Les muscles respiratoires dans le sevrage : Intérêt des nouveaux modes ventilatoires

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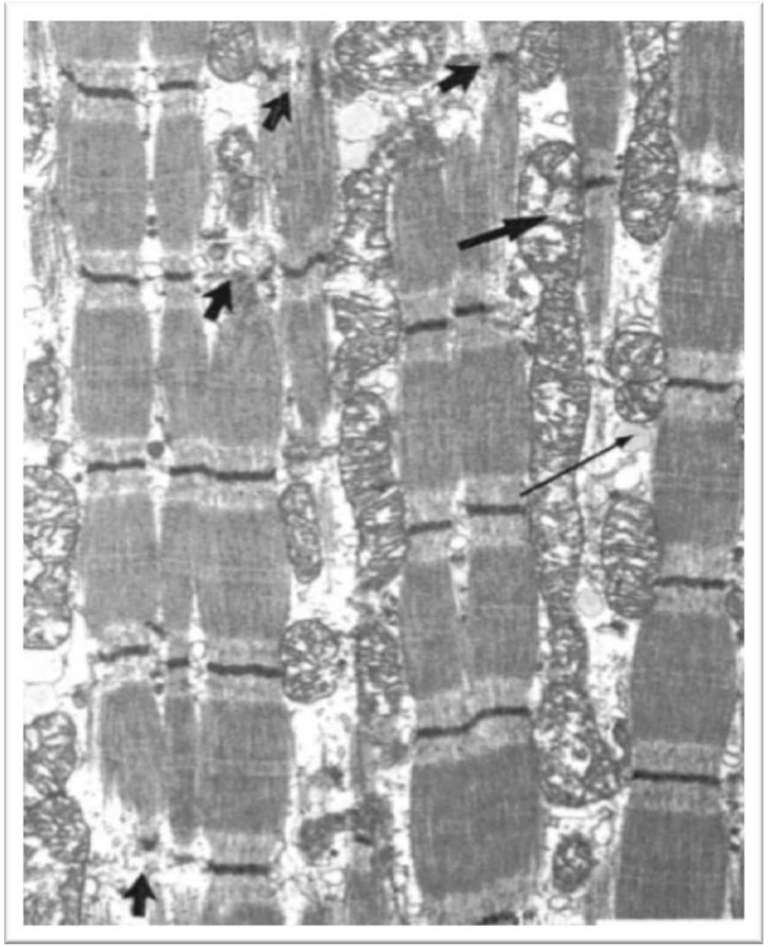
Atteintes neuromusculaires sévères

Des muscles squelettiques

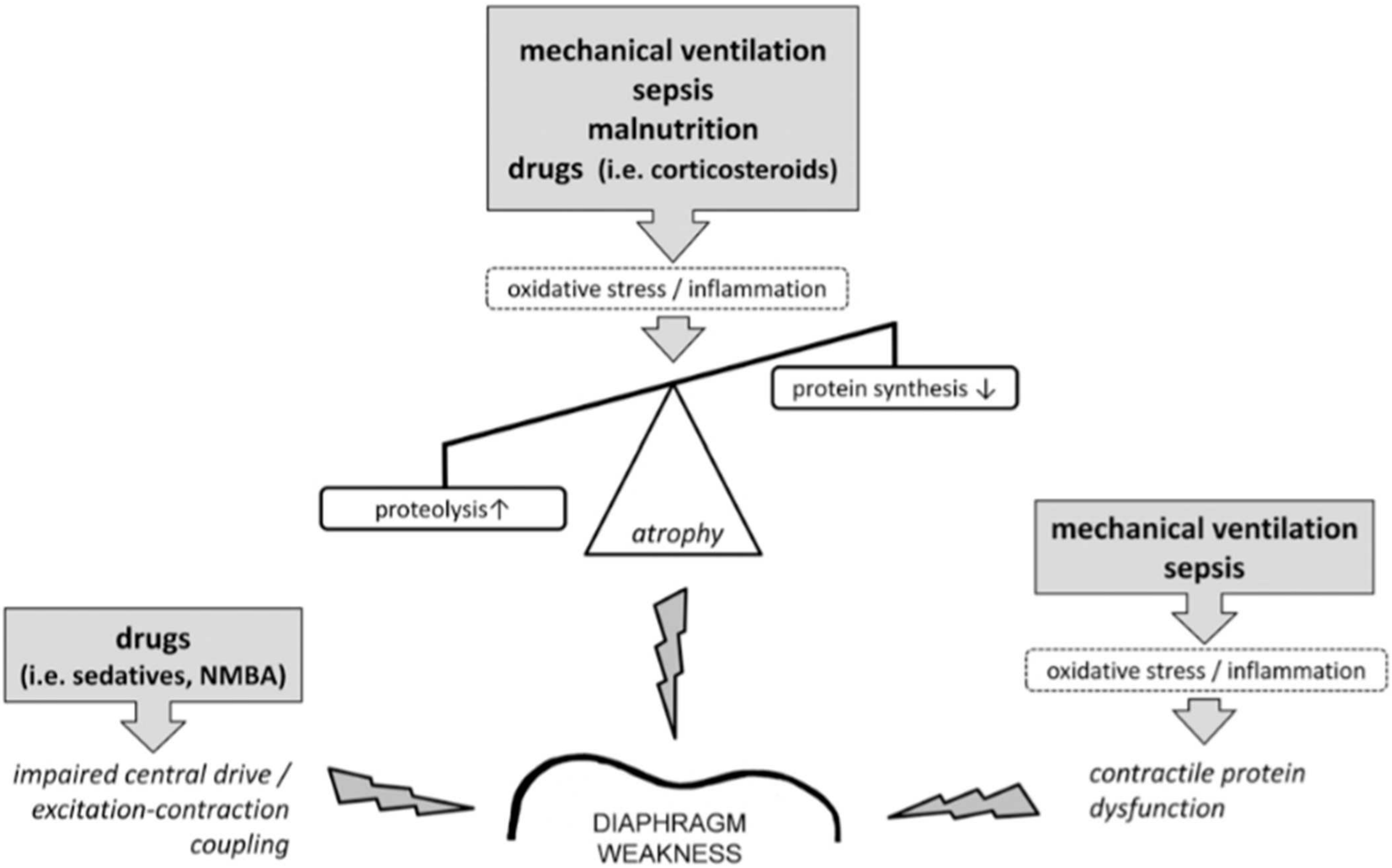
Des muscles respiratoires

FIGURE 1. Electron micrograph of skeletal muscle biopsy from patient 1 contrasting normal myofibrils *(above)* to severe myopathic fibrils *(below)* (original magnification × 13,750).

