Sevrage respiratoire DU Kiné

Mai 2024

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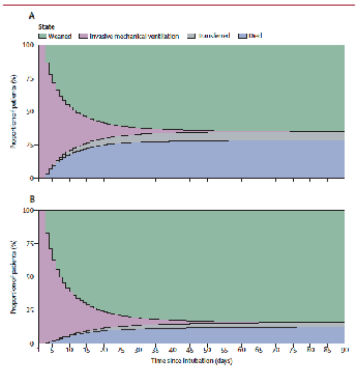
iVentilate

LES GRANDS PRINCIPES DU SEVRAGE

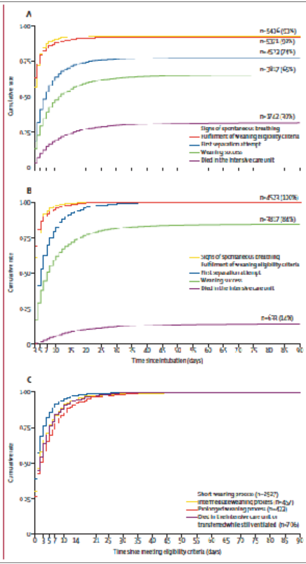
- *Simple à Difficile*
- *Sédation*
- *Fonction Cardiaque*
- *Force musculaire*

Weaning from mechanical ventilation in intensive care units across 50 countries (WEAN SAFE): a multicentre, prospective, observational cohort study

Tài Pham, Leo Heunks, Giacomo Bellani, Fabiana Madotto, Irene Aragao, Gaetan Beduneau, Ewan C Goligher, Giacomo Grasselli, Jon Henrik Laake, Jordi Mancebo, Oscar Peñuelas, Lise Piquilloud, Antonio Pesenti, Hannah Wunsch, Frank van Haren, Laurent Brochard, John G Laffey*, for the WEAN SAFE Investigators†*



Lancet Respir Med 2023; 11: 465–76



Sevrage 3 situations

1) **Sevrage simple** (premier essai)

65%

2) **Sevrage prolongé** (plus d'un essai)

25%

3) **Sevrage (très) difficile**

10%

Sevrage 3 situations

	Funk	Penuelas	Sellares	Tonnelier
Simple	59 %	55 %	44 %	30 %
Prolongé	26 %	39 %	37 %	40 %
Difficile	14 %	6 %	18 %	30 %

Etude WIND G.Beduneau terminée

Mécanismes du Sevrage non difficile

- Sevrage possible d'emblée:
  - ✳ screening quotidien
- Sevrage possible mais non identifié
  - ✳ Sur assistance
  - ✳ Trop de sédation
  - ✳ Pas de screening

Mécanismes du Sevrage difficile

- Pathologie pulmonaire/cardiaque sous jacente sévère
- Surcharge volémique
- Faiblesse musculaire respiratoire
- Métabolique/Nutrition/Anémie

Eur Respir J 2007; 29: 1033–1056
DOI: 10.1183/09031936.00010206
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TASK FORCE

Weaning from mechanical ventilation

J-M. Boles*, J. Bion#, A. Connors¶, M. Herridge+, B. Marsh§, C. Melot‡, R. Pearl**, H. Silverman##, M. Stanchina¶¶, A. Vieillard-Baron++, T. Welte§§

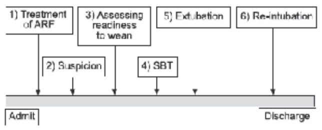


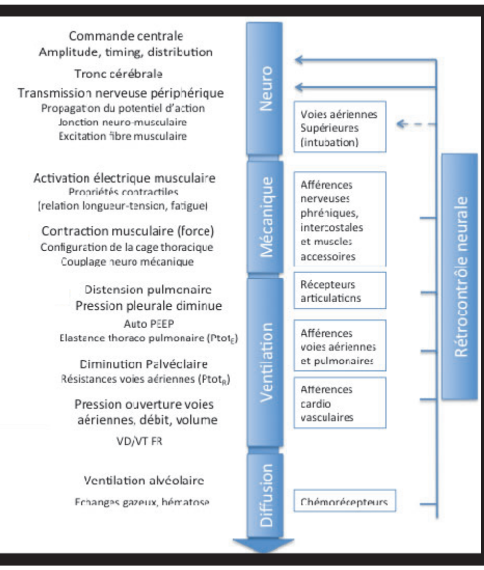
TABLE 3 Classification of patients according to the weaning process

Group/category	Definition
Simple weaning	Patients who proceed from initiation of weaning to successful extubation on the first attempt without difficulty
Difficult weaning	Patients who fail initial weaning and require up to three SBT or as long as 7 days from the first SBT to achieve successful weaning
Prolonged weaning	Patients who fail at least three weaning attempts or require >7 days of weaning after the first SBT

SBT: spontaneous breathing trial.

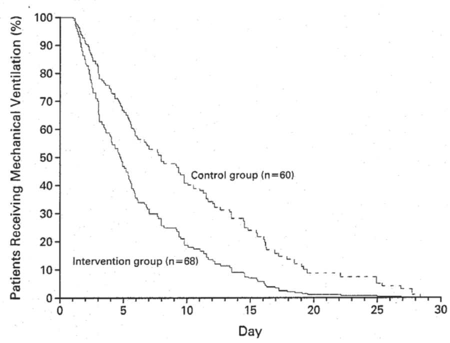
Sevrage du ventilateur

Sevrage de la sonde

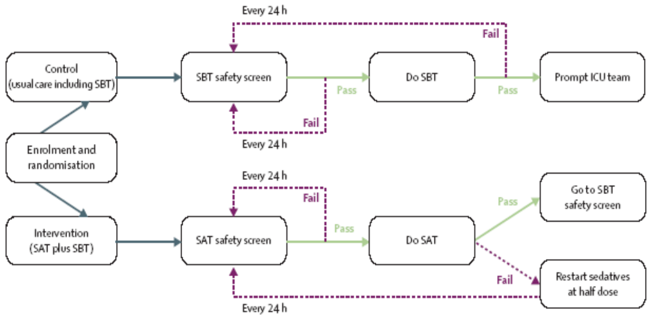


Protocole de sedation

Kress, JP. et al. N Engl J Med 2000; 342:1471-1477



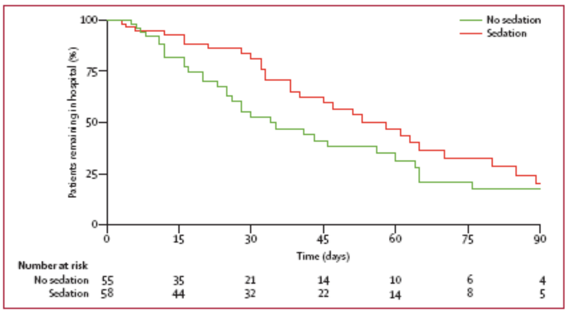
Efficacy and safety of a paired sedation and ventilator weaning protocol for mechanically ventilated patients in intensive care (Awakening and Breathing Controlled trial): a randomised controlled trial



Lancet 2008; 371: 126–34

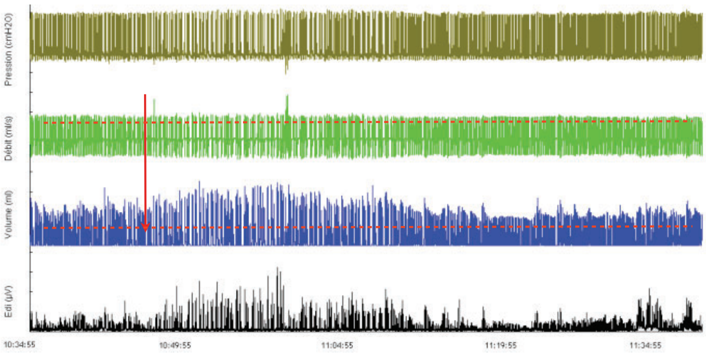
A protocol of no sedation for critically ill patients receiving mechanical ventilation: a randomised trial

Thomas Strøm, Torben Martinussen, Palle Toft



Lancet 2010

Test à l'anexate démontre l'inhibition de la sedation



CRITICAL CARE

REVIEW

Weaning failure of cardiac origin: recent advances

EDITORIAL

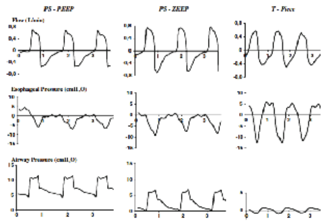
Christian Richard
Jean Louis Teboul

Weaning failure from cardiovascular origin

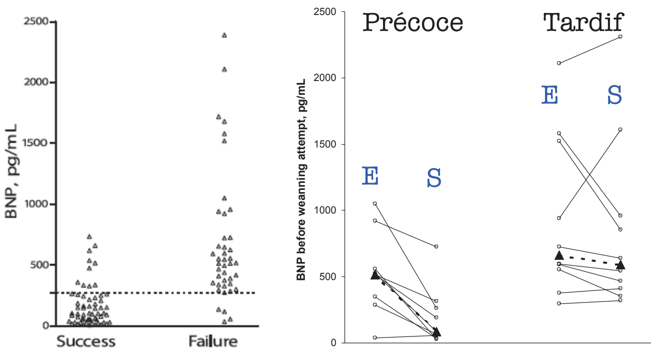
ORIGINAL

Belén Cabello
Arnaud W. Thille
Ferran Roche-Campo
Laurent Brochard
Francisco J. Gómez
Jordi Mancebo

