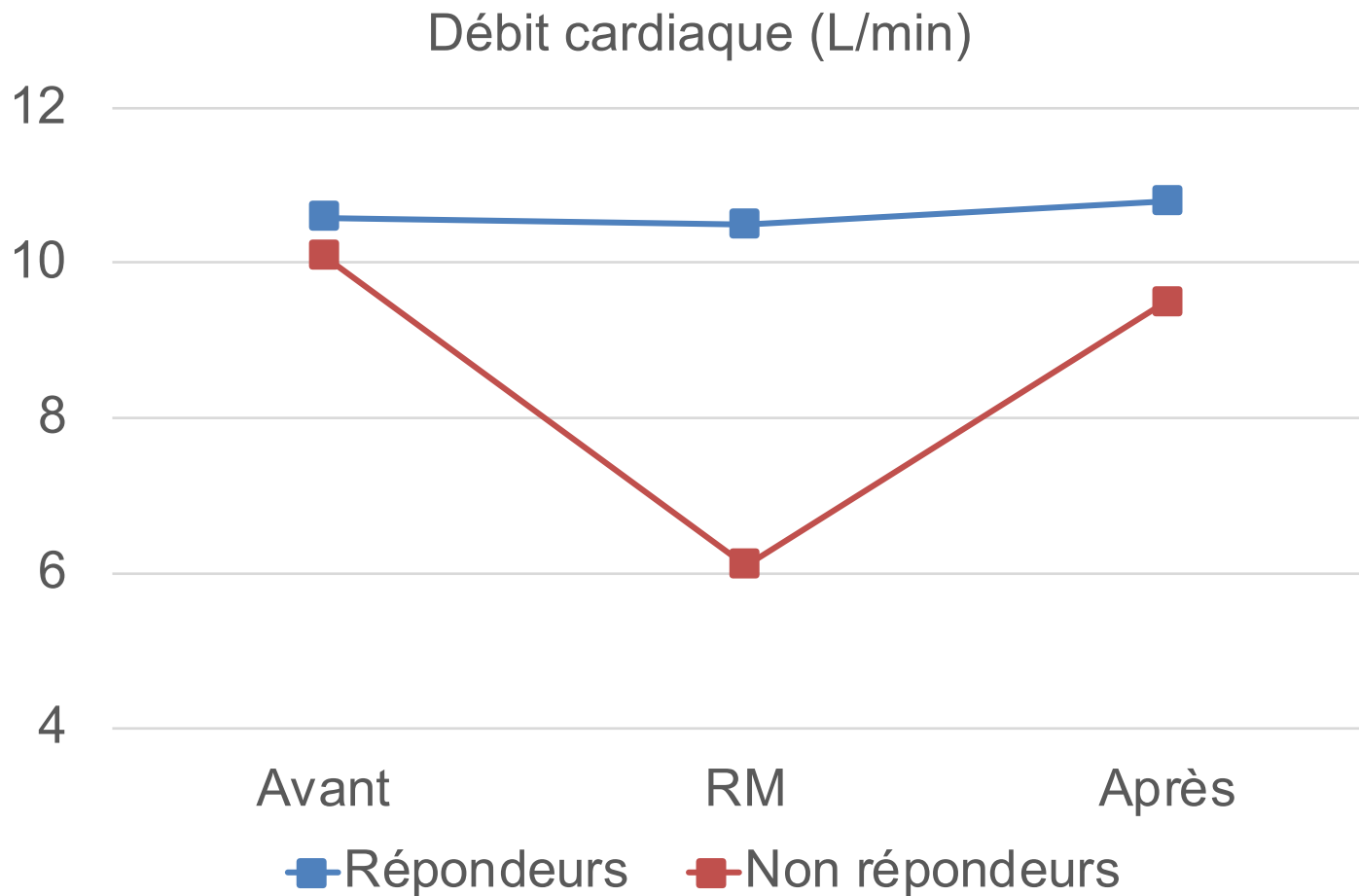
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- Répondeurs vs Non répondeurs