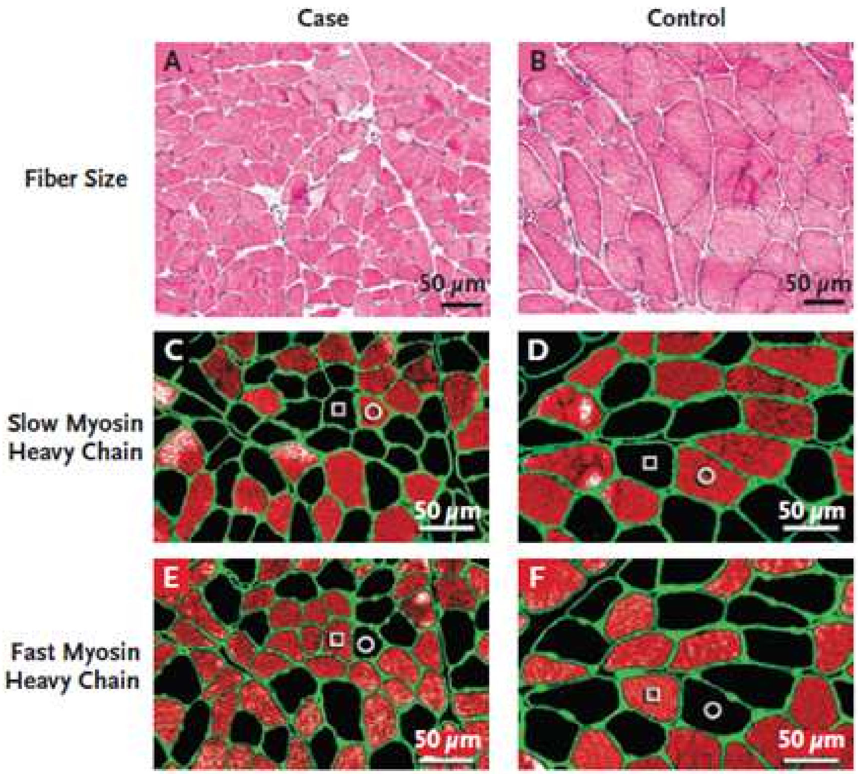


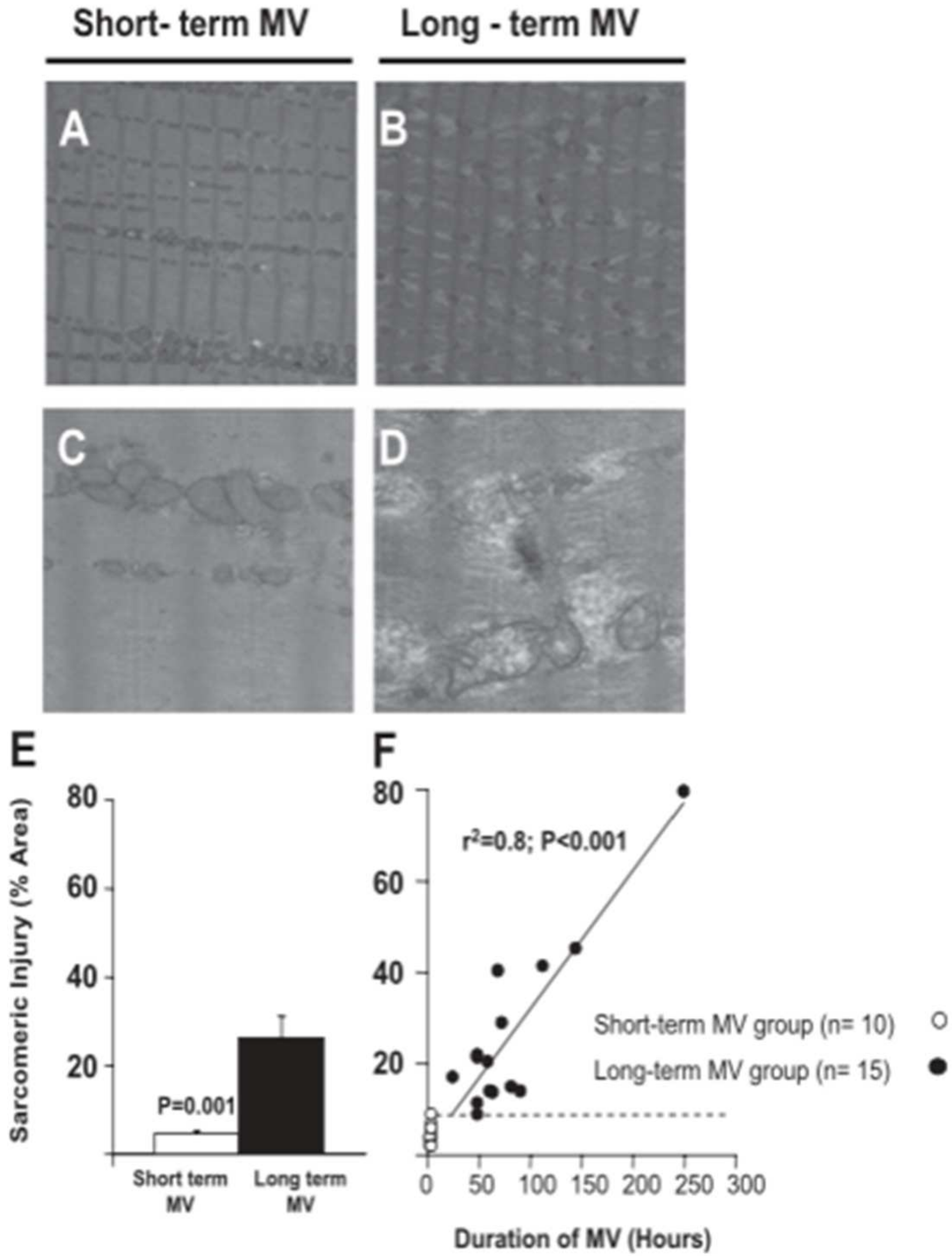
Griffin, D., et al. (1992). CHEST Journal **102**(2): 510-514.

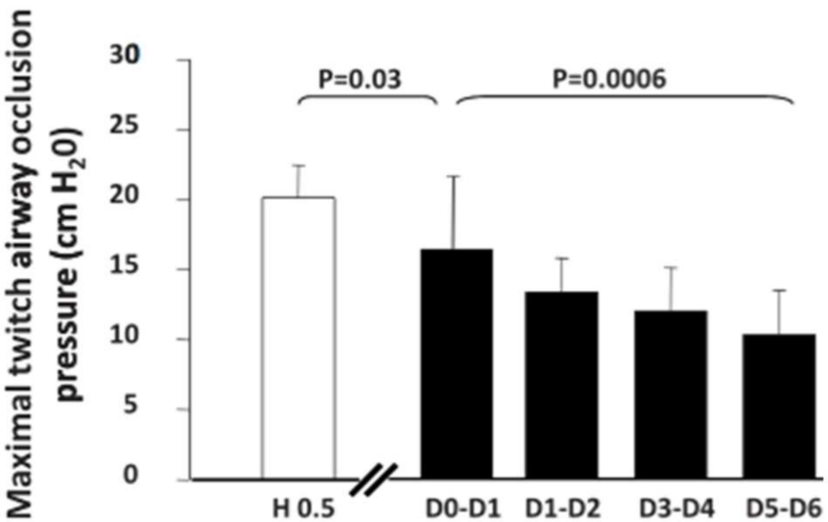
Laghi and Tobin (2003) Am J Respir Crit Care Med ; 168:10-48



Doorduin et al. Am J Respir Crit Care Med 2013, 187(1):20–27,







Levine, S., et al. (2008). NEJM **358**(13): 1327-1335.
Jaber et al. Am J Respir Crit Care Med 183:364–371

Sédation ?

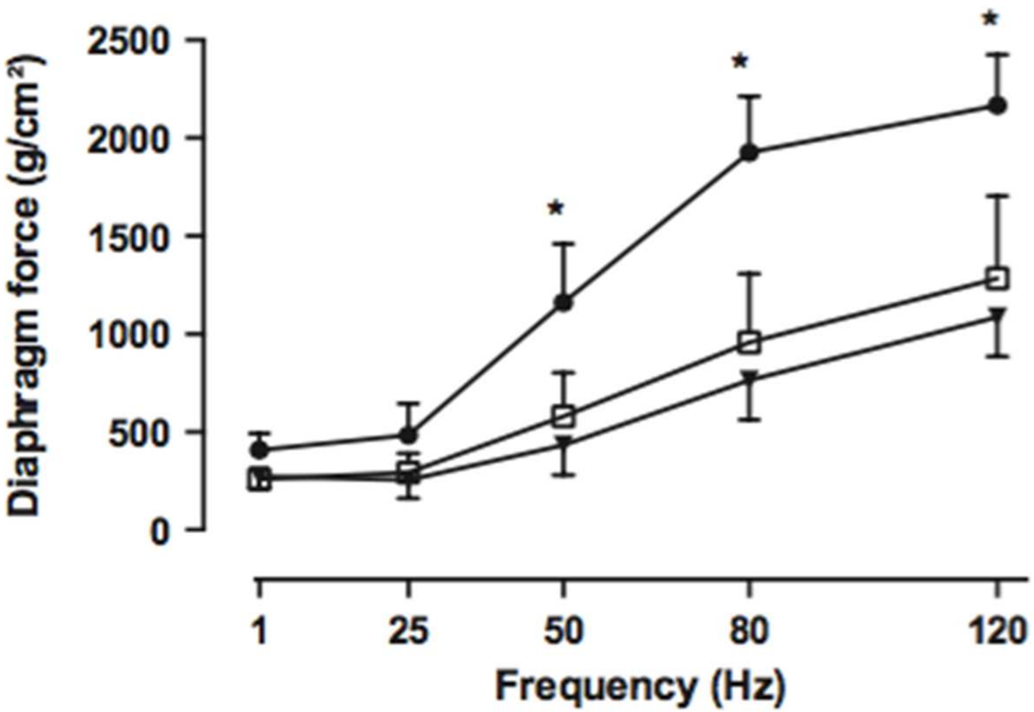


Fig. 1. Diaphragm force frequency curve in the controlled mechanical ventilation and spontaneous breathing sedated with propofol compared with control. Propofol under spontaneous breathing resulted in diaphragmatic dysfunction. *Open squares*: spontaneous breathing (n = 8); *triangles*: controlled mechanical ventilation (n = 7); *filled circles*: control (n = 8); *P < 0.05 *versus* control.