Physiological comparison of three spontaneous breathing trials in difficult-to-wean patients



Fonction cardiaque



Succès vs échec

Mekontso-Dessap ICM 2006

Balance hydrique

Intensive Care Med (2005) 31:1643–1647
DOI 10.1007/s00134-005-2801-3

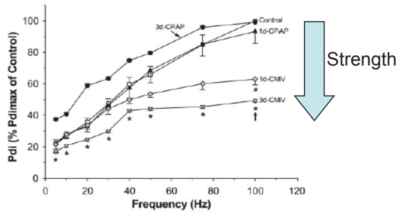
ORIGINAL

Anupama Upadya
Lisa Tilluckdharry
Visvanathan Muralidharan
Yaw Amoateng-Adjepong
Constantine A. Manthous

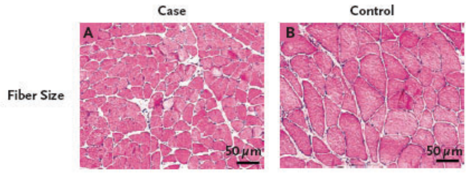
Fluid balance and weaning outcomes

	Weaning success (*n*=39)	Weaning failure (*n*=48)	All patients (*n*=87)	*p*
Duration of ventilation (days)	2 (1 to 8)	3 (1 to 14)	3 (1 to 14)	0.03
APACHE II (day of BT)	17 (3 to 30)	15 (3 to 25)	16 (3 to 30)	0.2
Fluid balance 24 h (ml)	–625 (–4,380 to +3,274)	+242 (–3,923 to +4,272)	–91 (–4,380 to +4,272)	0.01
Cumulative fluid balance (ml)	–633 (–8,232 to +9,534)	+920 (–1,1760 +2,0483)	–65 (–1,1760 to +2,0483)	0.06
Diuretics on day of trial	62%	51%	56%	0.2
Prealbumin (mg/dl)	14 (2 to 35)	12 (2 to 30)	13 (2 to 35)	0.8
f/V_t (breaths min^{-1} l^{-1})	50 (13 to 260)	80 (17 to 300)	67 (13 to 300)	0.005
PaO_2/FIO_2	240 (88 to 477)	244 (100 to 503)	240 (88 to 503)	0.9
Compliance (ml/cmH_2O)	44 (22 to 76)	39 (13 to 80)	43 (13 to 80)	0.2
Left ventricular dysfunction (%)	69	68	69	0.6

Faiblesse musculaire: Dysfonction diaphragmatique



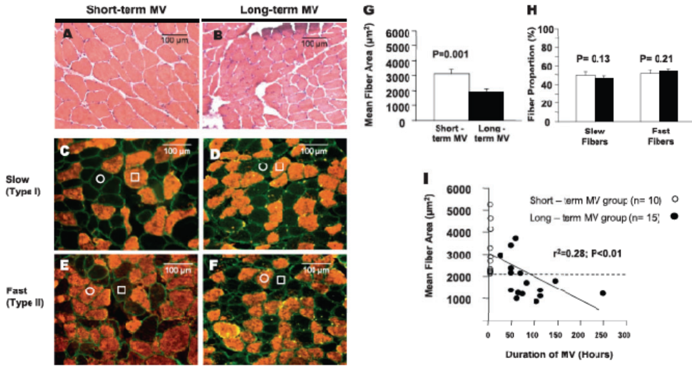
J Appl Physiol 92: 2585–2595, 2002.



N Engl J Med 2008;358:1327-35.

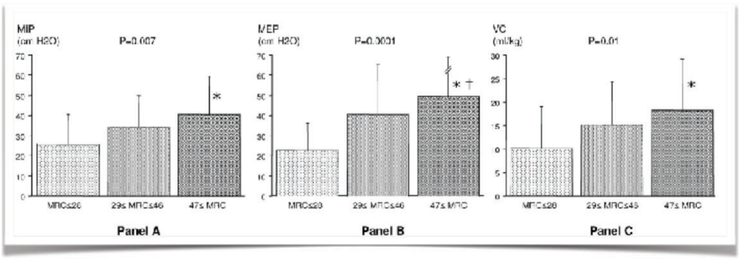
Rapidly Progressive Diaphragmatic Weakness and Injury during Mechanical Ventilation in Humans

Samir Jaber[1,2,6], Basil J. Petrof[3], Boris Jung[1,2], Gérald Chanques[1,2], Jean Philippe Berthet[4], Christophe Rabuel[5], Hassan Bouyabrine[6], Patricia Courouble[1,7], Christelle Koechlin-Ramonatxo[7], Mustapha Sebbane[1,7], Thomas Similowski[8], Valérie Scheuermann[9], Alexandre Mebazaa[5], Xavier Capdevila[1,2], Dominique Mornet[2], Jacques Mercier[2,10], Alain Lacampagne[9], Alexandre Philips[7], and Stefan Matecki[7,10]



Respiratory weakness is associated with limb weakness and delayed weaning in critical illness*

Bernard De Jonghe, MD; Sylvie Bastuji-Garin, MD, PhD; Marie-Christine Durand, MD; Isabelle Malissin, MD; Pablo Rodrigues, MD; Charles Cerf, MD; Hervé Outin, MD; Tarek Sharshar, MD, PhD; for Groupe de Réflexion et d'Etude des Neuromyopathies En Réanimation



Crit Care Med 2007; 35:2007–2015

Table 6. Analysis of risk factors for low maximal inspiratory pressure (MIP) or maximal expiratory pressure (MEP)

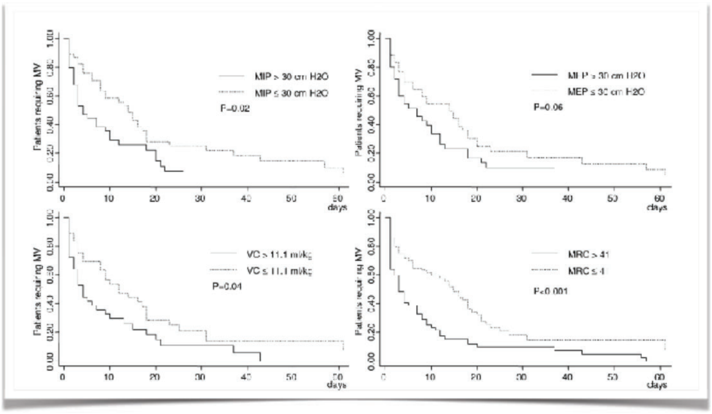
Univariate Analysis	MIP or MEP ≤30 cm H_2O (n = 53)	MIP and MEP >30 cm H_2O (n = 26)	*p* Value
At ICU admission			
Age in years, median (IQR)	67 (53–78)	70 (54–76)	.9
Female sex, n (%)	22 (41.5)	7 (26.9)	.3
Admission SAPS II, median (IQR)	46 (36–58)	44 (38–50)	.4
COPD, n (%)	20 (37.7)	13 (50)	.3
Before awakening			
Days of MV, median (IQR)	10 (8–14)	10 (8–13)	.9
Days with ≥2 failed organs, median (IQR)	6 (4–10)	5 (0–9)	.2
Use of corticosteroids, n (%)	33 (62.3)	16 (61.5)	.9
Use of neuromuscular blockers, n (%)[a]	13 (24.5)	11 (42.3)	.1
Average daily morning BGL (mmol/L), median (IQR)	8.1 (7.0–9.3)	7.5 (6.8–8.6)	.1
Septic shock, n (%)	31 (58.5)	8 (30.8)	.02
Multivariate Logistic Regression Analysis of Low MIP or MEP ≤30 cm H_2O	**OR**	**95% CI**	***p* Value**
Septic shock	3.17	1.17–8.58	.02