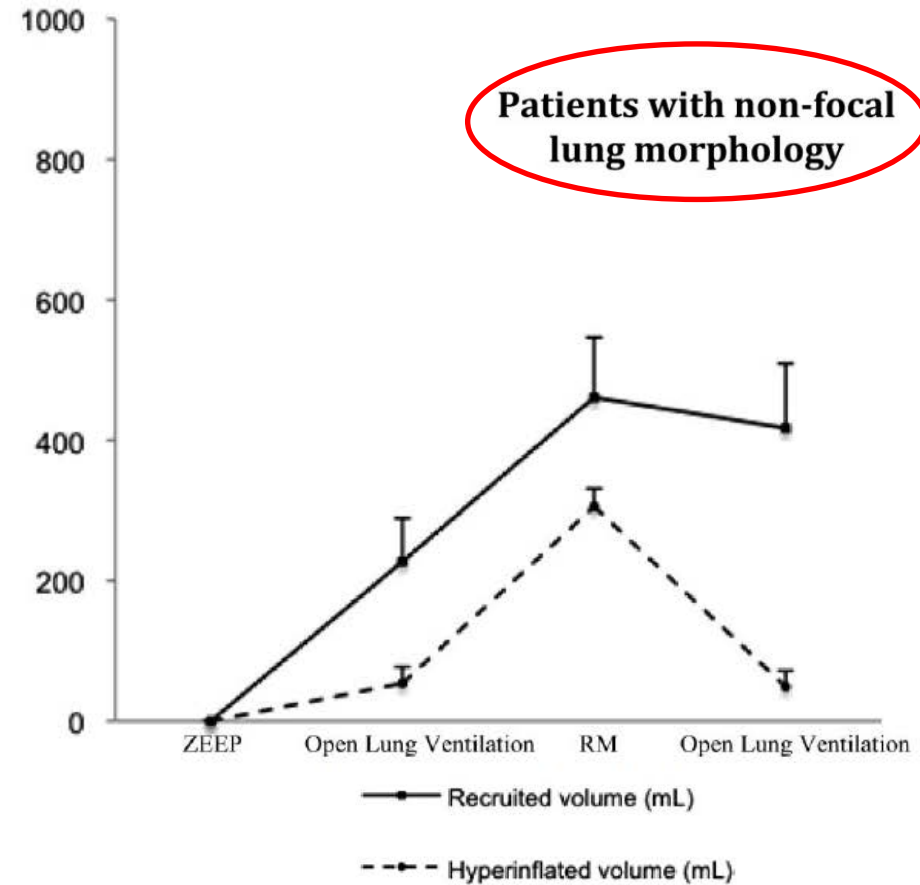
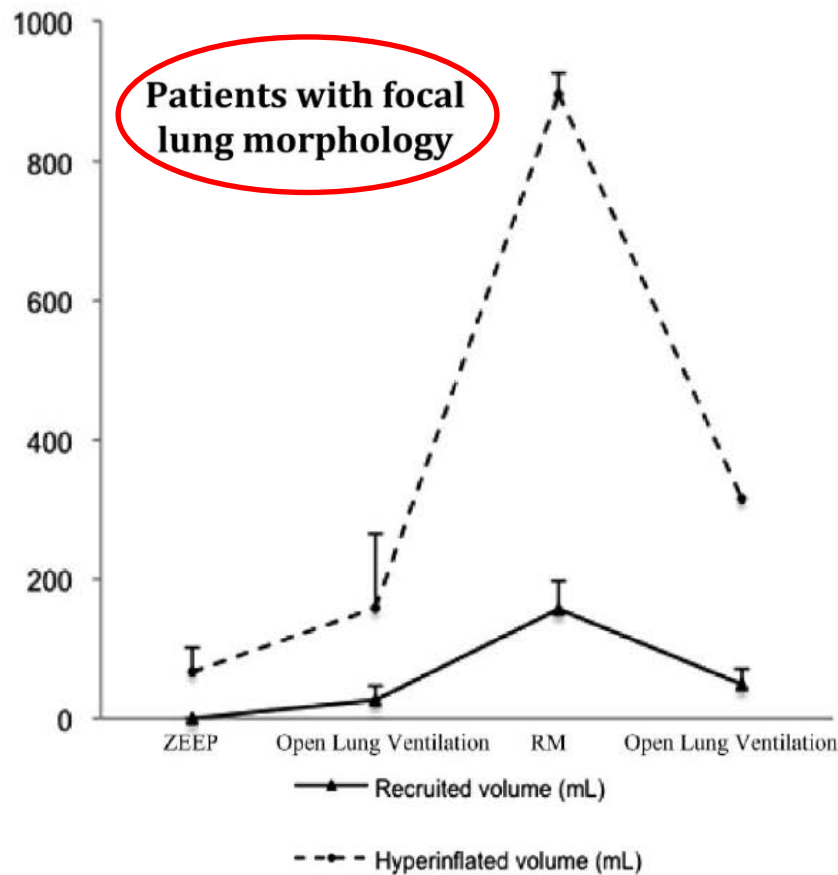
- Ccw plus élevée

	Patient	Age	Gender	Underlying Disease	Time on MV (days)
Nonresponders	4	67	M	Pancreatitis	10
	6	38	M	Polytrauma	6
	7	61	F	Peritonitis	7
	8	52	F	Pneumonia	6
	10	28	M	Pneumonia	7
	11	49	F	Peritonitis	6
	14	49	F	Peritonitis	7
	16	63	M	Pneumonia	10
	18	45	F	Peritonitis	5
	21	40	F	Pneumonia	7
	22	30	M	Pneumonia	9
Mean		47			7.1
SD		13			1.5
Responders	1	63	F	Pancreatitis	1
	2	19	M	Polytrauma	1
	3	35	M	Polytrauma	1
	5	25	M	Pneumonia	1
	9	37	F	Pancreatitis	1
	12	41	F	Pneumonia	1
	13	22	F	Pneumonia	1
	15	33	F	Pancreatitis	1
	17	68	M	Pneumonia	1
	19	62	F	Pneumonia	1
20	62	M	Pneumonia	2	
Mean		42			1.0*
SD		18			0.3

Lung morphology predicts response to recruitment maneuver in patients with acute respiratory distress syndrome

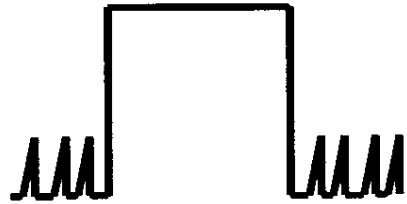
Jean-Michel Constantin,

Crit Care Med 2010 Vol. 38,



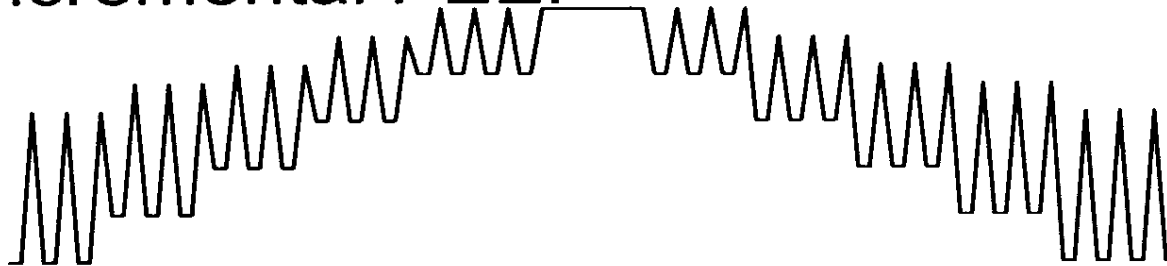
RM : Quelle méthode ?