Bruells et al. **A**nesthesiology **2014; 120:665-72**

Sédation

Ventilation contrôlée

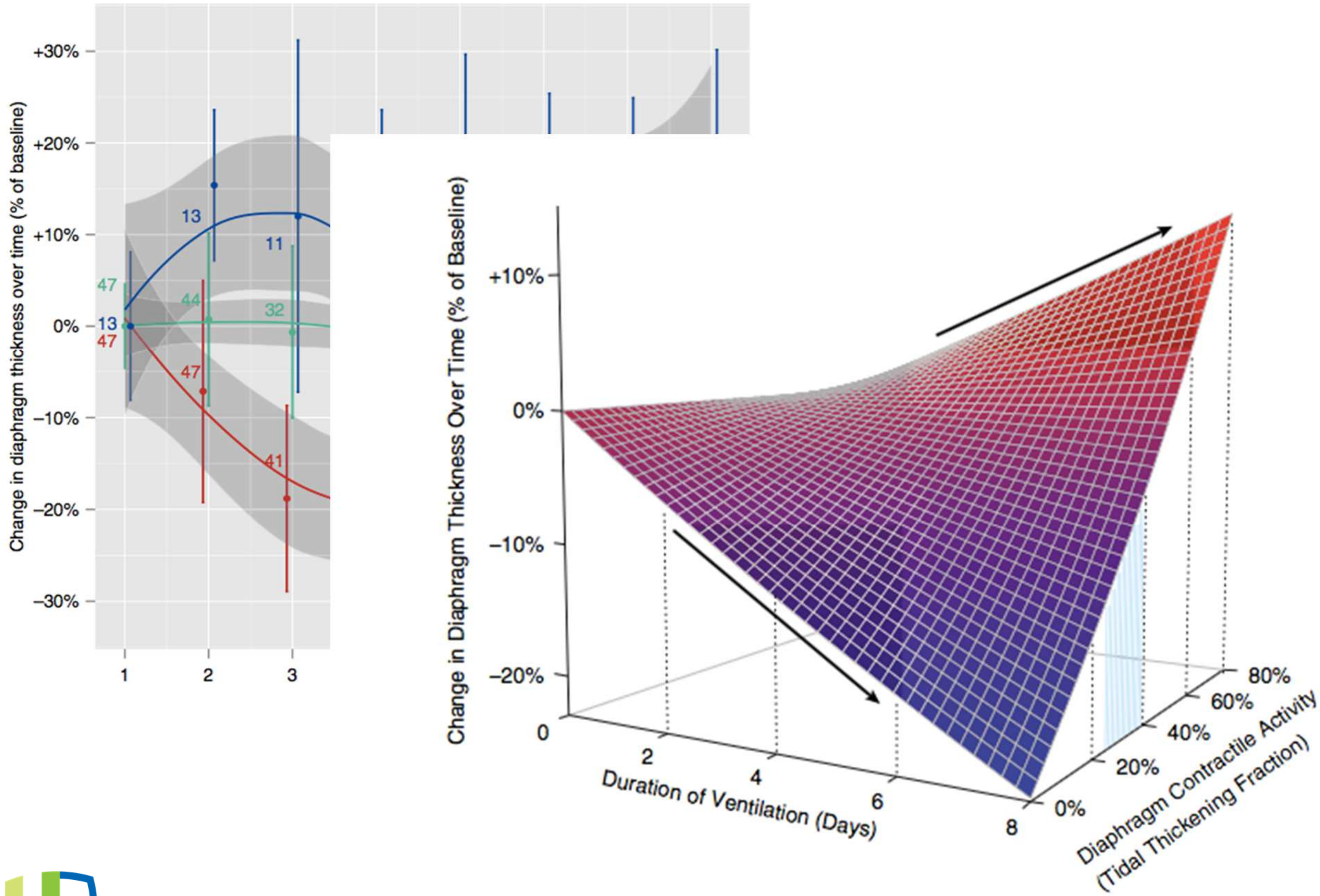
Dysfonction diaphragmatique

Difficultés de sevrage de la ventilation mécanique

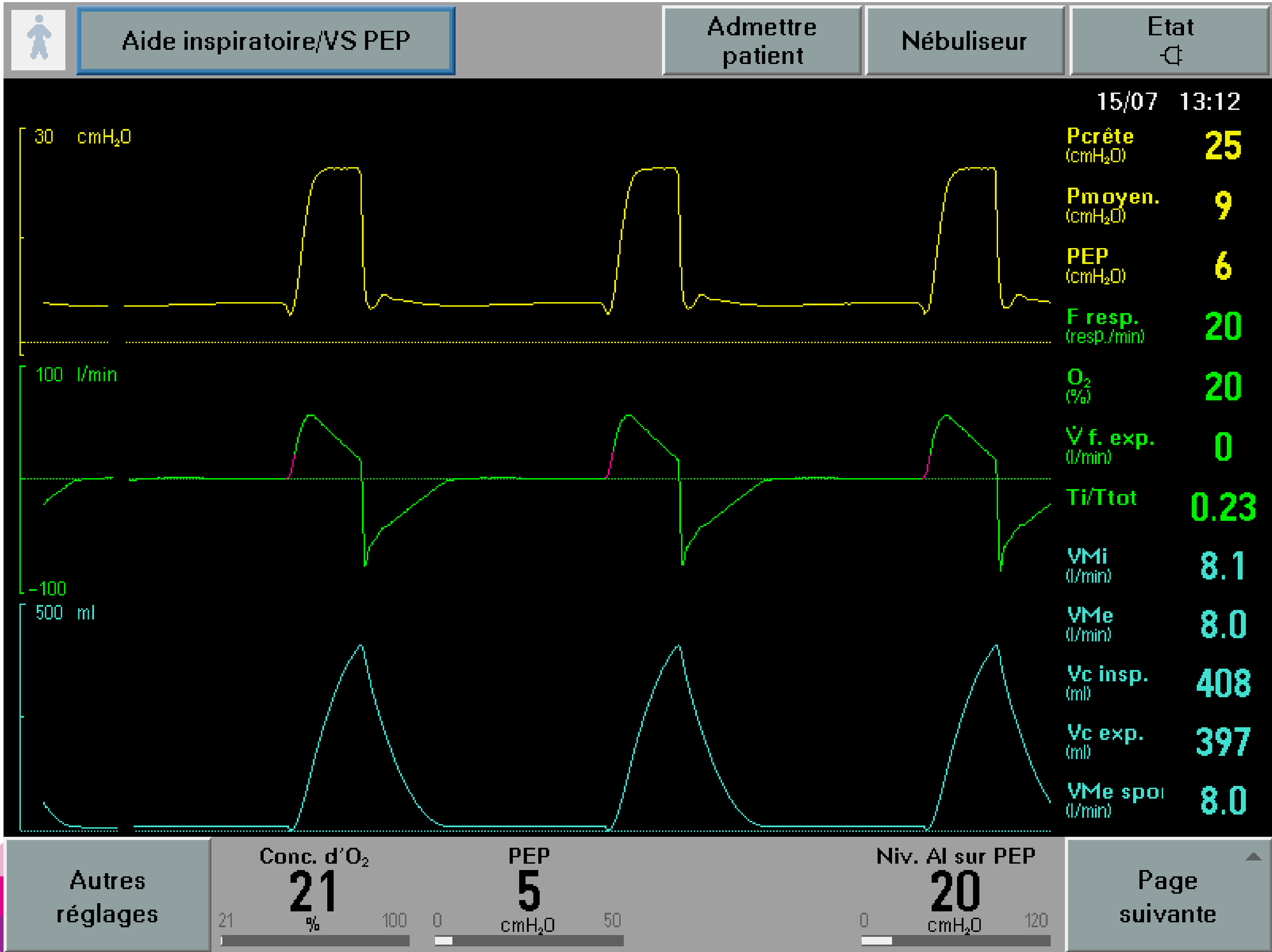
↗ de la durée de ventilation mécanique

Levée précoce de la sédation

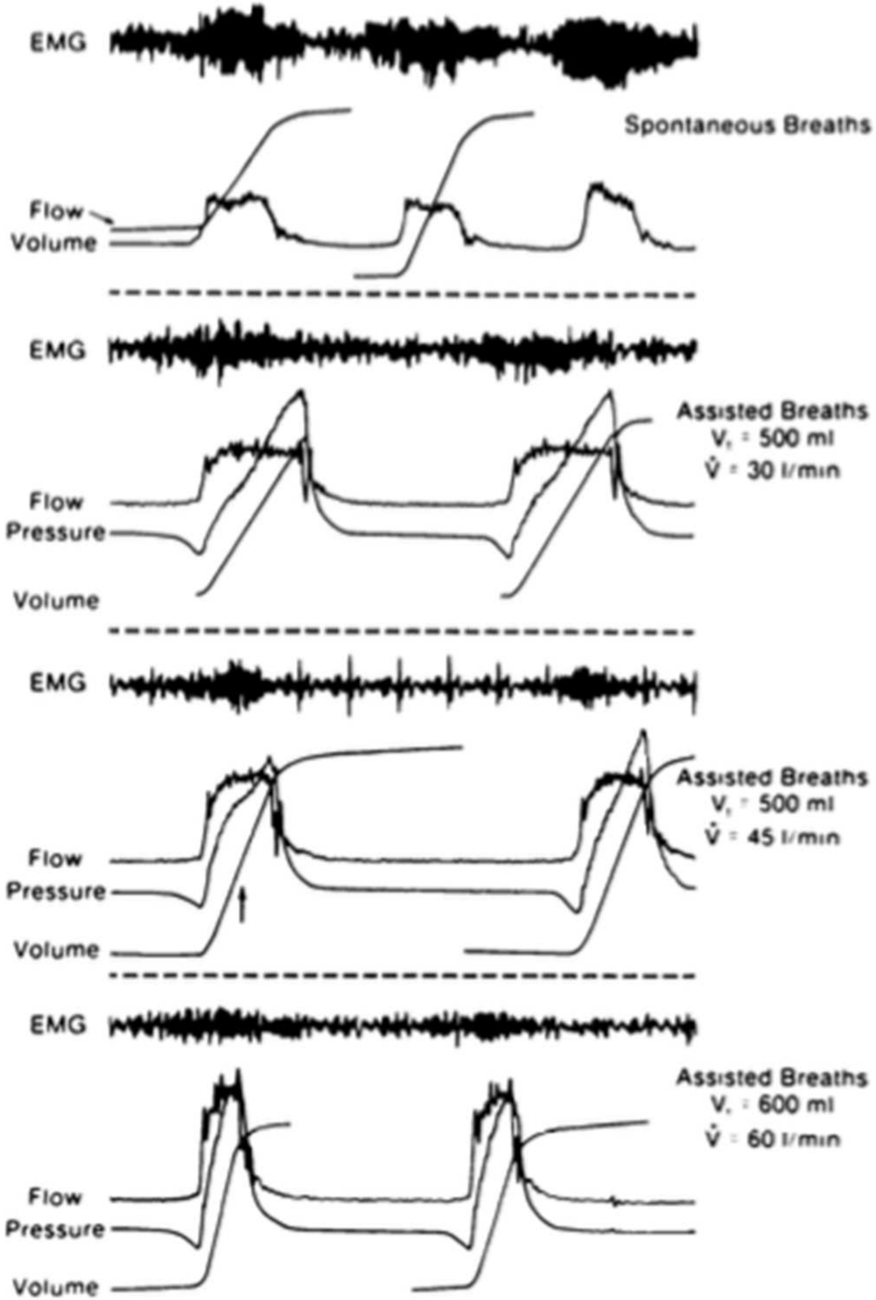
Ventilation assistée



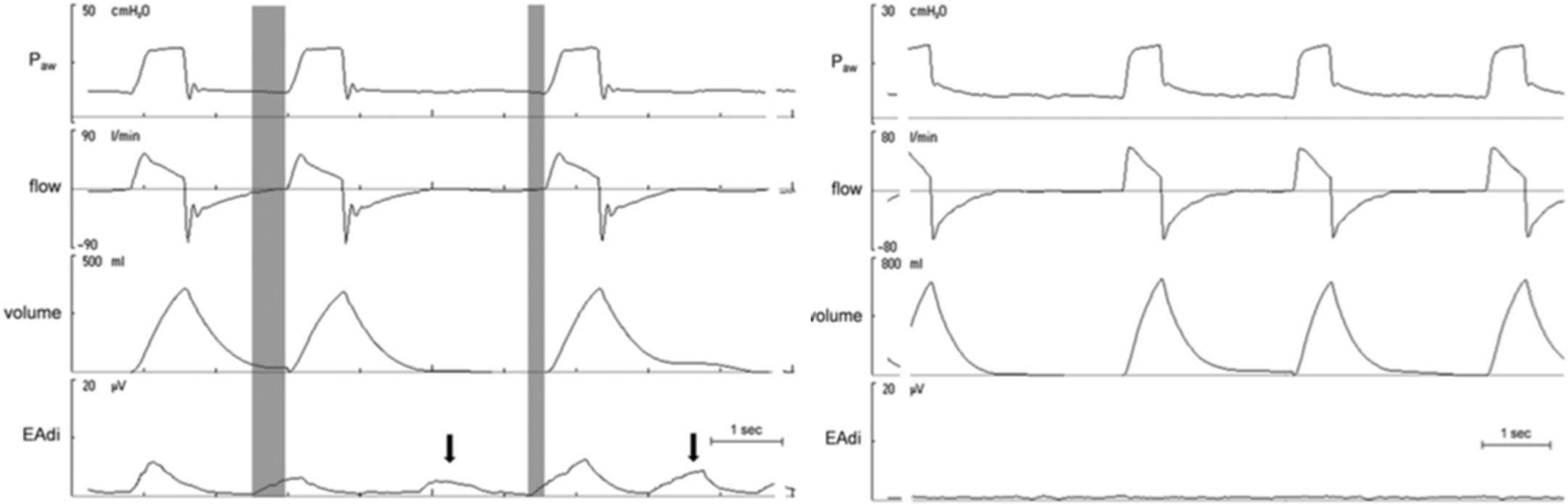
Goligher et al. 2015 AJRCCM. 192:1080-1088



Aide inspiratoire/VS PEP
Admettre patient
Nébuliseur
Etat
15/07 13:12
30 cmH2O
100 l/min
-100
500 ml
Pcrête (cmH2O) 25
Pmoyen. (cmH2O) 9
PEP (cmH2O) 6
F resp. (resp./min) 20
O2 (%) 20
V̇ f. exp. (l/min) 0
Ti/Ttot 0.23
VMi (l/min) 8.1
VMe (l/min) 8.0
Vc insp. (ml) 408
Vc exp. (ml) 397
VMe spoı (l/min) 8.0
Autres réglages
Conc. d'O2 21 % 21 100
PEP 5 cmH2O 0 50
Niv. AI sur PEP 20 cmH2O 0 120
Page suivante