Crit Care Med 2007; 35:2007–2015

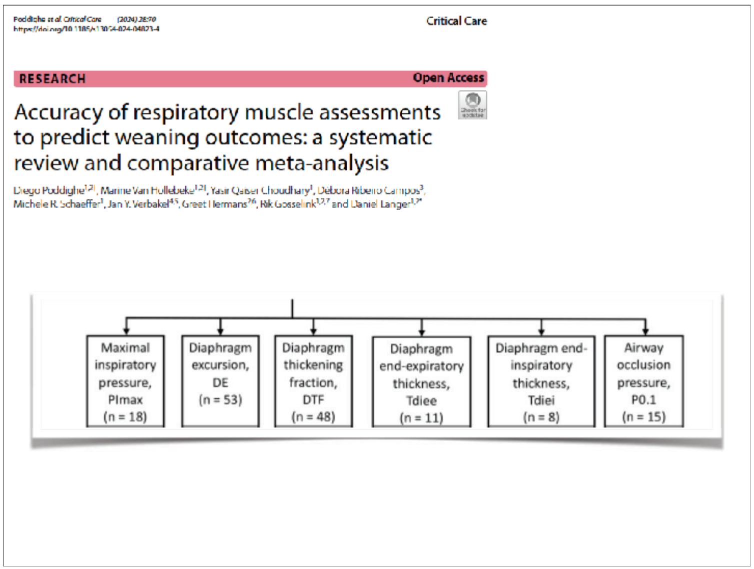
Table 5. Independent determinants of the risk of successful extubation delayed for >7 days after awakening

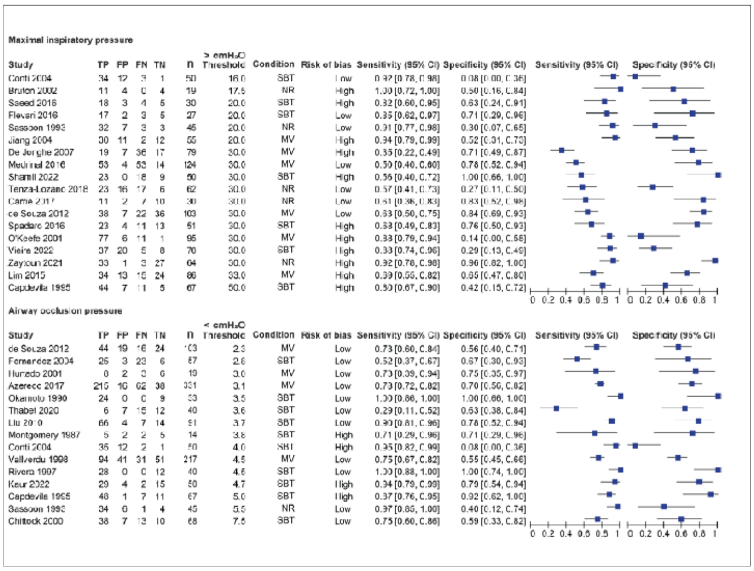
Model with MIP	OR	95% CI	*p* Value	Model with MEP	OR	95% CI	*p* Value	Model with VC	OR	95% CI	*p* Value	Model with MRC	OR	95% CI	*p* Value
MIP <30 cm H_2O	8.02	2.12–30.36	.002	MEP <30 cm H_2O	4.15	1.16–14.82	.03	VC <11.1 mL/kg	2.75	0.82–9.18	.1	MRC <41	3.03	1.23–7.43	.02
COPD	4.43	1.20–16.41	.03	COPD	4.56	1.24–16.75	.02	COPD	4.43	1.3–14.79	.02	COPD	2.74	1.10–6.85	.03
Cardiac insufficiency	4.96	1.25–19.71	.02	Cardiac insufficiency	3.79	1.07–13.39	.04	Cardiac insufficiency	3.24	0.92–11.38	.07	Cardiac insufficiency	2.14	0.82–5.61	.1

Crit Care Med 2007; 35:2007–2015



Crit Care Med 2007; 35:2007–2015



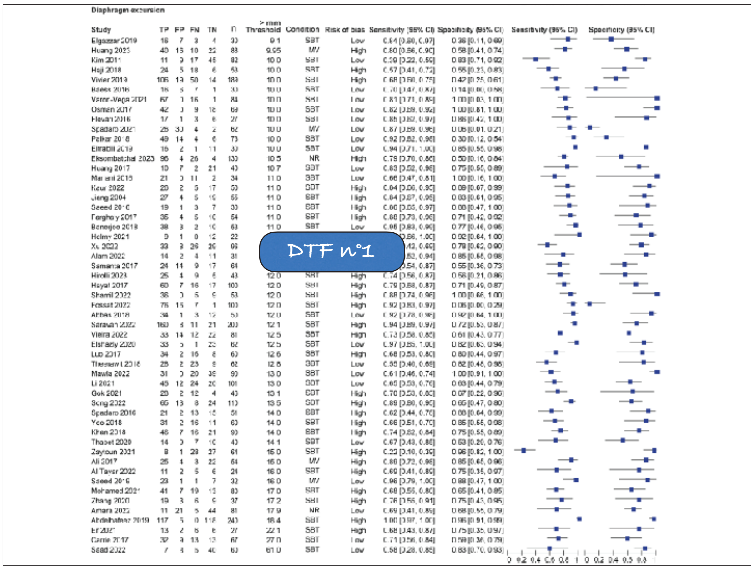


Maximal inspiratory pressure

Study	TP	FP	FN	TN	n	> cmH₂O Threshold	Condition	Risk of bias	Sensitivity (95% CI)	Specificity (95% CI)
Conti 2004	34	12	3	1	50	16.0	SBT	Low	0.92 [0.78, 0.98]	0.08 [0.00, 0.36]
Bruton 2002	11	4	0	4	19	17.5	NR	High	1.00 [0.72, 1.00]	0.50 [0.16, 0.84]
Saeed 2016	18	3	4	5	30	20.0	SBT	High	0.82 [0.60, 0.95]	0.63 [0.24, 0.91]
Flevari 2016	17	2	3	5	27	20.0	SBT	Low	0.85 [0.62, 0.97]	0.71 [0.29, 0.96]
Sassoon 1993	32	7	3	3	45	20.0	NR	Low	0.91 [0.77, 0.98]	0.30 [0.07, 0.65]
Jiang 2004	30	11	2	12	55	20.0	MV	High	0.94 [0.79, 0.99]	0.52 [0.31, 0.73]
De Jonghe 2007	19	7	36	17	79	30.0	MV	High	0.35 [0.22, 0.49]	0.71 [0.49, 0.87]
Medrinal 2016	53	4	53	14	124	30.0	MV	Low	0.50 [0.40, 0.60]	0.78 [0.52, 0.94]
Sharnil 2022	23	0	18	9	50	30.0	SBT	High	0.56 [0.40, 0.72]	1.00 [0.66, 1.00]
Tenza-Lozano 2018	23	16	17	6	62	30.0	NR	Low	0.57 [0.41, 0.73]	0.27 [0.11, 0.50]
Carrie 2017	11	2	7	10	30	30.0	NR	Low	0.61 [0.36, 0.83]	0.83 [0.52, 0.98]
de Souza 2012	38	7	22	36	103	30.0	MV	Low	0.63 [0.50, 0.75]	0.84 [0.69, 0.93]
Spadaro 2016	23	4	11	13	51	30.0	SBT	High	0.68 [0.49, 0.83]	0.76 [0.50, 0.93]
O'Keefe 2001	77	6	11	1	95	30.0	MV	High	0.88 [0.79, 0.94]	0.14 [0.00, 0.58]
Vieira 2022	37	20	5	8	70	30.0	SBT	High	0.88 [0.74, 0.96]	0.29 [0.13, 0.49]
Zaytoun 2021	33	1	3	27	64	30.0	NR	High	0.92 [0.78, 0.98]	0.96 [0.82, 1.00]
Lim 2015	34	13	15	24	86	33.0	MV	High	0.69 [0.55, 0.82]	0.65 [0.47, 0.80]
Capdevila 1995	44	7	11	5	67	50.0	SBT	High	0.80 [0.67, 0.90]	0.42 [0.15, 0.72]

Airway occlusion pressure

Study	TP	FP	FN	TN	n	< cmH₂O Threshold	Condition	Risk of bias	Sensitivity (95% CI)	Specificity (95% CI)
de Souza 2012	44	19	16	24	103	2.5	MV	Low	0.73 [0.60, 0.84]	0.56 [0.40, 0.71]
Fernandez 2004	25	3	23	6	57	2.6	SBT	Low	0.52 [0.37, 0.67]	0.67 [0.30, 0.93]
Hurtado 2001	8	2	3	6	19	3.0	MV	Low	0.73 [0.39, 0.94]	0.75 [0.35, 0.97]
Azerecc 2017	215	10	62	38	331	3.1	MV	Low	0.78 [0.72, 0.82]	0.79 [0.56, 0.82]
Okamoto 1990	24	0	0	9	33	3.5	SBT	Low	1.00 [0.86, 1.00]	1.00 [0.66, 1.00]
Thabet 2020	6	7	15	12	40	3.6	SBT	Low	0.29 [0.11, 0.52]	0.63 [0.38, 0.84]
Liu 2010	66	4	7	14	91	3.7	SBT	Low	0.90 [0.81, 0.96]	0.78 [0.52, 0.94]
Montgomery 1987	5	2	2	5	14	3.8	SBT	High	0.71 [0.29, 0.96]	0.71 [0.29, 0.96]
Conti 2004	35	12	2	1	50	4.0	SBT	High	0.95 [0.82, 0.99]	0.08 [0.00, 0.36]
Vallverdu 1998	94	41	31	51	217	4.5	MV	Low	0.75 [0.67, 0.82]	0.55 [0.45, 0.66]
Rivera 1997	28	0	0	12	40	4.6	SBT	Low	1.00 [0.88, 1.00]	1.00 [0.74, 1.00]
Kaur 2022	29	4	2	15	50	4.7	SBT	High	0.94 [0.79, 0.99]	0.79 [0.54, 0.94]
Capdevila 1995	48	1	7	11	67	5.0	SBT	High	0.87 [0.76, 0.95]	0.92 [0.62, 1.00]
Sassoon 1993	34	6	1	4	45	5.5	NR	Low	0.97 [0.85, 1.00]	0.40 [0.12, 0.74]
Chittock 2000	38	7	13	10	68	7.5	SBT	Low	0.75 [0.60, 0.86]	0.59 [0.33, 0.82]