Sustained Inflation

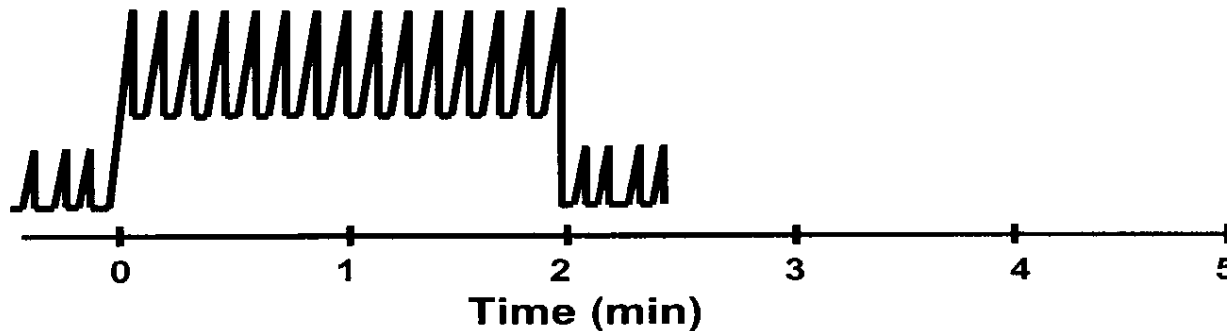


- Niveau de pression
- Durée

Incremental PEEP



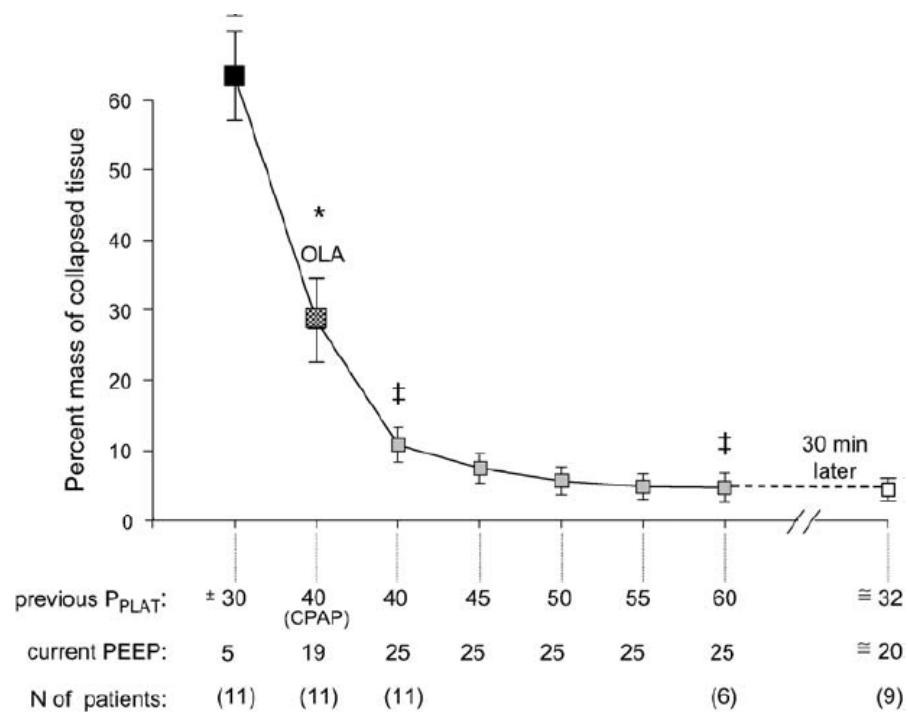
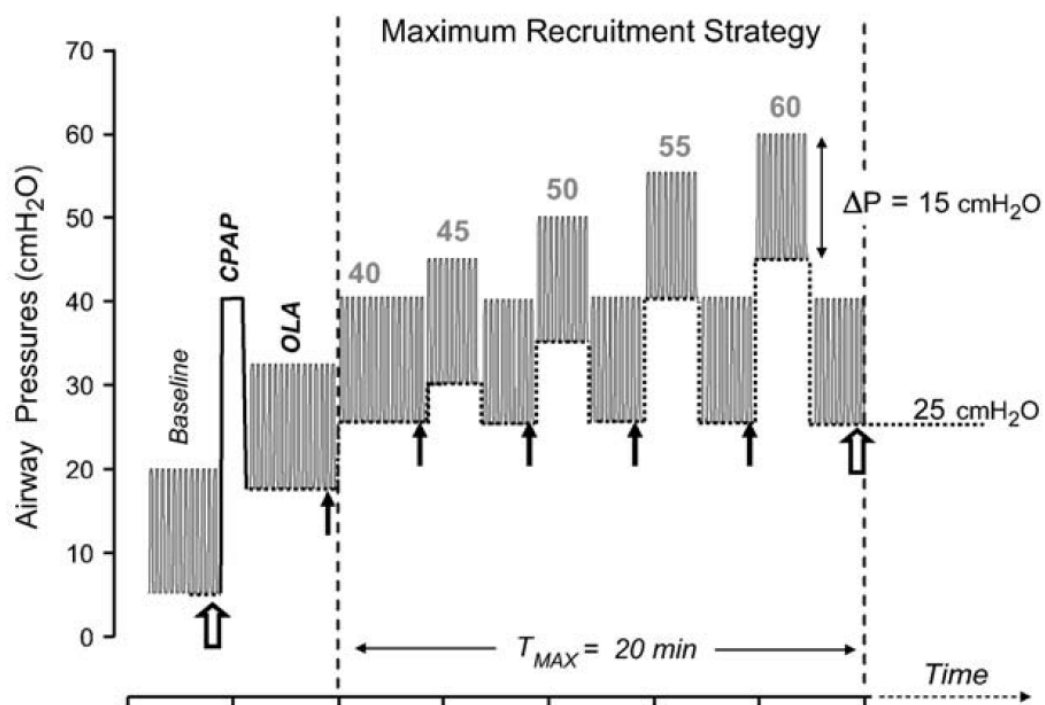
Pressure Controlled Ventilation



