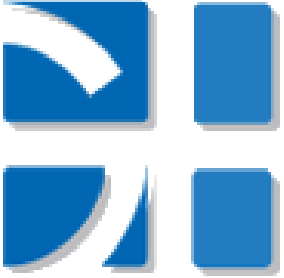


La Réhabilitation Précoce en Réanimation

UNE FORME D'URGENCE



**G R O U P E
HOSPITALIER
DU HAVRE**

Absence de conflit d'intérêt

Introduction

- En France: 718 000 patients hospitalisés en réanimation (ou USI/USC) en 2013. [1]
- En 2000 une enquête internationale révèle que 39% des patients sont ventilés plus de 48h. [2]
- En 2011 la SRLF estime que 40 à 70% des patients hospitalisés en réanimation sont intubés. [3]

[1] Programme de médicalisation des systèmes d'information

[2] Esteban, Am J Respir Crit Care Med, 2000

[3] www.srlf.org

SOME PARTICULARS
OF
A CASE
IN WHICH THE PATIENT WAS SAVED FROM THE
DESTRUCTIVE INFLUENCE OF OPIUM,
BY
ARTIFICIAL RESPIRATION.

By CHARLES IRVING SMITH, Esq.,
ASSISTANT SURGEON IN THE MADRAS ARMY.

WITH PRECEDING REMARKS,

By JOHN HOWSHIP, Esq.,

VICE PRESIDENT OF THE SOCIETY, SURGEON TO THE CHARING
CROSS HOSPITAL, AND LECTURER ON SURGERY.

READ FEB. 9TH, 1836.

Jane H., (æt. 25,) a stout young woman, was brought into the St. Marylebone Infirmary, July 20, 1828, under the following circumstances.

At six in the morning, she was observed by one who slept in the same room, to swallow something from a cup, the remains of which was opium. She shortly after became insensible. At 10 A.M. she was brought in. At this time, her extremities were cold and livid; the lips and face of a dark lead colour, the pulse fluttering, and scarcely perceptible at the wrist. Respiring three or four times in a minute, with sighing.

11½ A.M., it was determined, as the only remaining chance, to try the effects of artificial respiration; there being at this time no pulse whatever at the wrist, and only a slight irregular action at the heart, indicative that life was not quite extinct.

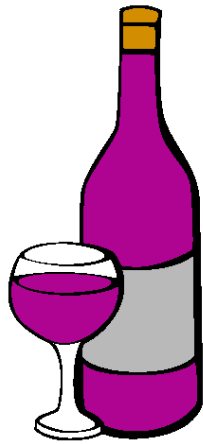
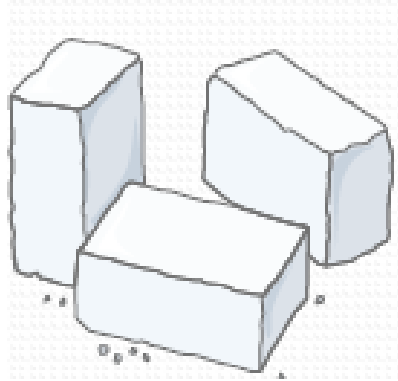
The mouth and one nostril being closed, a pair of common bellows was applied to the other nostril, and the chest was in that way inflated, and alternately emptied by pressure on the chest and sides.

100 ans plus tard: Première description d'un cas de neuro-myopathie de réanimation