Faiblesse musculaire

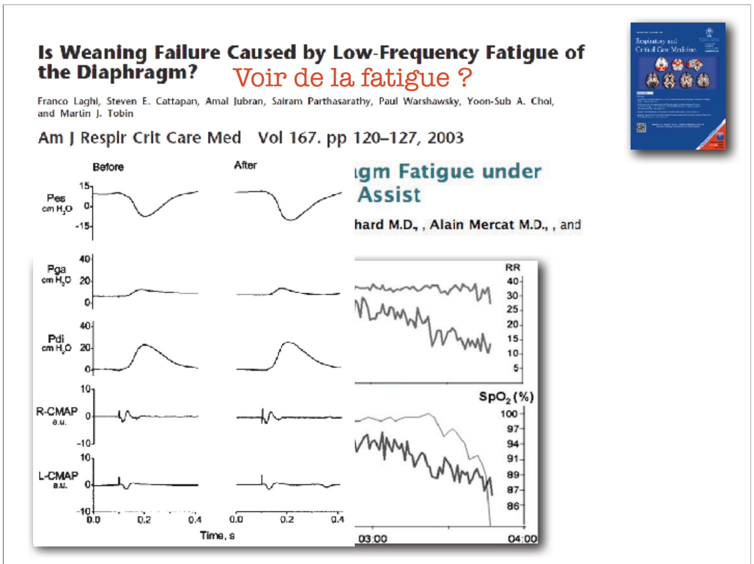
Review

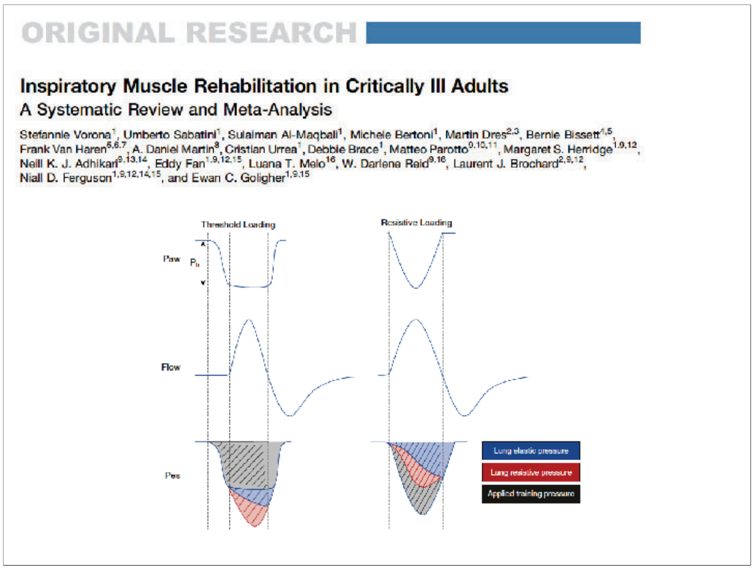
J Appl Physiol 107: 962–970, 2009.
First published April 30, 2009; doi:10.1152/japplphysiol.00165.2009.

HIGHLIGHTED TOPIC | *The Respiratory Muscles in Chronic Obstructive Pulmonary Disease*

Role of the respiratory muscles in acute respiratory failure of COPD: lessons from weaning failure

Martin J. Tobin,[1] Franco Laghi,[1] and Laurent Brochard[2]



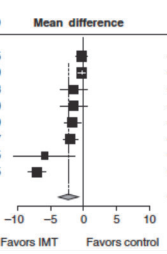


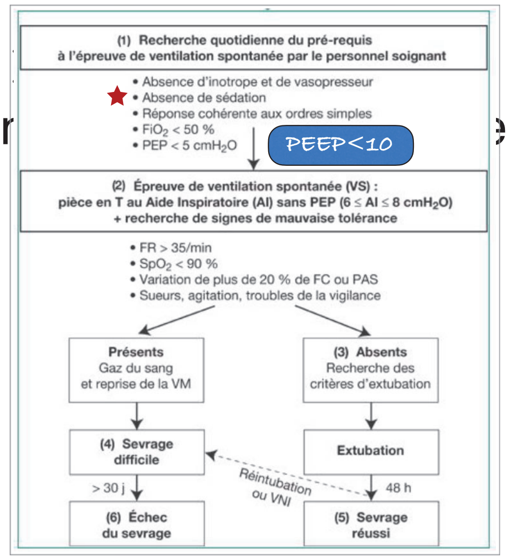
Outcome	Impact Effect (95% CI)	No. of Participants (RCTs)	Quality of the Evidence (GRADE)
Change in maximal inspiratory pressure from baseline after IMT	Mean difference in change 6 (5 to 8) cm H_2O higher in IMT group than in control group Pooled ratio of means for change in MIP relative to baseline MIP, 1.21 (1.16 to 1.26)	647 (15 RCTs)	⊕○○○ Very low*,†,‡
Change in maximal inspiratory pressure from baseline after IMT (sensitivity analysis excluding studies at high risk of bias)	Mean difference 9 (7 to 12) cm H_2O higher in IMT group than in control group	175 (3 RCTs)	⊕⊕⊕⊕ High
Maximal inspiratory pressure after IMT	Mean difference 7 (6 to 8) cm H_2O higher in IMT group than in control group	575 (15 RCTs)	⊕⊕○○ Low*,‡
Change in maximal expiratory pressure from baseline after IMT	Mean difference in change 9 (5 to 14) cm H_2O higher in IMT group than in control group Pooled ratio of means for change in MEP relative to baseline MEP, 1.39 (1.27 to 1.54)	153 (4 RCTs)	⊕⊕⊕○ Moderate*
Change in maximal expiratory pressure from baseline after IMT (sensitivity analysis excluding studies at high risk of bias)	Mean difference in change 9 (5 to 14) cm H_2O higher in IMT group than in control group	106 (2 RCTs)	⊕⊕⊕⊕ High
Duration of ventilation	Pooled duration of ventilation was 4.1 (0.8 to 7.4) d shorter in IMT group than in control group	325 (9 RCTs)	⊕○○○ Very low*,†,‡,§
Duration of ventilation (sensitivity analysis excluding studies at high risk of bias)	Pooled duration of ventilation was 4.6 (−1.0 to 10.1) d shorter in IMT group than in control group	220 (4 RCTs)	⊕⊕○○ Low†,§
Duration of weaning from mechanical ventilation	Pooled duration of weaning from mechanical ventilation was 2.3 (0.7 to 3.9) d shorter in IMT group than in control group	257 (8 RCTs)	⊕○○○ Very low*,†,§
Duration of weaning (sensitivity analysis excluding studies at high risk of bias)	Pooled duration of weaning from mechanical ventilation was 3.2 (0.6 to 5.8) d shorter in IMT group than in control group	208 (5 RCTs)	⊕⊕○○ Low†,§
ICU length of stay	Length of stay in ICU was 3.1 (−1.0 to 7.1) d shorter in IMT group than in control group	28 (2 RCTs)	⊕○○○ Very low*,‡,§
Mortality in ICU	Pooled relative risk of death in ICU was 0.67 (0.20 to 2.20) in IMT group compared with control group	197 (3 RCTs)	⊕⊕○○ Low‡,§

The impact of inspiratory muscle training (IMT) on the duration of weaning from mechanical ventilation

Study	Experimental Total	Experimental Mean	Experimental SD	Control Total	Control Mean	Control SD	MD	95% CI	Weight
Condessa 2013	45	2.2	1.8	47	2.5	2.5	−0.30	[−1.19; 0.59]	14.1%
Caruso 2005	12	1.0	0.5	13	1.3	0.9	−0.30	[−0.87; 0.27]	14.4%
Melo 2017	6	4.9	1.2	4	6.4	1.8	−1.50	[−3.51; 0.51]	12.0%
Shimizu 2014	8	3.4	1.3	5	4.9	2.0	−1.50	[−3.47; 0.47]	12.1%
Cader 2010	14	3.6	1.5	14	5.3	1.9	−1.70	[−2.97; −0.43]	13.5%
Dixit 2014	15	4.3	1.5	15	6.3	1.7	−2.00	[−3.15; −0.85]	13.7%
Tonella 2017	11	3.5	1.6	8	9.4	6.5	−5.90	[−10.50; −1.30]	6.8%
Mohamed 2014	20	3.3	1.6	20	10.4	2.5	−7.10	[−8.40; −5.80]	13.4%
Random effects model	**131**			**126**			**−2.30**	**[−3.94; −0.67]**	**100.0%**