Stratégie de recrutement maximal

Reversibility of Lung Collapse and Hypoxemia in Early Acute Respiratory Distress Syndrome

João B. Borges, Valdelis N. Okamoto, Gustavo F. J. Matos, Maria P. R. Caramez, Paula R. Arantes, Fabio Barros, Ciro E. Souza, Josué A. Victorino, Robert M. Kacmarek, Carmen S. V. Barbas, Carlos R. R. Carvalho, and Marcelo B. P. Amato



Stratégie de recrutement maximal

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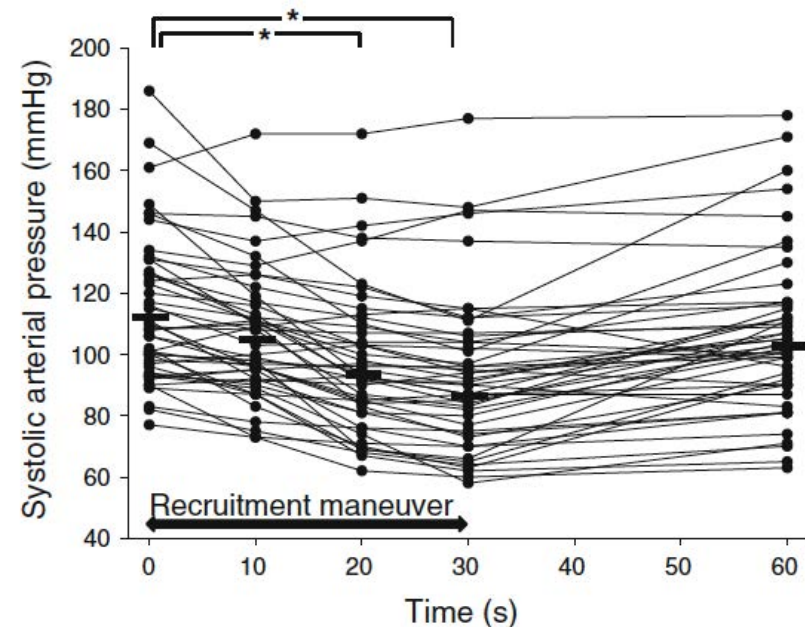
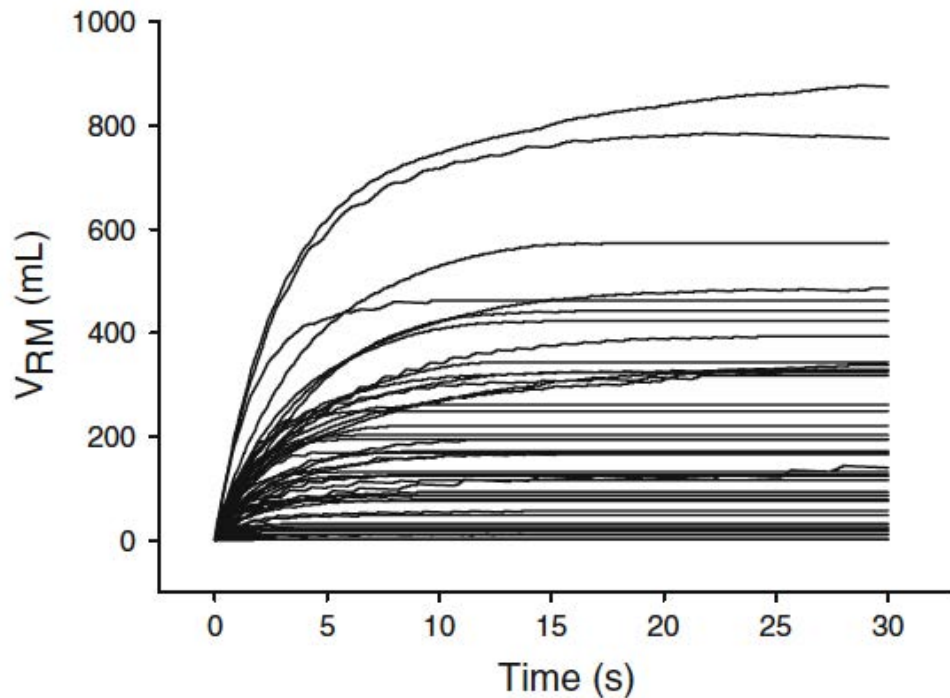
João B. Borges, Valdelis N. Okamoto, Gustavo F. J. Matos, Maria P. R. Caraméz, Paula R. Arantes, Fabio Barros, Ciro E. Souza, Josué A. Victorino, Robert M. Kacmarek, Carmen S. V. Barbas, Carlos R. R. Carvalho, and Marcelo B. P. Amato