Flick et al. **1989**
Chest 96:130-135



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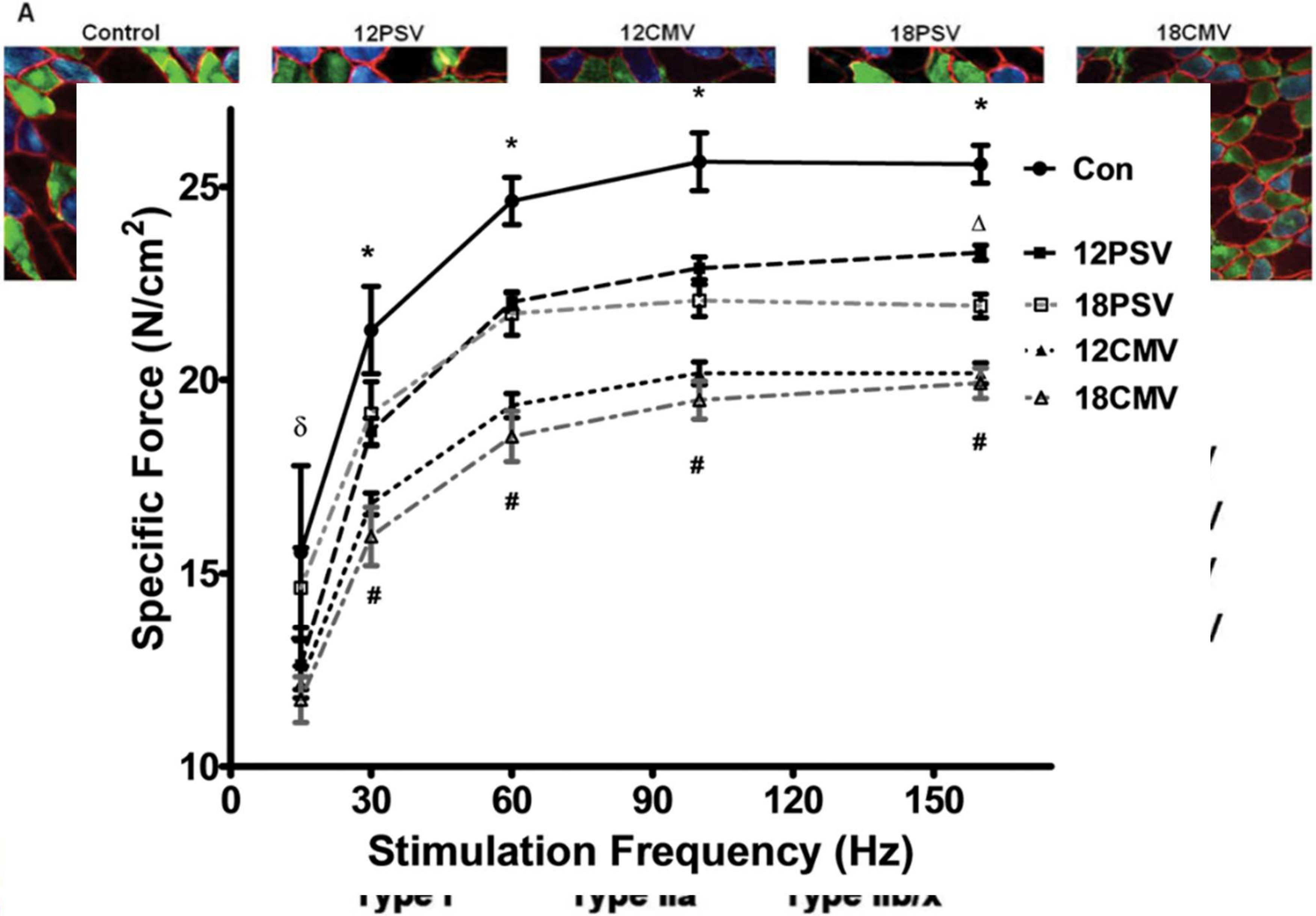
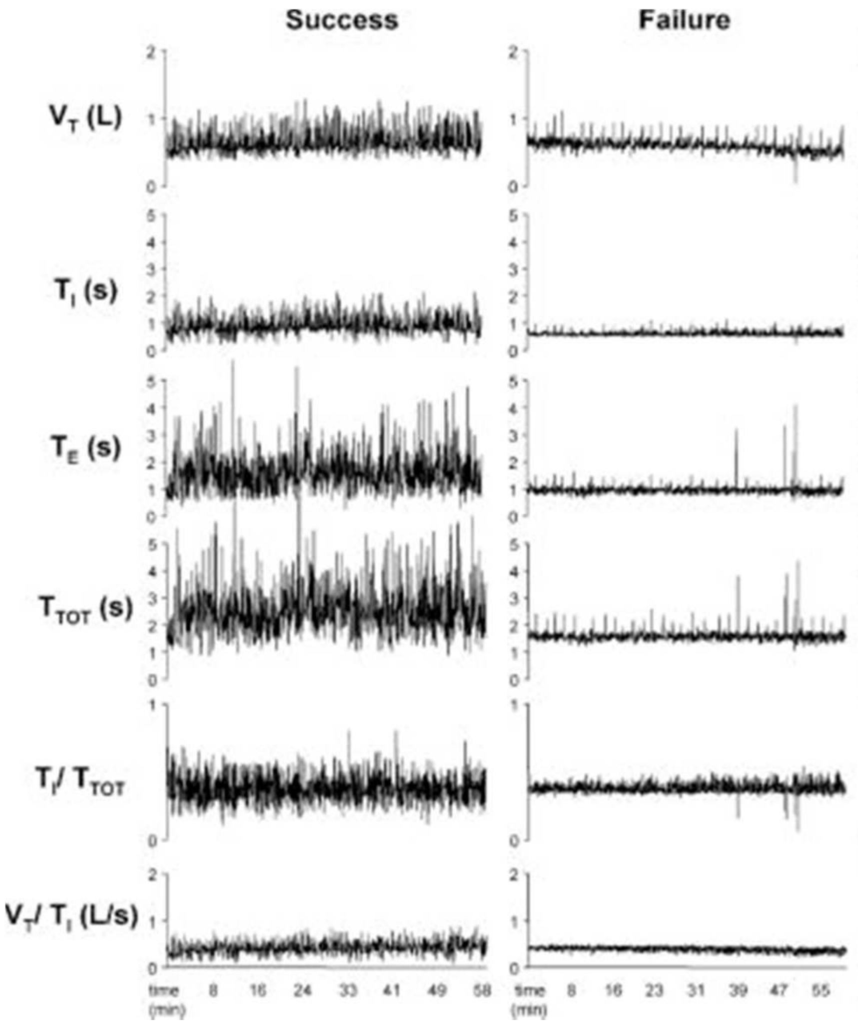


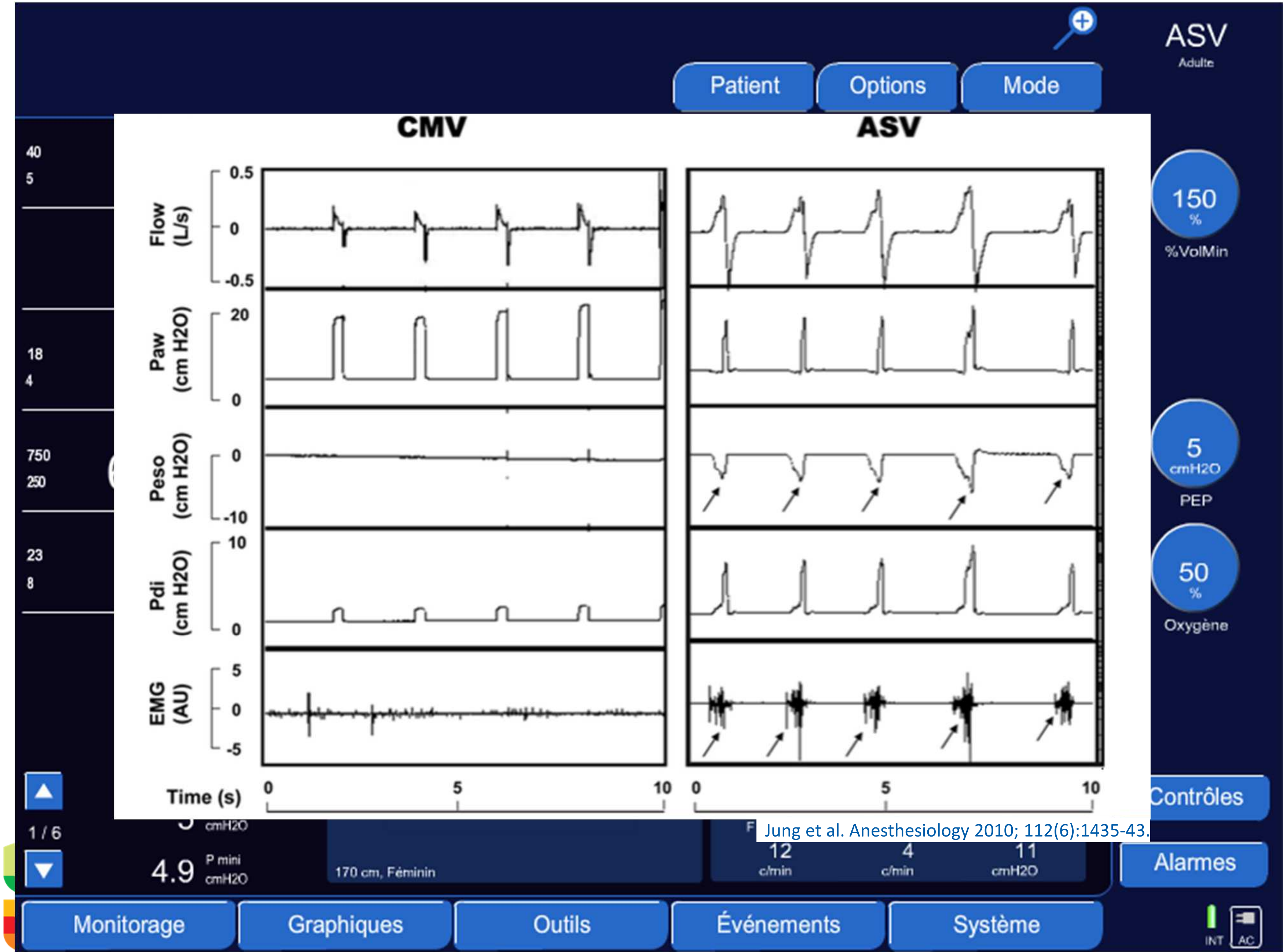
Hudson et al. 2012 Crit Care Med. 40(4): 1254–1260

Reduced breathing variability as a predictor of unsuccessful patient separation from mechanical ventilation*