Heterogeneity: $I^2 = 93\%$, $\tau^2 = 4.724$, $p < 0.01$



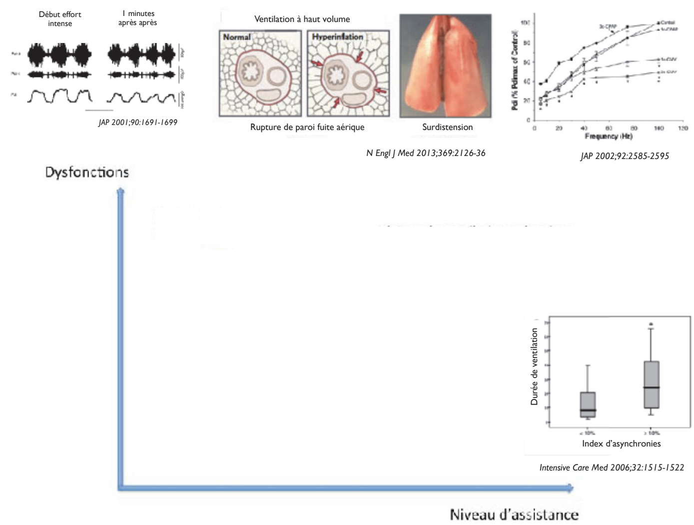


LA VENTILATION ASSISTEE LORS DU SEVRAGE

- ***Niveau d'aide***
- ***Synchronisation***

Problématiques du mode lors du sevrage

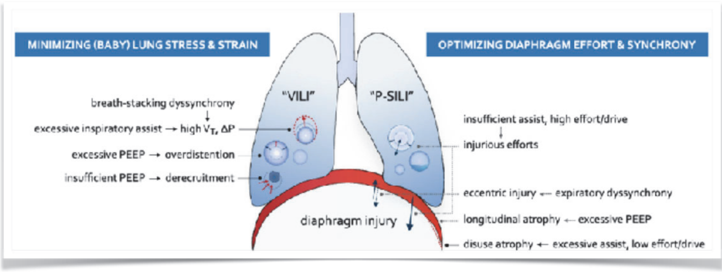
- Synchroniser le patient au respirateur/limiter les asynchronies
- Adapter l'aide inspiratoire aux besoins du patient
  - VSAI: aide fixe à adapter manuellement
  - Intelligence artificielle en VSAI: Smartcare
  - Neurally Adjusted Ventilatory Assist: NAVA
  - Proportionnal Assist Ventilation: PAV+



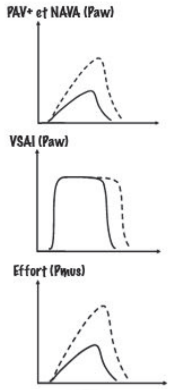
Intensive Care Med (2020) 46:2314–2326
https://doi.org/10.1007/s00134-020-06288-9

NARRATIVE REVIEW

Clinical strategies for implementing lung and diaphragm-protective ventilation: avoiding insufficient and excessive effort



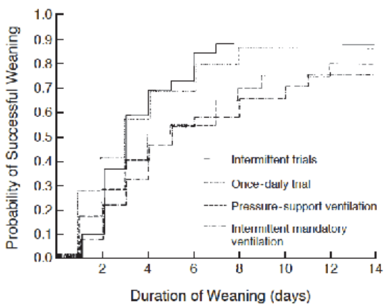
Pmus + Pvent = Volume x E + Débit x R



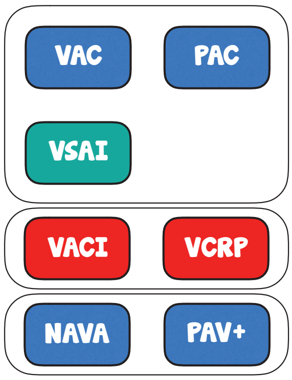
The New England Journal of Medicine
©Copyright, 1995, by the Massachusetts Medical Society
Volume 332 FEBRUARY 9, 1995 Number 6

A COMPARISON OF FOUR METHODS OF WEANING PATIENTS FROM MECHANICAL VENTILATION

Andrés Esteban, M.D., Ph.D., Fernando Frutos, M.D., Martin J. Tobin, M.D., Inmaculada Alía, M.D., José F. Solsona, M.D., Inmaculada Valverdú, M.D., Rafael Fernández, M.D., Miguel A. de la Cal, M.D., Salvador Benito, M.D., Ph.D., Roser Tomás, M.D., Demetrio Carriedo, M.D., Santiago Macías, M.D., and Jesús Blanco, M.D., for the Spanish Lung Failure Collaborative Group*

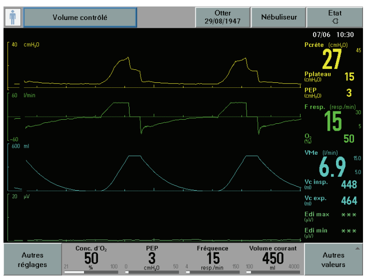


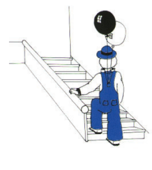
VS et modes



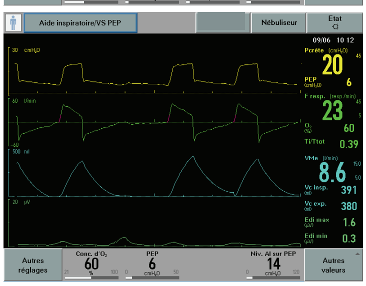
Le Niveau d'Aide

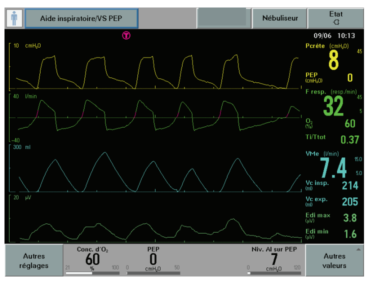
- *En fonction du VTE 6 à 8 ml.kg PBW*
- *En fonction de l'effort: Pocc, P0,1t, Pmo, EAdi Index Pdi, PTP oeso, Pmus*





Le bon niveau d'aide dans le sevrage ?



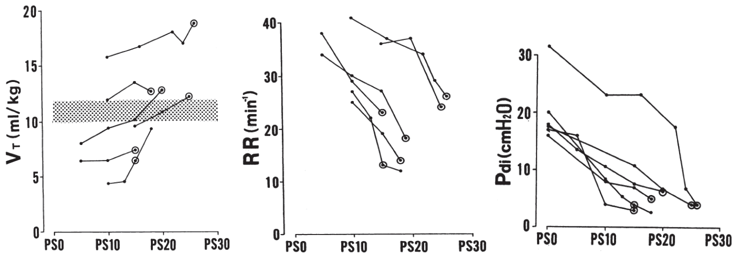


Determination of the optimal pressure support level evaluated by measuring transdiaphragmatic pressure.

T Kimura, J Takezawa, K Nishiwaki and Y Shimada

Chest 1991;100;112-117

Niveau d'aide ?



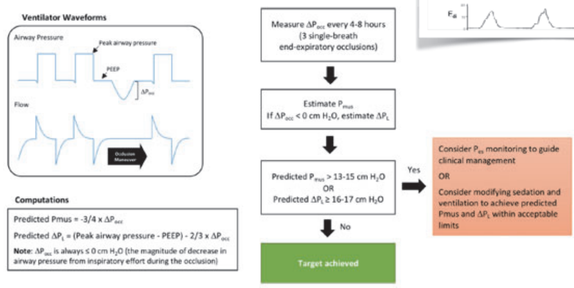
Bertoni et al. Critical Care (2019) 23:346
https://doi.org/10.1186/s13054-019-2617-0

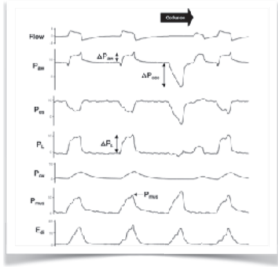
Critical Care

RESEARCH Open Access

A novel non-invasive method to detect excessively high respiratory effort and dynamic transpulmonary driving pressure during mechanical ventilation

Michele Bertoni[1,2], Irene Telias[3,4], Martin Urner[3,5], Michael Long[6], Lorenzo Del Sorbo[3,5], Eddy Fan[3,5,7], Christer Sinderby[3,4], Jennifer Beck[3,4], Ling Liu[8], Haibo Qiu[8], Jenna Wong[3], Arthur S. Slutsky[3,4], Niall D. Ferguson[3,5,7,9,10], Laurent J. Brochard[3,4] and Ewan C. Goligher[3,5,13,11]*