Situation	Baseline (n = 26)	OLA (n = 11)	Step 1 (n = 26)	Step 2 (n = 17)	Step 3 (n = 13)	Step 4 (n = 11)	Step 5 (n = 8)
Cardiac index, ml/min/m ² , mean (SD)	5.8 (± 1.9)	4.7 (± 1.4)	5.7 (± 1.7)	5.3 (± 1.8)	4.8 (± 1.8)	4.7 (± 1.7)	4.7 [§] (± 1.9)
Mean arterial pressure,* mm Hg, mean (SD)	84 (± 16)	NA	88 (± 13)	87 (± 11)	90 (± 14)	91 (± 14)	93 [†] (± 14)
Mixed venous saturation, %, mean (SD)	77 (± 16)	85 [†] (± 7)	86 [‡] (± 8)	85 (± 8)	87 (± 7)	87 (± 7)	88 [‡] (± 7)
Arterial pH, mean (SD)	7.15 (± 0.12)	7.11 [†] (± 0.11)	7.13 (± 0.13)	7.10 (± 0.14)	7.08 (± 0.15)	6.99 (± 0.11)	6.94 (± 0.11)
Arterial P _{CO₂} , mm Hg, mean (SD)	64 (± 18)	75 [†] (± 19)	70 (± 25)	75 (± 27)	81 (± 30)	89 (± 31)	95 [‡] (± 34)
Ventilator settings during measurements							
PEEP, cm H ₂ O, mean	5	19	25	25	25	25	25
P _{PLAT} , cm H ₂ O, mean	30	31	40	40	40	40	40
Previous recruiting pressure, cm H ₂ O	—	40	40	45	50	55	60

Jean-Michel Arnal
Jérémie Paquet
Marc Wysocki
Didier Demory
Stéphane Donati
Isabelle Granier
Gaëlle Corno
Jacques Durand-Gasselín

Optimal duration of a sustained inflation recruitment maneuver in ARDS patients

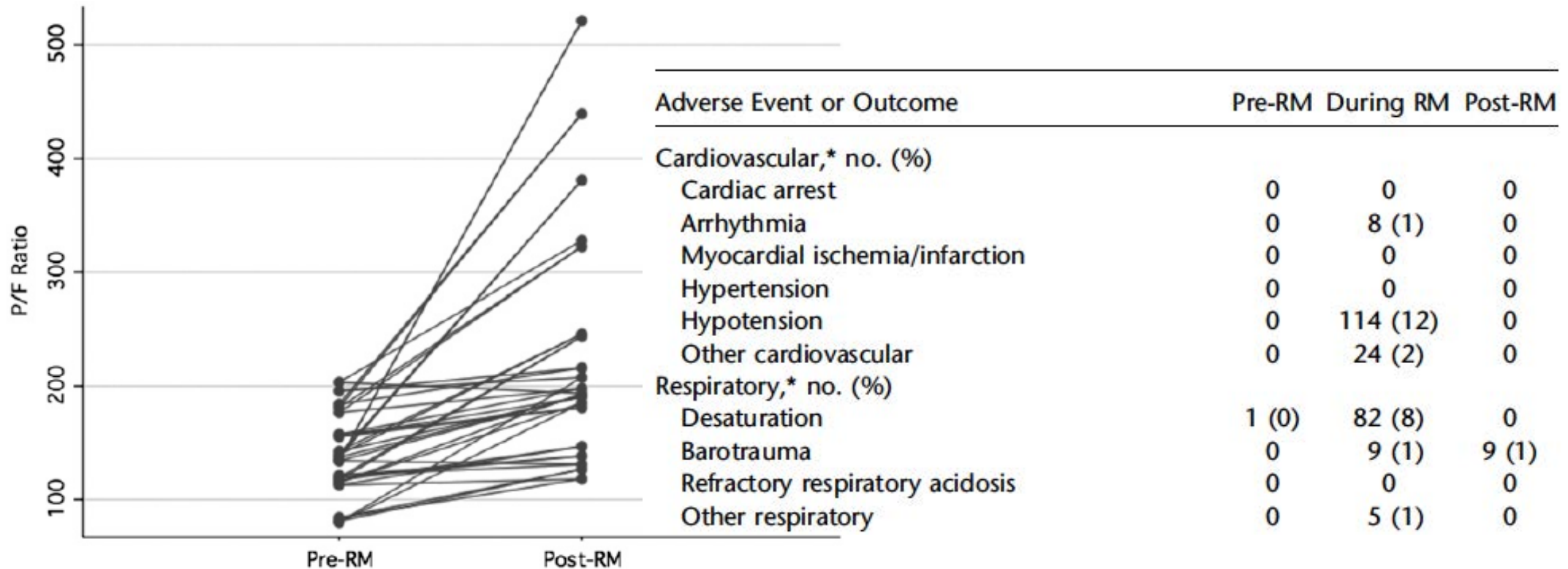
Intensive Care Med (2011) 37:1588–1594



Recruitment Maneuvers for Acute Lung Injury

A Systematic Review

Eddy Fan^{1,2}, M. Elizabeth Wilcox¹, Roy G. Brower², Thomas E. Stewart¹, Sangeeta Mehta¹, Stephen E. Lapinsky¹, Maureen O. Meade³, and Niall D. Ferguson¹



Lung Recruitment Maneuvers for Adult Patients with Acute Respiratory Distress Syndrome

A Systematic Review and Meta-Analysis

Ewan C. Goligher^{1,2,3}, Carol L. Hodgson⁴, Neill K. J. Adhikari^{1,5}, Maureen O. Meade^{6,7}, Hannah Wunsch^{1,5}, Elizabeth Uleryk⁸, Ognjen Gajic⁹, Marcelo P. B. Amato¹⁰, Niall D. Ferguson^{1,2,3,11}, Gordon D. Rubenfeld^{1,5}, and Eddy Fan^{1,3,11}