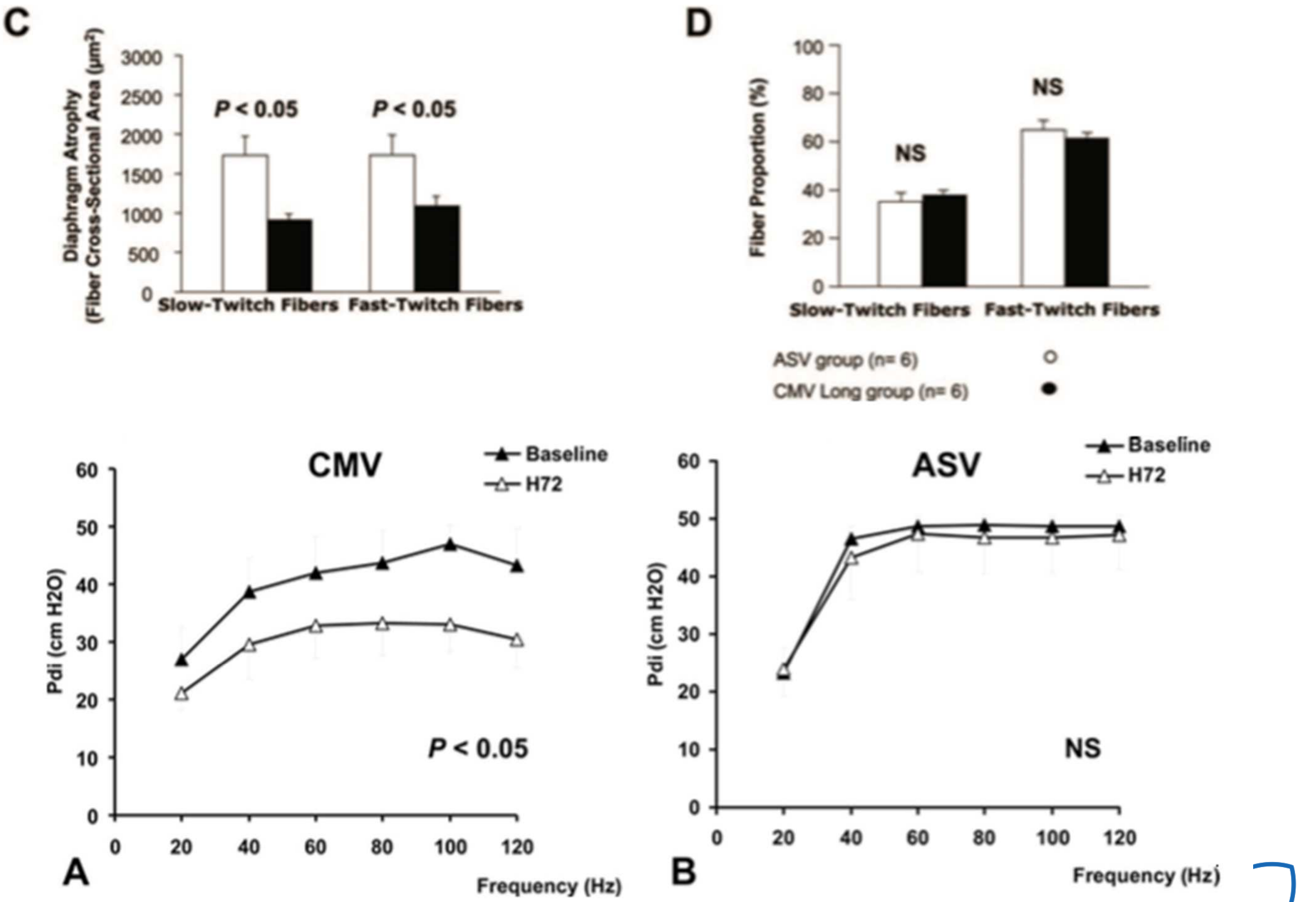
Marc Wysocki, MD; Christophe Cracco, MD; Antonio Teixeira, MD, MSci Biostat; Alain Mercat, MD; Jean-Luc Diehl, MD; Yannick Lefort, MD; Jean-Philippe Derenne, MD; Thomas Similowski, MD, PhD



Wysocki M. et al Crit Care Med 2006.



Jung et al. Anesthesiology 2010; 112(6):1435-43.



Jung et al. Anesthesiology 2010; 112(6):1435-43.


PPEAK 22 cmH2O
fTOT 28 1/min
PEEP 4.1 cmH2O
I:E 1:1.3
fTOT 28 1/min
VTE 504 mL
VE TOT 14.1 L/min
O2 35 %
CPAV 37 mL/cmH2O
RPAV 8.4 cmH2O/L/s
PEEPI 0.9 cmH2O
PCIRC
cmH2O
PLUNG
cmH2O
Menu
WOB
J/L
WOBPT
WOBTOT
VT
mL
Adult
SPONT
PAV+
80kg
5.63mL/kg
Manual Insp
VT 450 mL
% Supp 70 %
VSENS 3.0 L/min
O2 35 %
ESENS 3 L/min
PEEP 5.0 cmH2O
Manual Event
O2
03:20:00pm

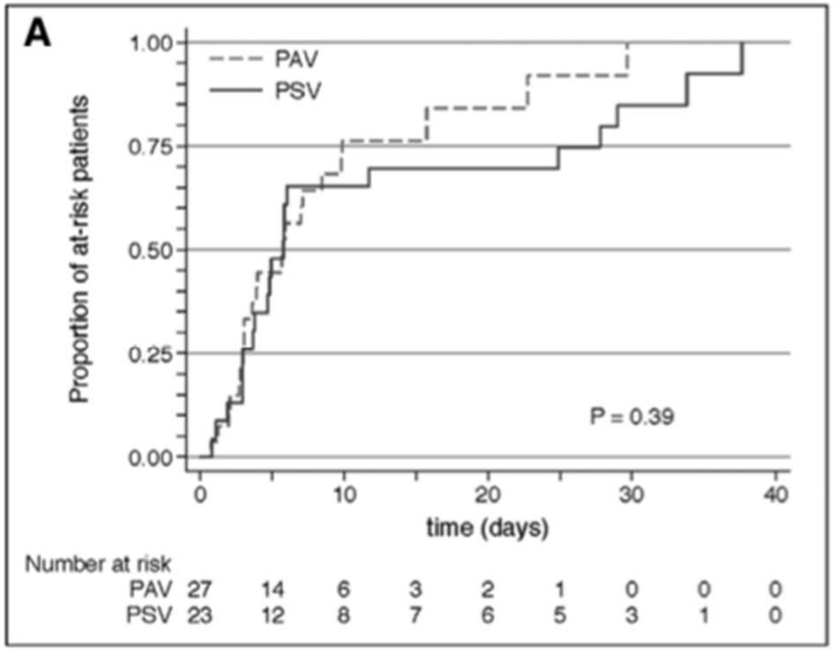
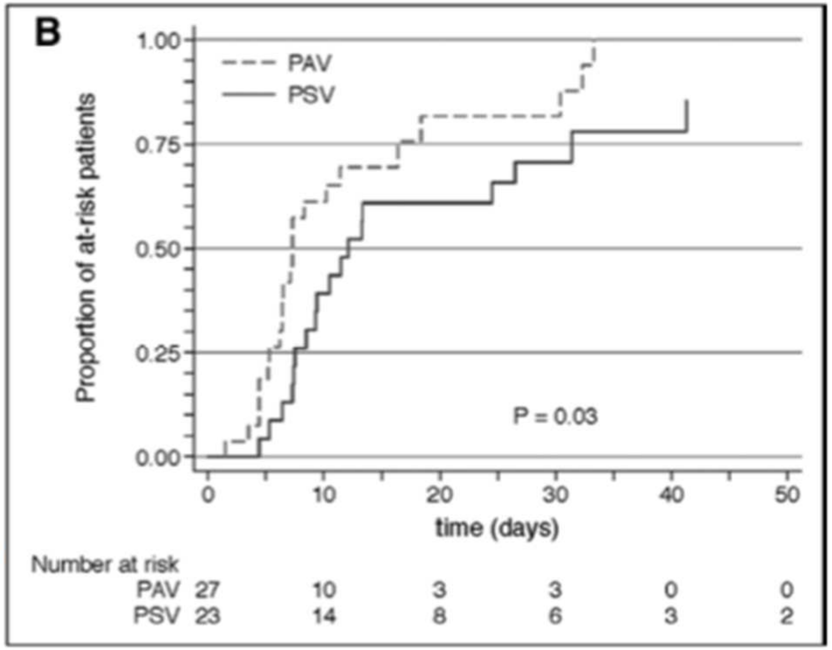


Figure 3. A, Time to successful extubation for the two treatment groups (Ka



plan-Meier curves). **B**, Time to live ICU discharge for the two treatment

CONCLUSIONS

In conclusion, this pilot study demonstrates that protocols using stepwise reductions in PAV or PSV to maintain patients at the lowest level of support without fatigue, coupled with daily assessment for SBTs, may be used safely and effectively in the population at risk for difficult or prolonged weaning from early in their recovery until ventilation discontinuation. Although patients may be supported with these protocols throughout their recovery period, approximately 75% of patients required intermittent use of A/C mode for respiratory distress not alleviated at maximal support, and used A/C mode intermittently on average 6 hours/d. As a physiologic study, this trial included a sufficiently large sample size to show that PAV+ may facilitate weaning and aid in recovery of the respiratory muscles, by imparting a greater share of the respiratory workload to the diaphragm, without inducing clinical signs of respiratory distress, and by reducing patient-ventilator asynchrony, even at high levels of support. Whether or not these attributes of PAV will translate into improved clinical outcomes merits further study, but we now have sufficient clinical evidence and physiologic rationale to proceed to a rigorous, multicenter RCT designed to answer these specific questions. This report not only demonstrates that such a trial is feasible but also informs study design by providing valuable insight into the utility, safety, and constraints of PAV+ and PSV protocols applied throughout the trajectory of recovery and weaning.