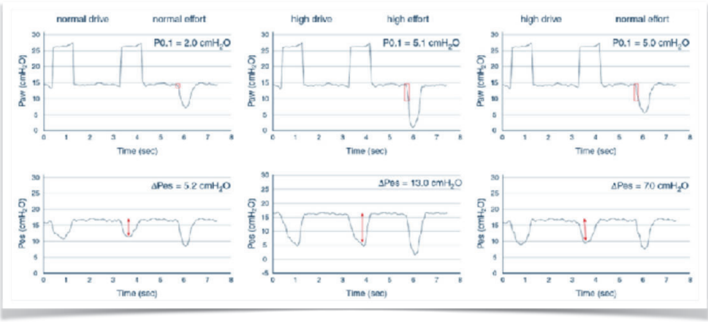


Intensive Care Med (2020) 46:606–618
https://doi.org/10.1007/s00134-020-05942-6

NARRATIVE REVIEW

Respiratory drive in the acute respiratory distress syndrome: pathophysiology, monitoring, and therapeutic interventions

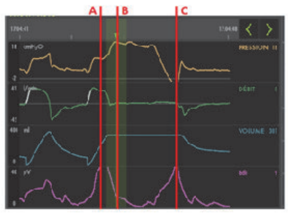
Elena Spinelli[1], Tommaso Mauri[1,2]*, Jeremy R. Beitler[3], Antonio Pesenti[1,2] and Daniel Brodie[3]



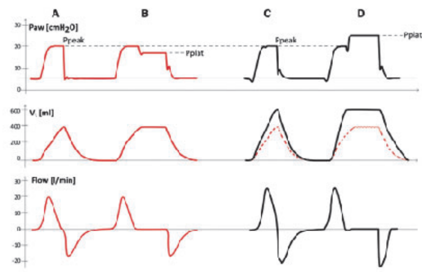
Driving Pressure Is Associated with Outcome during Assisted Ventilation in Acute Respiratory Distress Syndrome

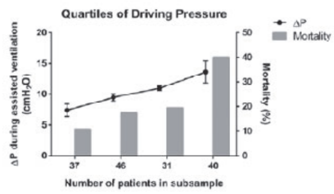
Giacomo Bellani, M.D., Ph.D., Alice Grassi, M.D., Simone Sosio, M.D., Stefano Gatti, M.D., Brian P. Kavanagh, M.B., Antonio Pesenti, M.D., Giuseppe Foti, M.D.

ANESTHESIOLOGY 2019; 131:594–604



Pression Motrice en VSAI





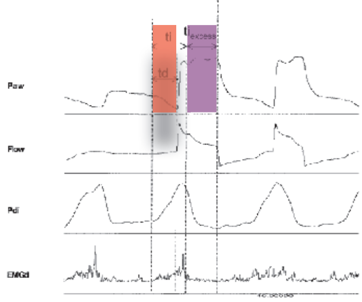
LA SYNCHRONIE PATIENT VENTILATEUR

La synchronie

Impact of Expiratory Trigger Setting on Delayed Cycling and Inspiratory Muscle Workload

Didier Tassaux, Marc Gainnier, Anne Battisti, and Philippe Jolliet

Am J Respir Crit Care Med Vol 172. pp 1283–1289, 2005

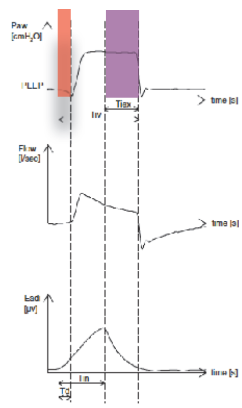


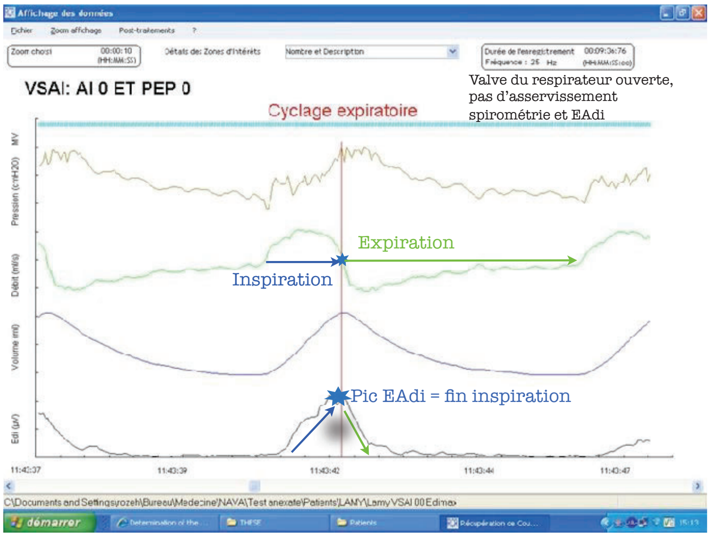
Intensive Care Med

ORIGINAL

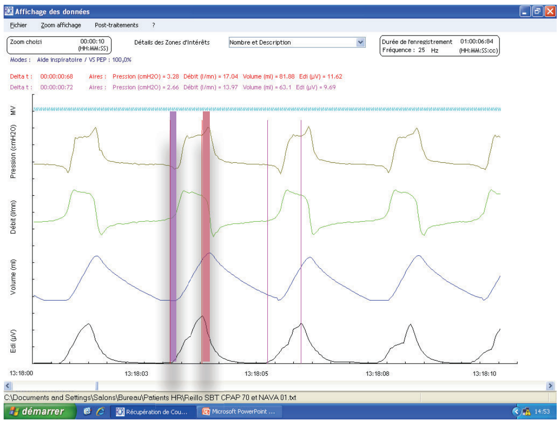
Lise Piquilloud
Laurence Vignaux
Emilie Bialais
Jean Roeseler
Thierry Sottiaux
Pierre-François Laterre
Philippe Jolliet
Didier Tassaux

Neurally adjusted ventilatory assist improves patient–ventilator interaction





L'aide inspiratoire crée de l'asynchronie

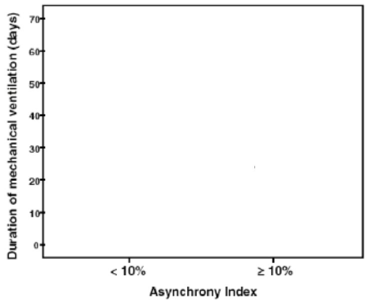


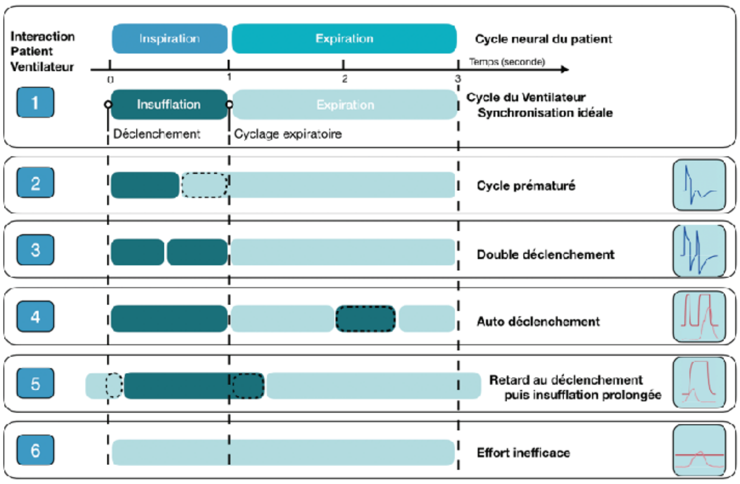
Problématiques des asynchronies?