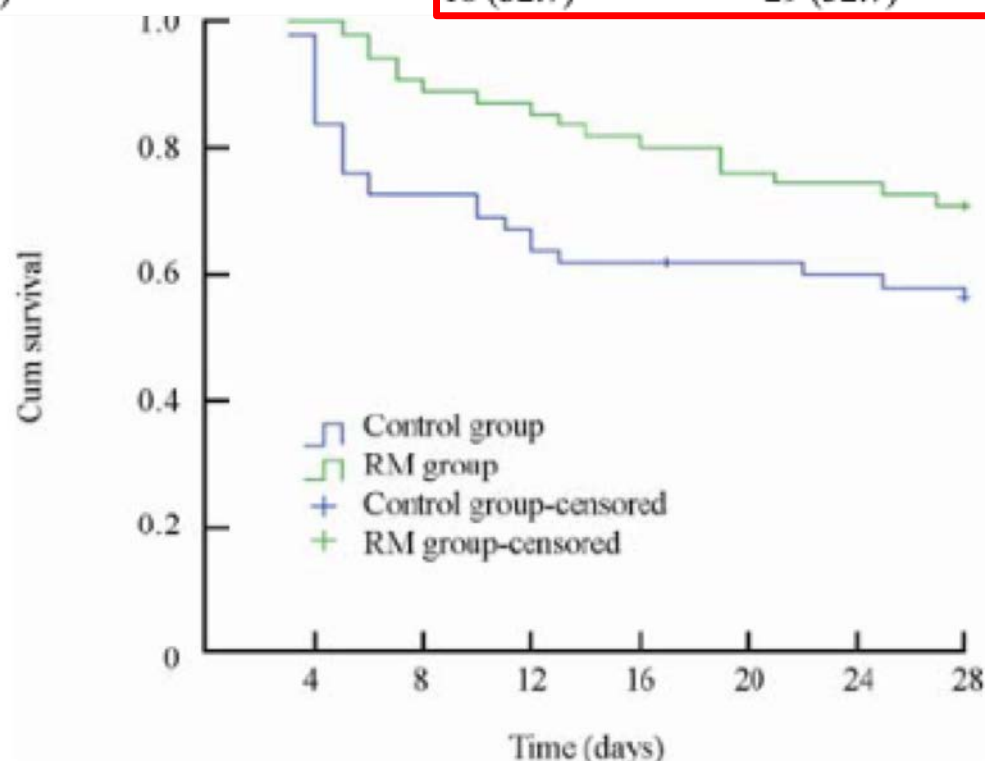
Clinical efficacy and safety of recruitment maneuver in patients with acute respiratory distress syndrome using low tidal volume ventilation: a multicenter randomized controlled clinical trial

XI Xiu-ming, JIANG Li, ZHU Bo and the RM group

Chin Med J 2010;123(21):3100-3105

Table 5. Comparison of the clinical outcome between the two groups

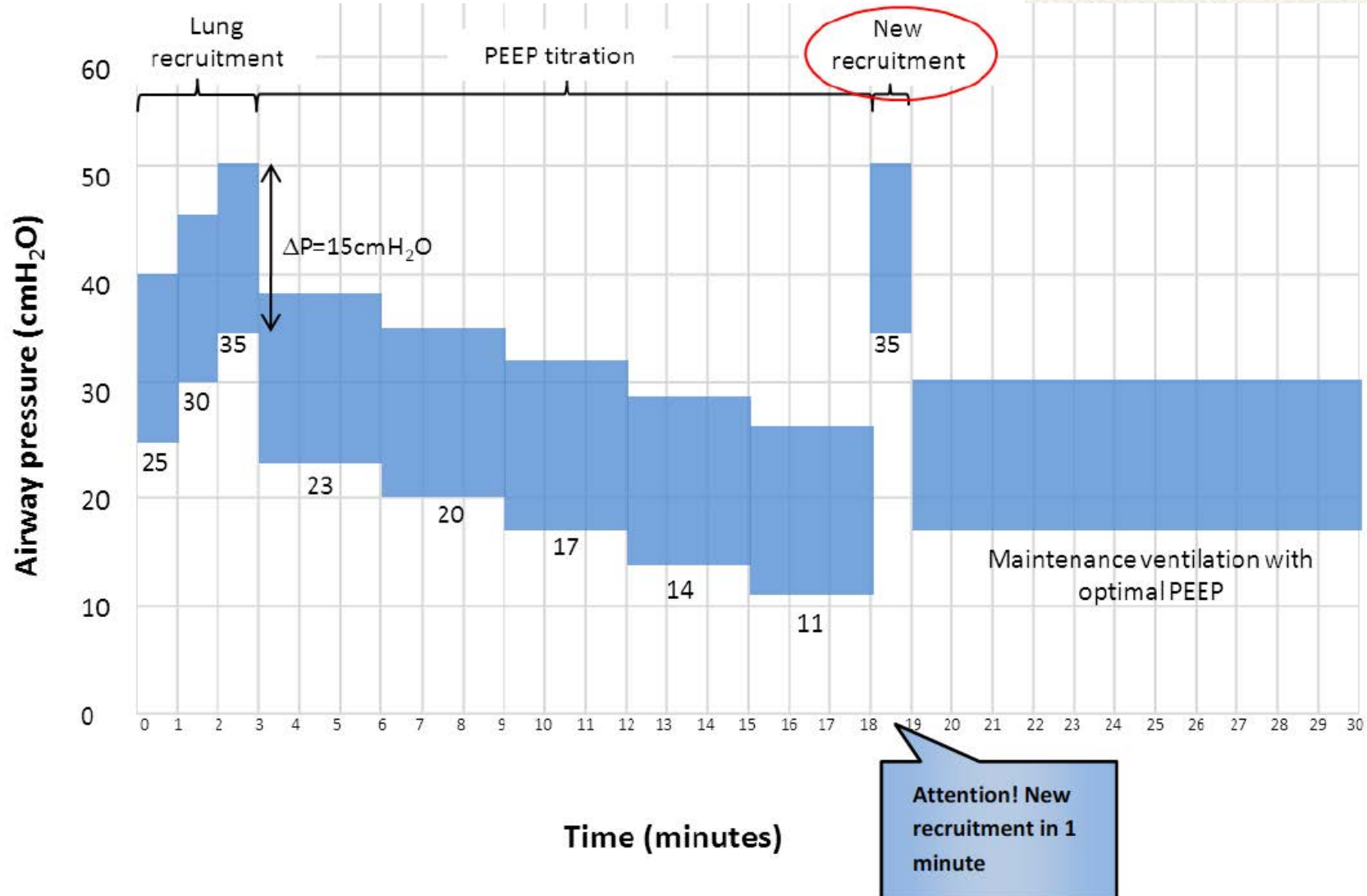
Outcomes	RM group (n=55)	Control group (n=55)	Relative risk (95% Confidence interval)
Death in hospital (n (%))	23 (41.8)	31 (56.4)	0.74 (0.50–1.10)
Death by day 28 (n (%))	16 (29.1)	24 (43.6)	0.67 (0.40–1.11)
Death in intensive care unit (n (%))	18 (32.7)	29 (52.7)	0.62 (0.39–0.98)