SEVERE MYOPATHY AFTER STATUS ASTHMATICUS

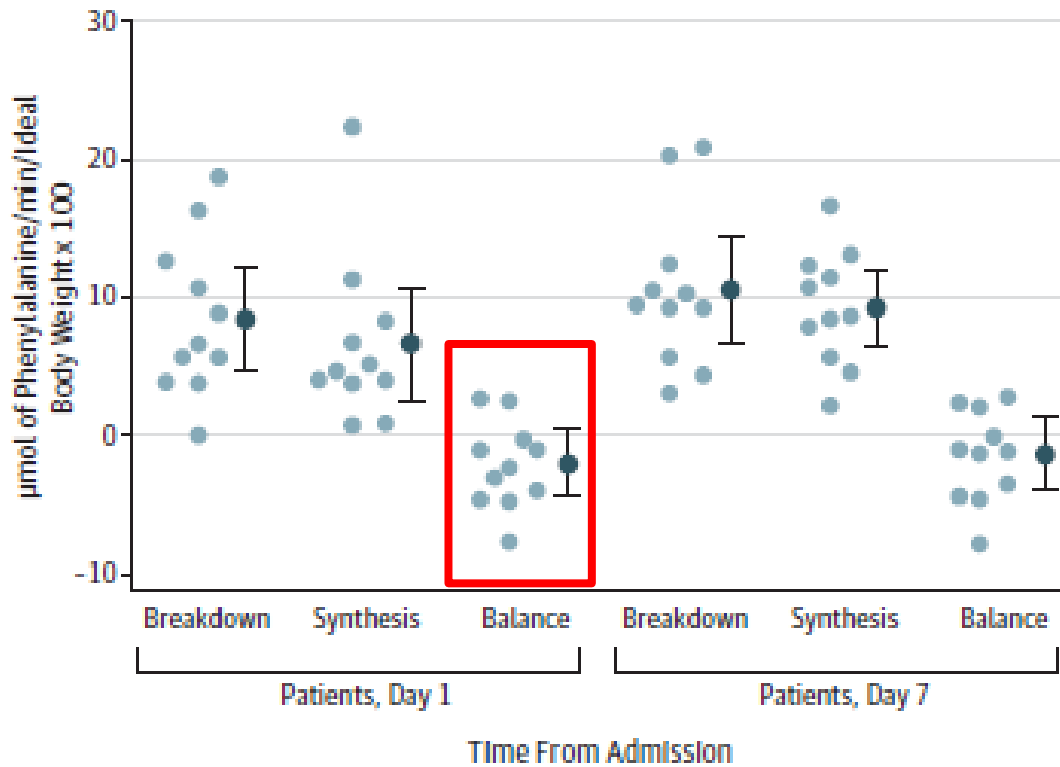
She was treated with intravenous hydrocortisone and aminophylline, but deteriorated and was ventilated. She remained on the **ventilator for 8 days** and received large doses of **hydrocortisone sodium succinate** (up to 3 g in 24 hours by constant infusion), salbutamol infusion (5 µg/min), and ampicillin. She was also given **intermittent doses of pancuronium bromide**, phenoperidine, metoclopramide, and promethazine. Her serum-potassium was consistently normal during her illness.

Facteurs de risques de la neuro-myopathie

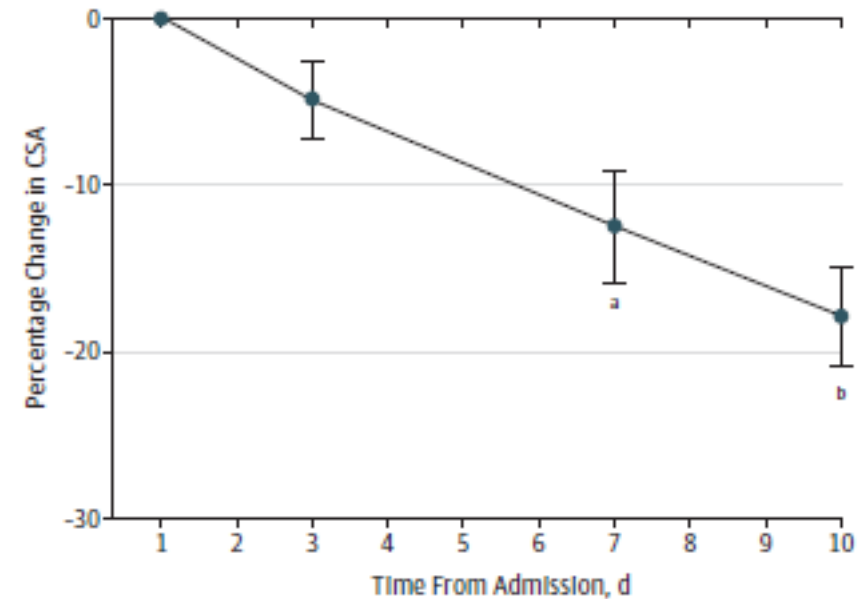


Une atteinte précoce et rapide...