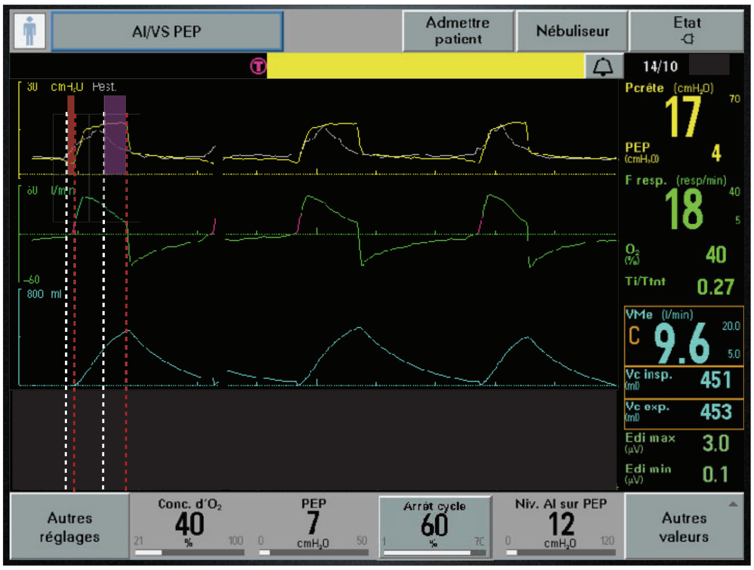
Intensive Care Med (2006) 32:1515–1522
DOI 10.1007/s00134-006-0301-8
ORIGINAL

Arnaud W. Thille
Pablo Rodriguez
Belen Cabello
François Lellouche
Laurent Brochard

Patient-ventilator asynchrony during assisted mechanical ventilation



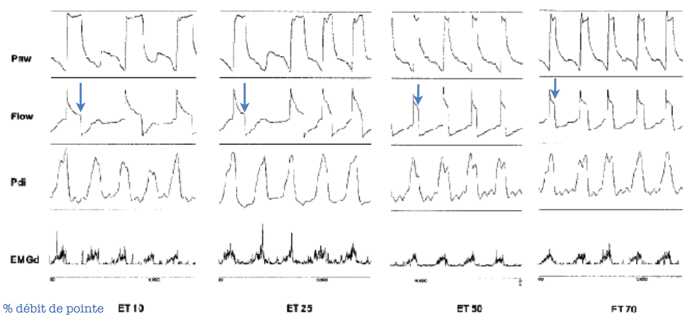




Impact of Expiratory Trigger Setting on Delayed Cycling and Inspiratory Muscle Workload

Didier Tassaux, Marc Gainnier, Anne Battisti, and Philippe Jolliet

Am J Respir Crit Care Med Vol 172. pp 1283–1289, 2005

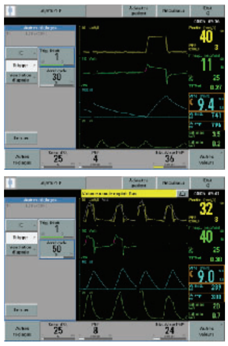


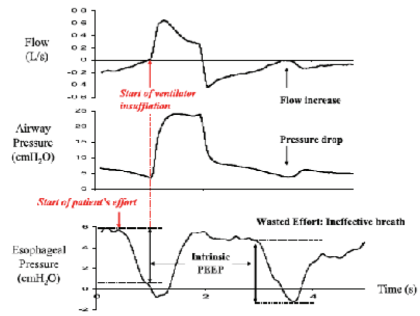
Intensive Care Med (2008) 34:1477–1486
DOI 10.1007/s00134-008-1121-9

ORIGINAL

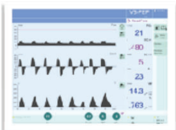
Arnaud W. Thille
Belen Cabello
Fabrice Galia
Aissam Lyazidi
Laurent Brochard

Reduction of patient-ventilator asynchrony by reducing tidal volume during pressure-support ventilation

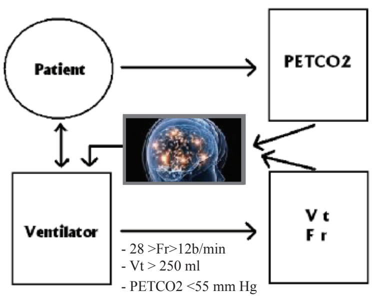




Système Smartcare



- Système Néoganesh: règles, scénarios pour être dans une zone de confort: VTE FR E_TCO_2 évaluation 2-3 min



The knowledge base = 112 rules

SOME GENERAL RULES USED IN THE KNOWLEDGE-BASED SYSTEM

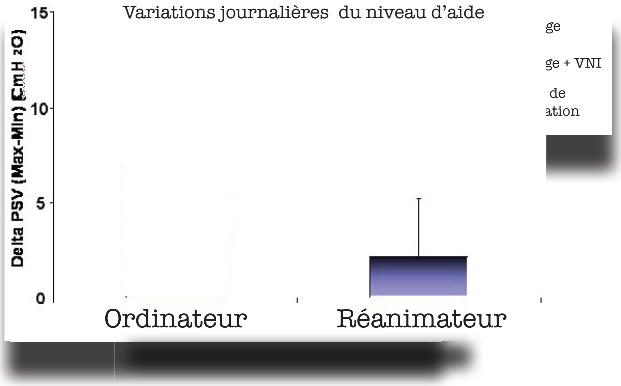
1. Never reduce the level of pressure suppor at night, except in case of excessive alveolar ventilation.
2. Try to keep the patient within a zone of "comfort," with a respiratory rate between 12 and 28 breaths per minute, a tidal volume above a minimum threshold, and a P_{ETCO_2} below a maximum threshold.
3. Do not let the tidal volume fall below 300 or 250 ml in patients whose body weight is above or below 55 kg, respectively.
4. Keep the respiratory rate between 12 and 28 breaths/min so that the patient is comfortable. In some patients, the upper limit can be moved up to 32 breaths/min.
5. Do not let the end-tidal CO_2 exceed 60 mm Hg in COPD patients and 50 mm Hg in patients with other disorders.
6. Decrease the level of pressure support by 2 cm H_2O when the patient has a stable ventilation within the comfort zone during at least 30 min with a level of pressure support less than 20 cm H_2O.
7. Decrease the level of pressure support by 4 cm H_2O when the patient has a stable ventilation within the comfort zone during at least 60 min with a level of pressure support of 20 cm H_2O or more.
8. Initiate the preweaning observation period when the level of pressure support is at the minimal value (5 or 9 cm H_2O in tracheotomized or intubated patients, respectively).
9. Consider that the patient is ready to be weaned after 1 or 2 h of stable ventilation at the minimal level of pressure support (1 h in those patients with a level of pressure support of 15 cm H_2O or less after 1 h of observation, 2 h in those with an initial level of pressure support greater than 15 cm H_2O.
10. Adapt the level of pressure support to the physiologic needs of the patient and evaluate every 2 min.
11. Consider that a patient requiring a PEEP level above 5 cm H_2O is not ready to be weaned.
12. The maximal level of pressure support is 40 cm H_2O.
13. In case of severe hypoventilation, switch to assist-control ventilation with preset parameters.

Dojat M - Am J Respir Crit Care Med 1996; 153: 997-1004

A Multicenter Randomized Trial of Computer-driven Protocolized Weaning from Mechanical Ventilation

François Lellouche, Jordi Mancebo, Philippe Jolliet, Jean Roeseler, Fréderique Schortgen, Michel Dojat, Belen Cabello, Lila Bouadma, Pablo Rodriguez, Salvatore Maggiore, Marc Reynaert, Stefan Mersmann, and Laurent Brochard

Am J Respir Crit Care Med Vol 174. pp 894–900, 2006

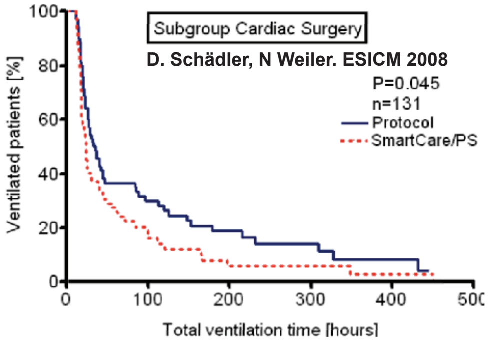


Intensive Care Med (2008) 34:1788–1795
DOI 10.1007/s00134-008-1179-4

ORIGINAL

Louise Rose
Jeffrey J. Presneill
Linda Johnston
John F. Cade

A randomised, controlled trial of conventional versus automated weaning from mechanical ventilation using SmartCare™/PS



SEPARATION DU VENTILATEUR

- ***INDEX PREDICTIFS***
- ***TEST***

The New England
Journal of Medicine

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Volume 324 — MAY 23, 1991 — Number 21

A PROSPECTIVE STUDY OF INDEXES PREDICTING THE OUTCOME OF TRIALS OF WEANING FROM MECHANICAL VENTILATION

Karl L. Yang, M.D., and Martin J. Tobin, M.D.