Bosma et al. Crit Care Med. 2016 Jun;44(6):1098-108

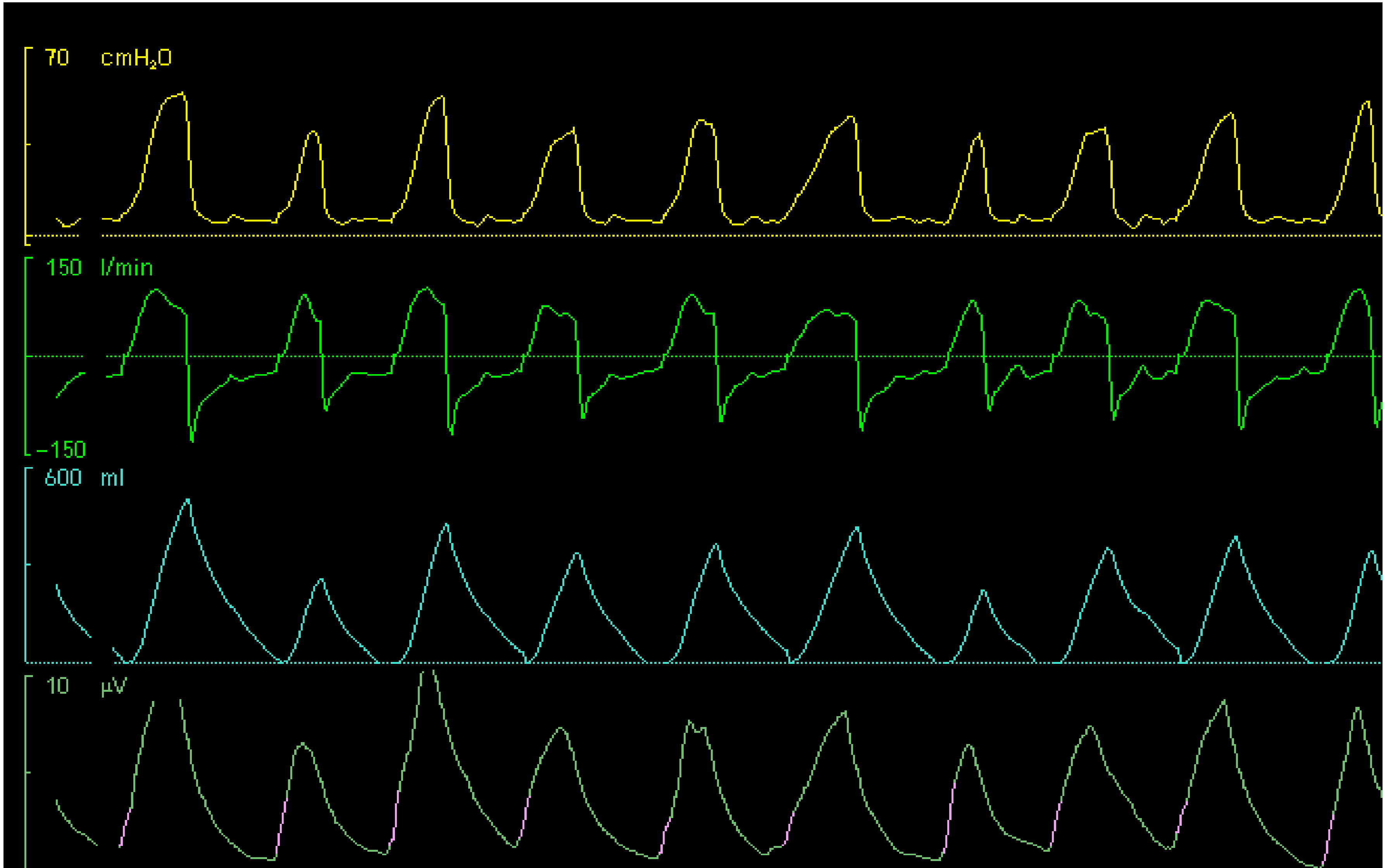
Crossover study of proportional assist versus assist control ventilation

Table 1 Comparison of airway pressures, physiological outcomes and blood gas exchange by ventilator mode

	PAV	ACV	p Value
Mean airway pressure (cm H_2O)	8.4 (7.1–9.0)	9.1 (7.1–11.0)	0.028
Peak inflation pressure (cm H_2O)	17 (13–20)	18 (14–20)	0.036
PTPdi (cm H_2O.s/min)	217 (60–556)	309 (55–544)	0.005
Pimax (cm H_2O)	21.9 (11.2–37.3)	23.6 (13.6–38.6)	0.182
Pdimax (cm H_2O)	44.3 (21.3–66.4)	37.9 (19.5–45.2)	0.002
TAA (degrees)	1.2 (0.4–3.5)	1.9 (1.2–3.3)	0.050
Respiratory rate (bpm)	54 (40–66)	57 (46–74)	0.025
Expiratory tidal volume (mL/kg)	6.8 (3.7–7.4)	7.2 (2.7–7.8)	0.182
SaO_2 (%)	96 (93–98)	93 (92–98)	0.021
FiO_2	0.40 (0.21–0.50)	0.50 (0.30–0.60)	0.005
PaO_2 (kpa)	7.2 (4.4–13.2)	6.1 (3.9–11.7)	0.158
Oxygenation index	5.6 (5.0–10.7)	10.1 (7–16.1)	0.002
$PaCO_2$ (kpa)	7.6 (5.7–10.0)	7.6 (5.7–12.1)	0.814
Desaturation episodes (n)	1 (0–3)	1 (0–5)	0.200

The results are expressed as the median (range).
ACV, assist control ventilation; PAV, proportional assist ventilation; TAA, thoracoabdominal asynchrony.

Bhat P, et al. Arch Dis Child Fetal Neonatal Ed 2014;0:F1–F4.