B Leg protein balance (n = 11)



A Change in rectus femoris (RF) cross-sectional area (CSA) over 10 d



| No. of patients | 62 | 57 | 60 | 62 |
|-----------------|----|----|----|----|
| | | | | |

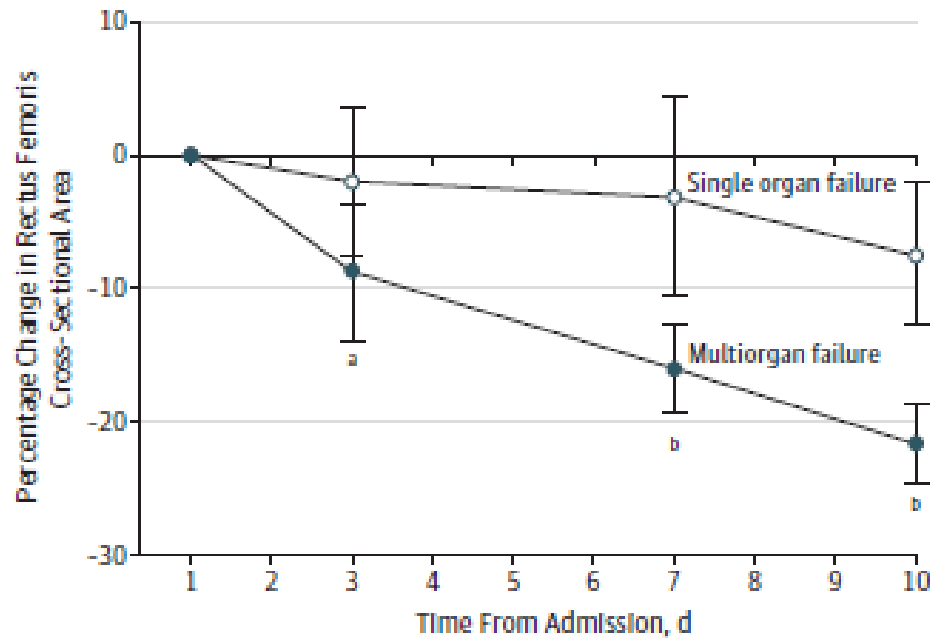
Summary data (dark circles) are expressed as medians and 95% confidence intervals.

^a $P = .002$ for change from day 1 to day 7 by repeated measures 2-way analysis of variance.

^b $P < .001$ for change from day 1 to day 10.

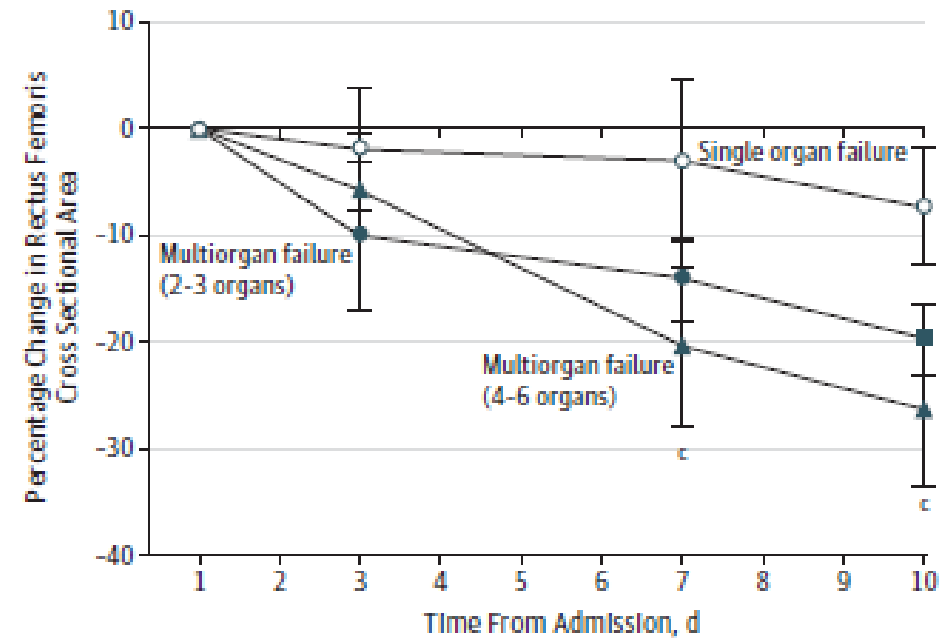
...majorée par la défaillance multi-organique.