Effect of Lung Recruitment and Titrated Positive End-Expiratory Pressure (PEEP) vs Low PEEP on Mortality in Patients With Acute Respiratory Distress Syndrome

A Randomized Clinical Trial

JAMA. doi:10.1001/jama.2017.14171
Published online September 27, 2017.



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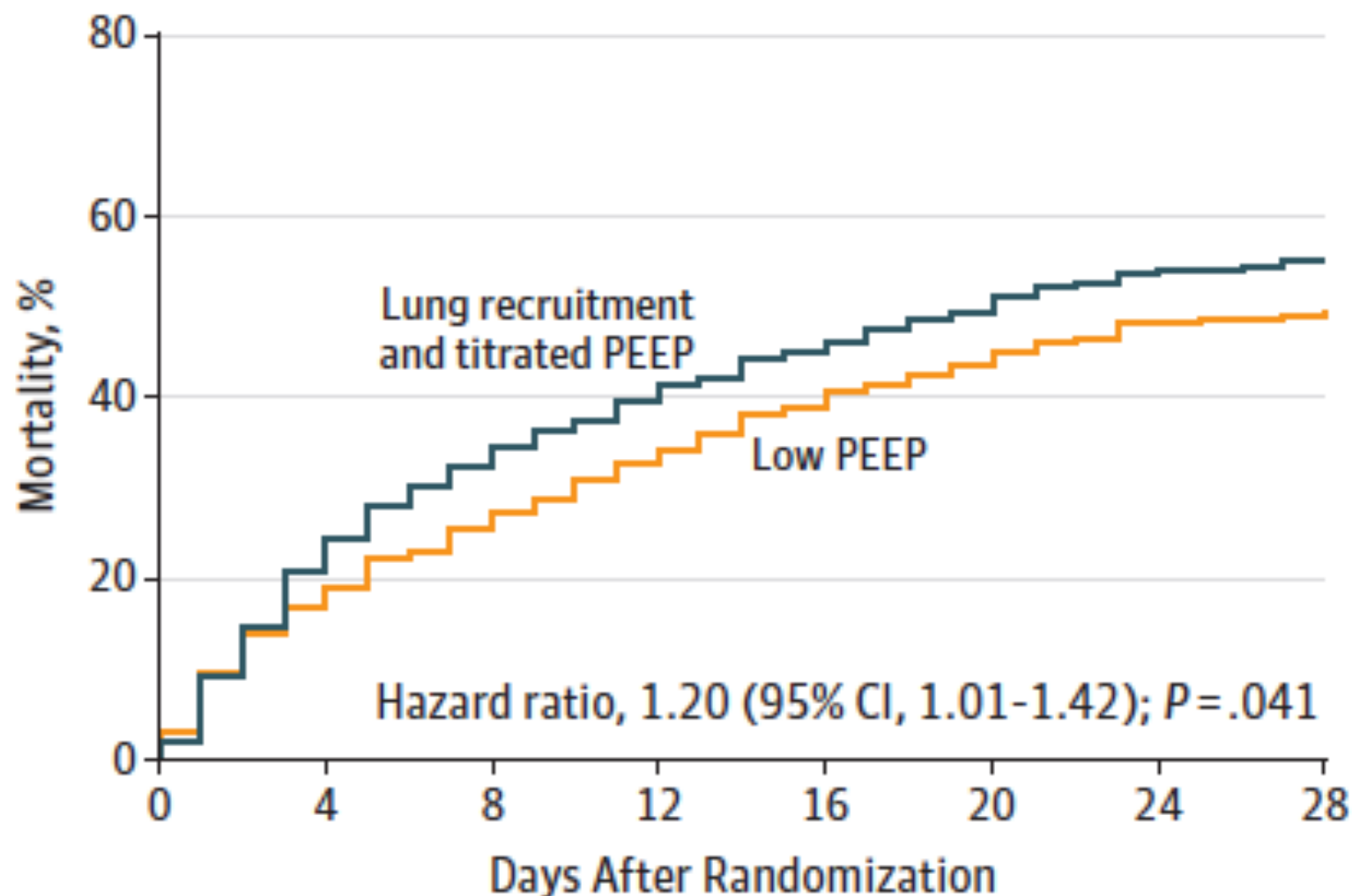
JAMA. doi:10.1001/jama.2017.14171
Published online September 27, 2017.