70 cmH2O
150 l/min
-150
600 ml
10 µV

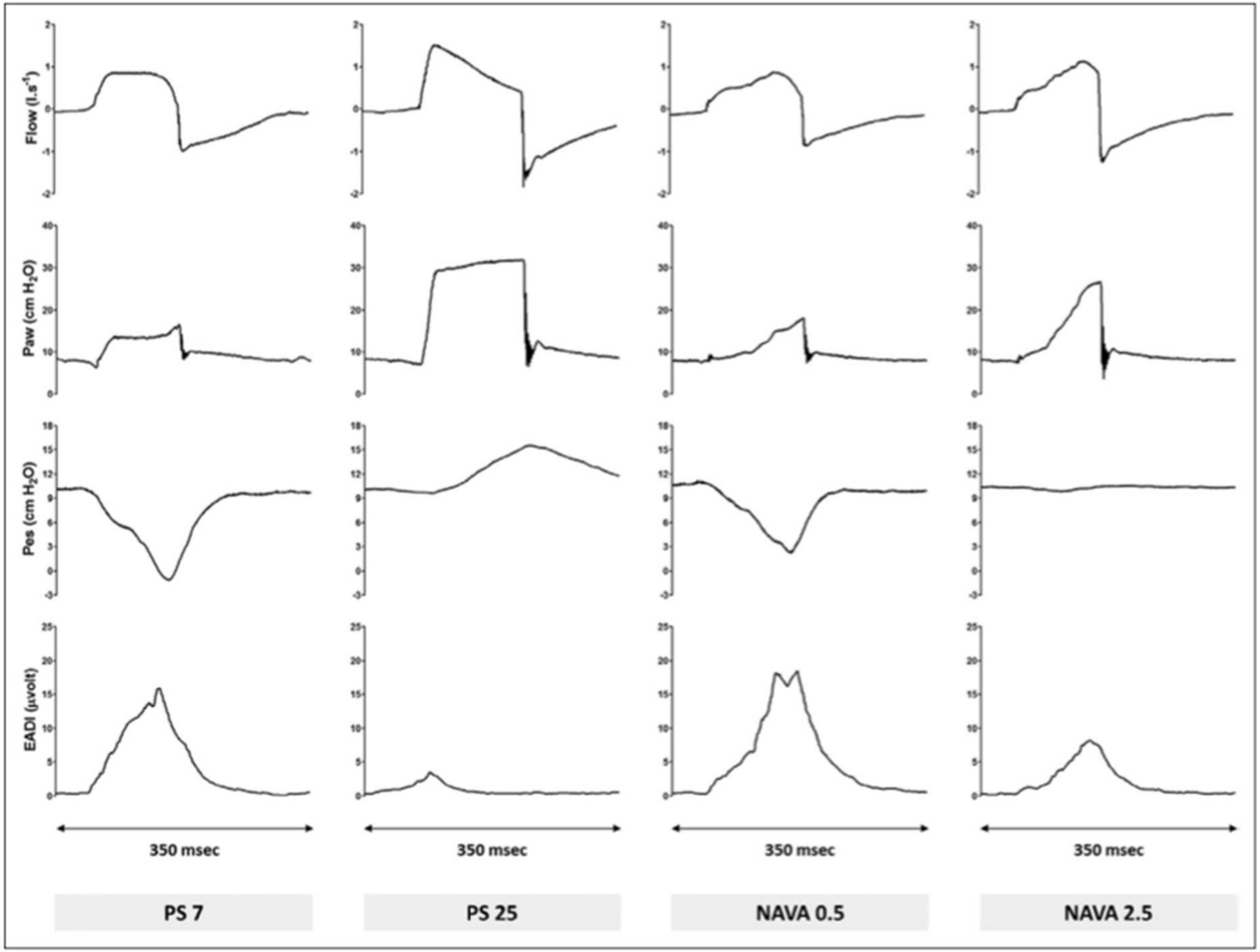


Figure 1. Representative recordings of flow, airway pressure (Paw), esophageal pressure (Pes), and electrical activity of the diaphragm (EAdi) over one breath at pressure support level 7 cm H_2O (PS 7) and 25 cm H_2O (PS 25) and neurally adjusted ventilatory assist level 0.5 cm H_2O/µvolt (NAVA 0.5) and 2.5 cm H_2O/µvolt (NAVA 2.5). At high levels of assistance, note that contrary to NAVA most of the insufflation occurred passively during PS ventilation.

Carteaux et al. *Crit Care Med* 2016; 44:503–511

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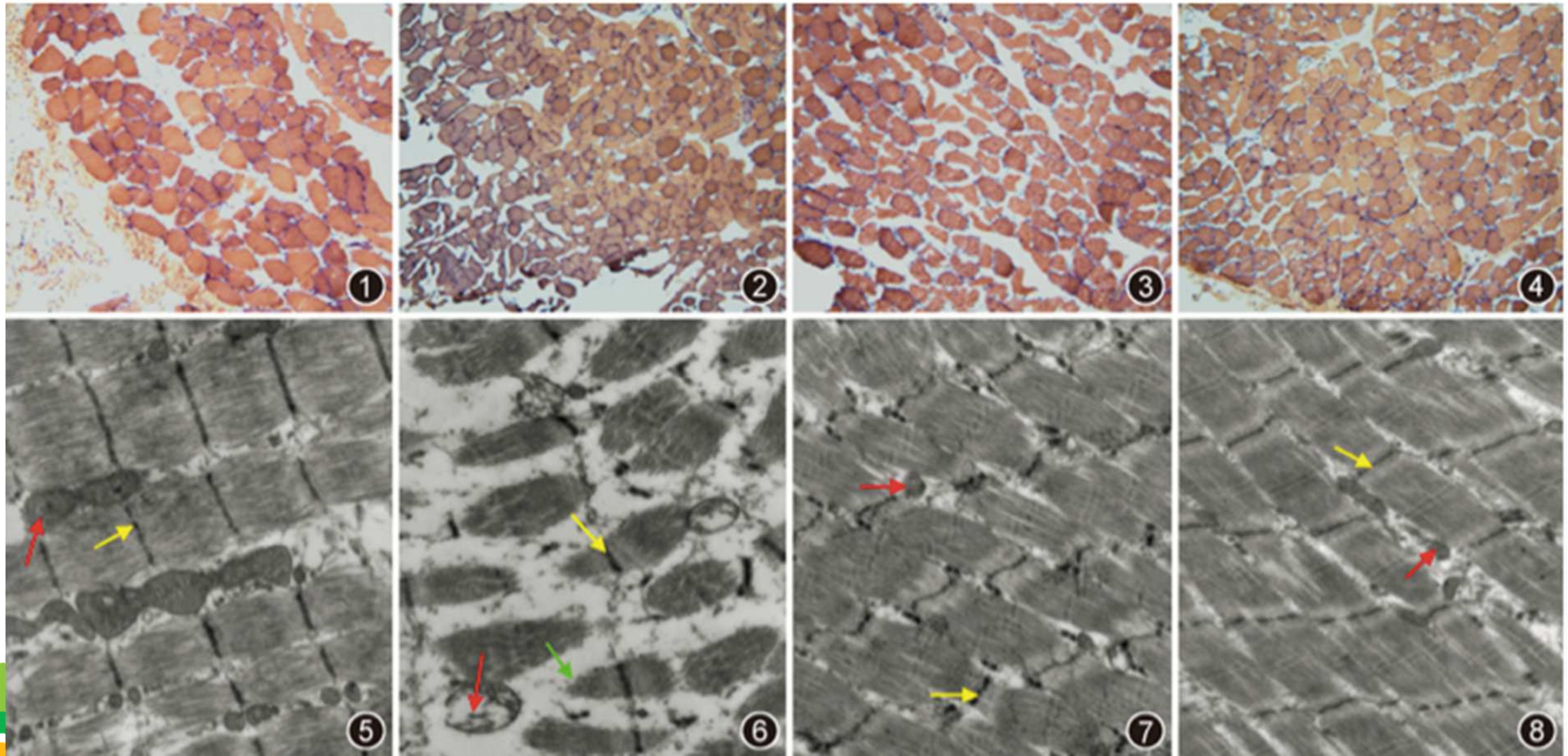
·论著·

Zhonghua Jie He He Hu Xi Za Zhi. 2011 Apr;34(4):288-93.

[Effects of neurally adjusted ventilatory assist on prevention of ventilator-induced diaphragmatic dysfunction in acute respiratory distress syndrome rabbits].

[Article in Chinese]

Huang DY[1], Liu J, Wu XY, Liu HG, Wu AP, Jiang DW, Yang Y, Qiu HB.



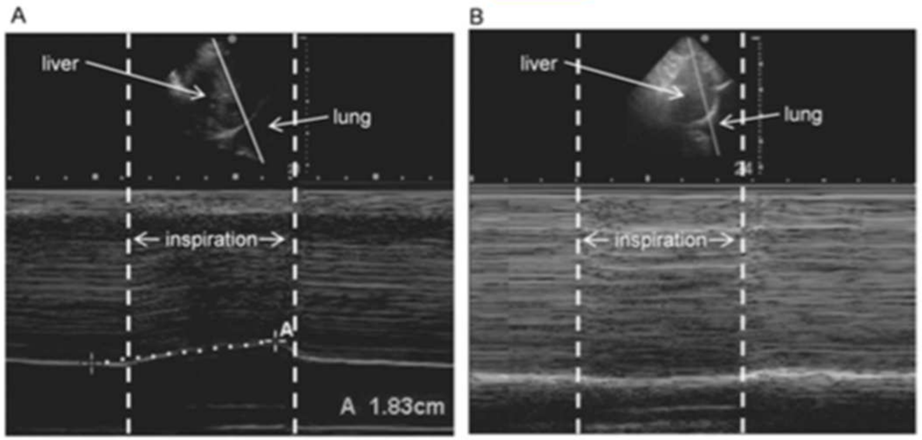


Figure 3. Ultrasonographic M-mode images from the right hemidiaphragm. (*A*) Normal diaphragm motion: the diaphragm moves 1.8 cm cephalad during inspiration. (*B*) Caudal movement of the diaphragm in a patient with diaphragm paralysis.

Ventilation mécanique altère le diaphragme ➔ Ventilation contrôlée et ventilation assistée !

Respecter le travail du diaphragme.

Plus amples investigations quant à l'impact des modes non-conventionnels.

Limiter les autres causes de dysfonctions diaphragmatiques.

Merci de votre attention !

Doorduin et al. Am J Respir Crit Care Med 187(1):20–27,