Premier Index FR/VT

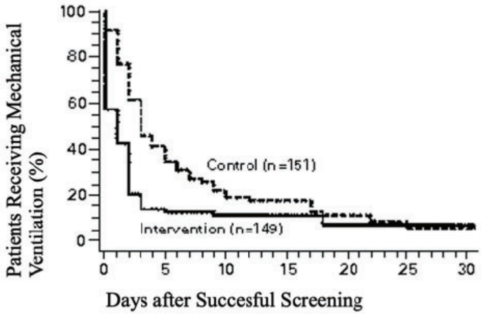
Table 3. Effect of Duration of Mechanical Ventilation (<8 Days or ≥8 Days) on the Accuracy of Indexes in Predicting Weaning Outcome.*

Index	Sensitivity		Specificity		Positive Predictive Value		Negative Predictive Value	
	<8 days	≥8 days	<8 days	≥8 days	<8 days	≥8 days	<8 days	≥8 days
Minute ventilation	0.79	0.75	0.75	0.08	0.65	0.35	0.40	0.33
Respiratory frequency	0.89	1.00	0.31	0.42	0.69	0.53	0.63	1.00
Tidal volume	1.00	0.88	0.50	0.58	0.78	0.58	1.00	0.88
Tidal volume/patient's weight	0.96	0.88	0.38	0.42	0.73	0.50	0.86	0.83
Maximal inspiratory pressure	1.00	1.00	0.00	0.25	0.64	0.47	1.00	1.00
Dynamic compliance	0.75	0.63	0.69	0.25	0.81	0.36	0.61	0.50
Static compliance	0.82	0.50	0.56	0.08	0.77	0.27	0.64	0.20
PaO_2/PAO_2 ratio	0.79	0.88	0.38	0.17	0.69	0.41	0.50	0.67
Frequency/tidal volume ratio	1.00	0.88	0.63	0.67	0.82	0.64	1.00	0.89
CROP index	0.82	0.75	0.56	0.58	0.77	0.55	0.64	0.78

Identifying patients capable of breathing spontaneously and duration of mechanical ventilation

- Intervention Group
1) A daily screening of respiratory function (by the respiratory therapists of the unit)
   - PaO_2/FIO_2 > 200
   - PEEP< 5 cm H_2O
   - Adequate cough
   - f/VT < 105 c/min
   - No vasopressor agents or sedatives
2) A 2-hour trial of spontaneous breathing
3) Notification of the physician of the successful results

FEUX VERT



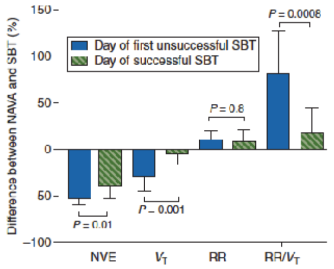
Ely E.W. et coll. N Engl J Med 1996; 335: 1864-9.

British Journal of Anaesthesia Page 1 of 6
doi:10.1093/bja/aet258

BJA

Neuro-ventilatory efficiency during weaning from mechanical ventilation using neurally adjusted ventilatory assist

H. Rozé[1,2,3]*, B. Repusseau[1], V. Perrier[1], A. Germain[1], R. Séramondi[1], A. Dewitte[1,3], C. Fleureau[1] and A. Ouattara[1,2]



Augmentation de l'EAdi pour un même niveau de pression entre le début et la fin du sevrage

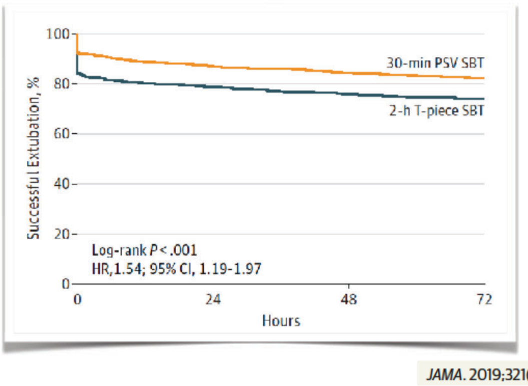
TEST VSAI 7/0

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

JAMA

Effect of Pressure Support vs T-Piece Ventilation Strategies During Spontaneous Breathing Trials on Successful Extubation Among Patients Receiving Mechanical Ventilation
A Randomized Clinical Trial

Carles Subirà, MD; Gonzalo Hernández, MD, PhD; Antònia Vázquez, MD, PhD; Raquel Rodríguez-García, MD; Alejandro González-Castro, MD; Carolina García, MD; Olga Rubio, MD, PhD; Lara Ventura, MD; Alexandra López, MD; María-Carmen de la Torre, MD, PhD; Elena Keough, MD; Vanesa Arauzo, MD; Carilla Hermosa, MD; Carmen Sánchez, MD; Ana Tizón, MD; Eva Tenza, MD, PhD; César Laborda, MD; Sara Cabañes, MD; Vicoria Lacueva, MD; María del Mar Fernández, MD, PhD; Anna Arnau, MSc, PhD; Rafael Fernández, MD, PhD



JAMA. 2019;321(22):2175-2182.

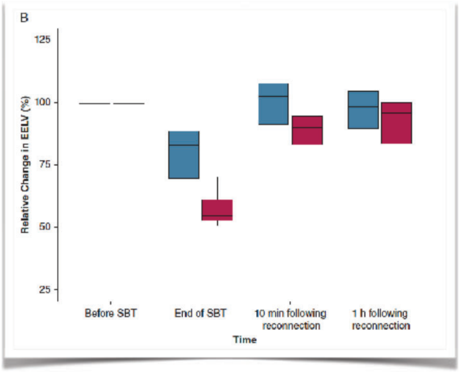
Critical Care Original Research
CHEST

Physiologic Effects of Reconnection to the Ventilator for 1 Hour Following a Successful Spontaneous Breathing Trial

Rémi Coudroy, PhD; Alice Lejars, MD; Mateo Rodriguez, MD; Jean-Pierre Frat, PhD; Christophe Rault, PhD; François Arrivé, MD; Sylvain Le Pape, PhD; and Arnaud W. Thille, PhD

VSAI 7/0

Tube en T



CHEST 2024;

Noninvasive Positive-Pressure Ventilation for Postextubation Respiratory Distress
A Randomized Controlled Trial

JAMA

Sean P. Keenan, MD, FRCPC, MSc
Caroline Powers, RRT
David G. McCormack, MD, FRCPC
Gary Block, MD, FRCPC

Outcomes	NPPV (n = 39)	Standard Therapy (n = 42)	P Value
Reintubation, No. (%)	28 (72)	29 (69)	.79
Pneumonia, No. (%)	16 (41)	17 (40)	.61
Duration of ventilation†			
Mean (SD)	8.4 (7.4)	17.5 (28.0)	.11
Median (range)	6.7 (0.5-28.6)	8.9 (2.0-146.7)	.12
ICU length of stay			
Mean (SD)	15.1 (10.9)	19.4 (25.0)	.32
Median (range)	11.9 (3.6-41.7)	10.8 (2.3-152.7)	.72
Hospital length of stay			
Mean (SD)	32.2 (25.4)	29.8 (28.4)	.69
Median (range)	19 (6-111)	22 (4-162)	.51
ICU survival, No. (%)	33 (85)	32 (76)	.34
Hospital survival, No. (%)	27 (69)	29 (69)	.99

JAMA. 2002;287:3238-3244

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Noninvasive Positive-Pressure Ventilation for Respiratory Failure after Extubation

Andrés Esteban, M.D., Ph.D., Fernando Frutos-Vivar, M.D.,
Niall D. Ferguson, M.D., Yaseen Arabi, M.D.,
Carlos Apezteguía, M.D., Marco González, M.D., Scott K. Epstein, M.D.,
Nicholas S. Hill, M.D., Stefano Nava, M.D., Marco-Antonio Soares, M.D.,
Gabriel D'Empaire, M.D., Inmaculada Alía, M.D., and Antonio Anzueto, M.D.

CONCLUSIONS

Noninvasive positive-pressure ventilation does not prevent the need for reintubation or reduce mortality in unselected patients who have respiratory failure after extubation.

N Engl J Med 2004;350:2452-60.

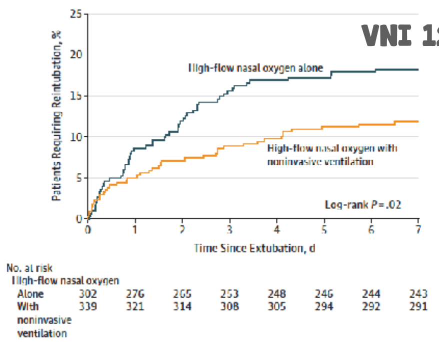
JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Effect of Postextubation High-Flow Nasal Oxygen With Noninvasive Ventilation vs High-Flow Nasal Oxygen Alone on Reintubation Among Patients at High Risk of Extubation Failure
A Randomized Clinical Trial

JAMA

Sélection de patients à risque d'échec

VNI 12H/J 48H

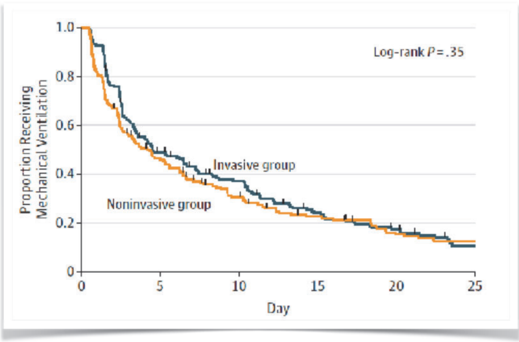


JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Effect of Protocolized Weaning With Early Extubation to Noninvasive Ventilation vs Invasive Weaning on Time to Liberation From Mechanical Ventilation Among Patients With Respiratory Failure
The Breathe Randomized Clinical Trial

JAMA

Pas de précipitation



JAMA. 2018;320(18):1881-1888.

Conclusion

- Protocole de sevrage
- Screening quotidien des patients
- Adapter le niveau d'aide
- Améliorer l'interaction patient ventilateur
  - Synchronisation
  - Proportionnalité
  - Nouvel outil de monitorage au lit du patient: l'EAdi