In June 2015, starting with the 556th patient, the steering committee, in consultation with the data monitoring committee, decided to modify the recruitment maneuver and PEEP titration strategy after 3 cases of resuscitated cardiac arrest possibly associated with the experimental group treatment were observed. During the recruitment maneuver, PEEP was increased to 25 cm H₂O, 30 cm H₂O, and then 35 cm H₂O, in steps of 1 minute. Maximum plateau pressure was 50 cm H₂O. Decremental PEEP trial was shorter, with each PEEP step lasting 3 minutes, followed by a new recruitment maneuver with PEEP of 35 cm H₂O.

Effect of Lung Recruitment and Titrated Positive End-Expiratory Pressure (PEEP) vs Low PEEP on Mortality in Patients With Acute Respiratory Distress Syndrome

A Randomized Clinical Trial

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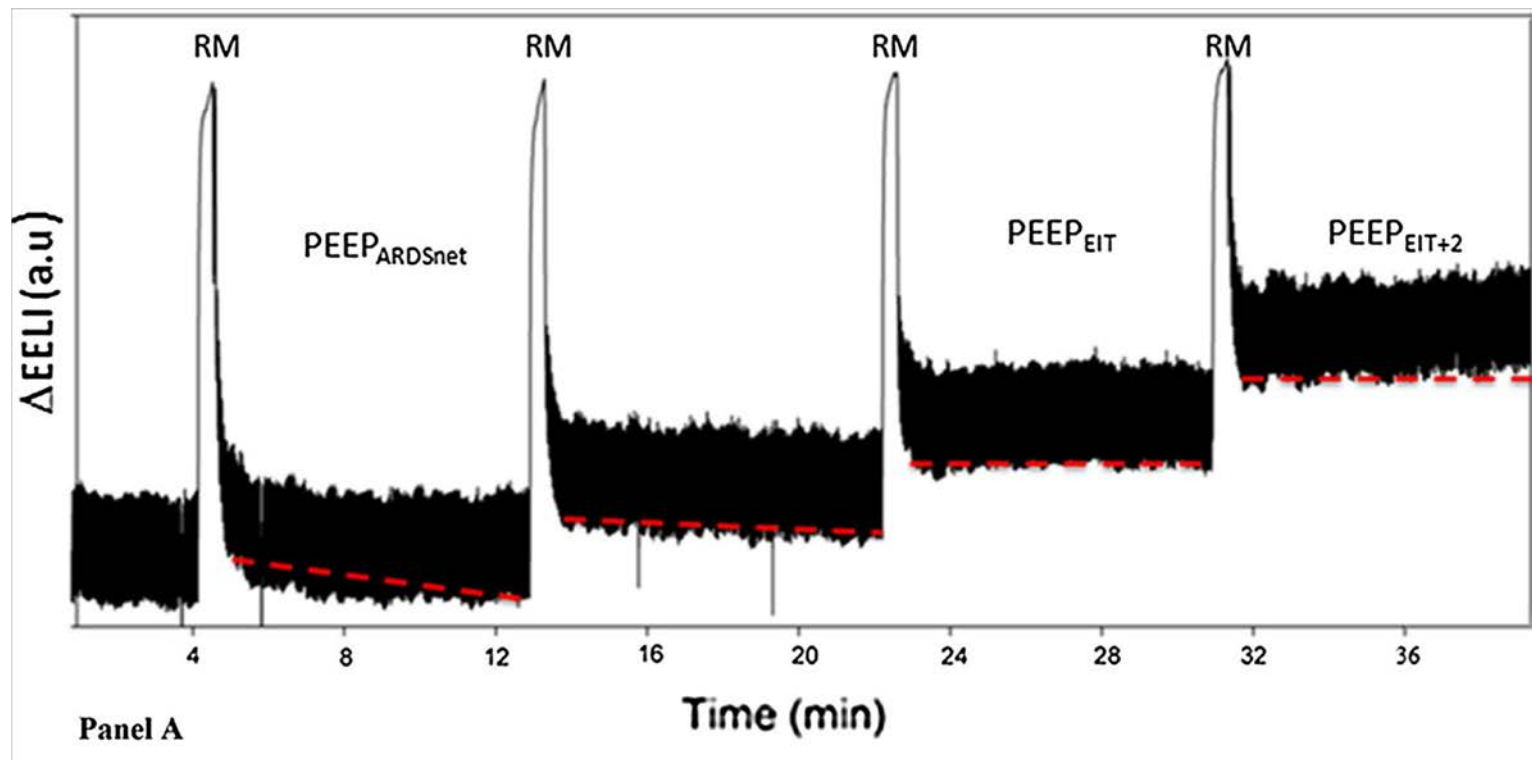


RM – EIT – Titration PEEP



Bedside selection of positive end-expiratory pressure by electrical impedance tomography in hypoxemic patients: a feasibility study

Nilde Eronia¹, Tommaso Mauri^{2,3}, Elisabetta Maffezzini⁴, Stefano Gatti⁴, Alfio Bronco⁴, Laura Alban^{2,3}, Filippo Binda³, Tommaso Sasso^{2,3}, Cristina Marenghi³, Giacomo Grasselli³, Giuseppe Foti^{1,4}, Antonio Pesenti^{2,3} and Giacomo Bellani^{1,4*}



SDRA : Manœuvres de recrutement ?

- Systématique : NON
- En cas de dérecrutement accidentel ++
- Manœuvre de courte durée (< 20 sec)
- Pplat 40 – 45 cmH₂O
- Préférer manœuvre maintenant la ventilation
- Sous stricte surveillance (FC, PA, SpO₂)
- Arrêt immédiat si mauvaise tolérance

réanimation 2019

Paris 23-25 janvier 2019

Paris Expo - Porte de Versailles



Jean-Michel Arnal
J r mie Paquet
Marc Wysocki
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Optimal duration of a sustained inflation recruitment maneuver in ARDS patients

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