A Single vs multiorgan failure



| No. of patients | 1 | 3 | 7 | 10 |
|----------------------|----|----|----|----|
| Single organ failure | 15 | 14 | 15 | 15 |
| Multiorgan failure | 47 | 43 | 45 | 47 |

B Single vs multiorgan failure

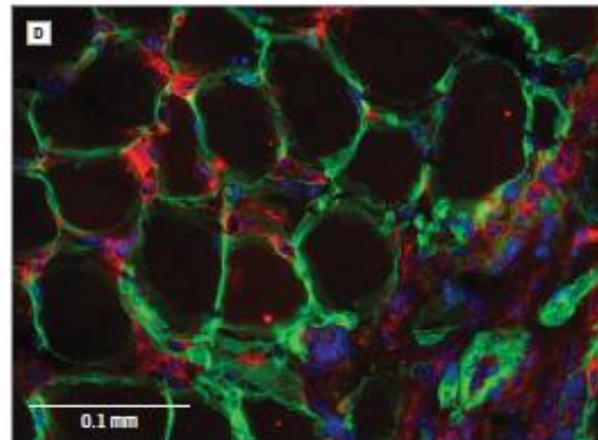
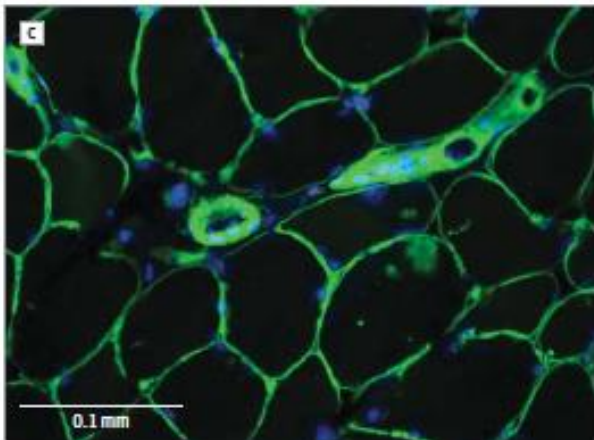
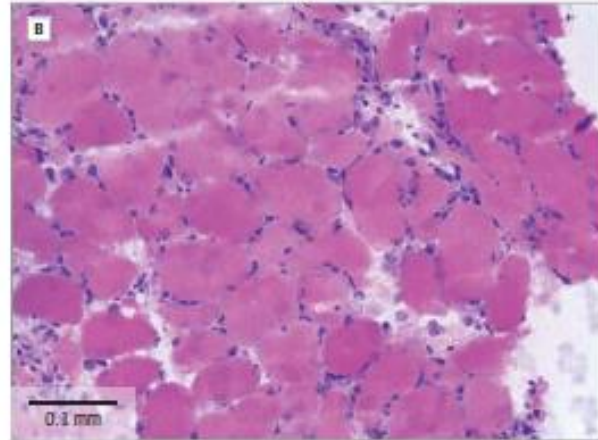
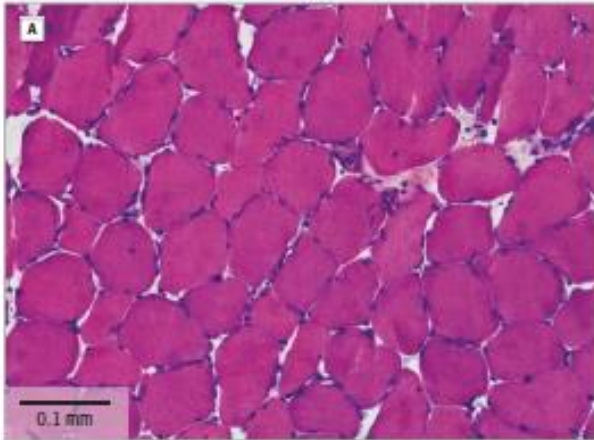


| No. of patients | 1 | 3 | 7 | 10 |
|----------------------|----|----|----|----|
| Single organ failure | 15 | 14 | 15 | 15 |
| Multiorgan failure | | | | |
| 2-3 Organs | 33 | 31 | 32 | 33 |
| 4-6 Organs | 14 | 12 | 13 | 14 |

Des répercussions musculaires en 7 jours....

Day 1

Day 7



Dès J1:

- Augmentation de la destruction protéinique vs. synthèse protéinique
- Modification de la signalisation cellulaire

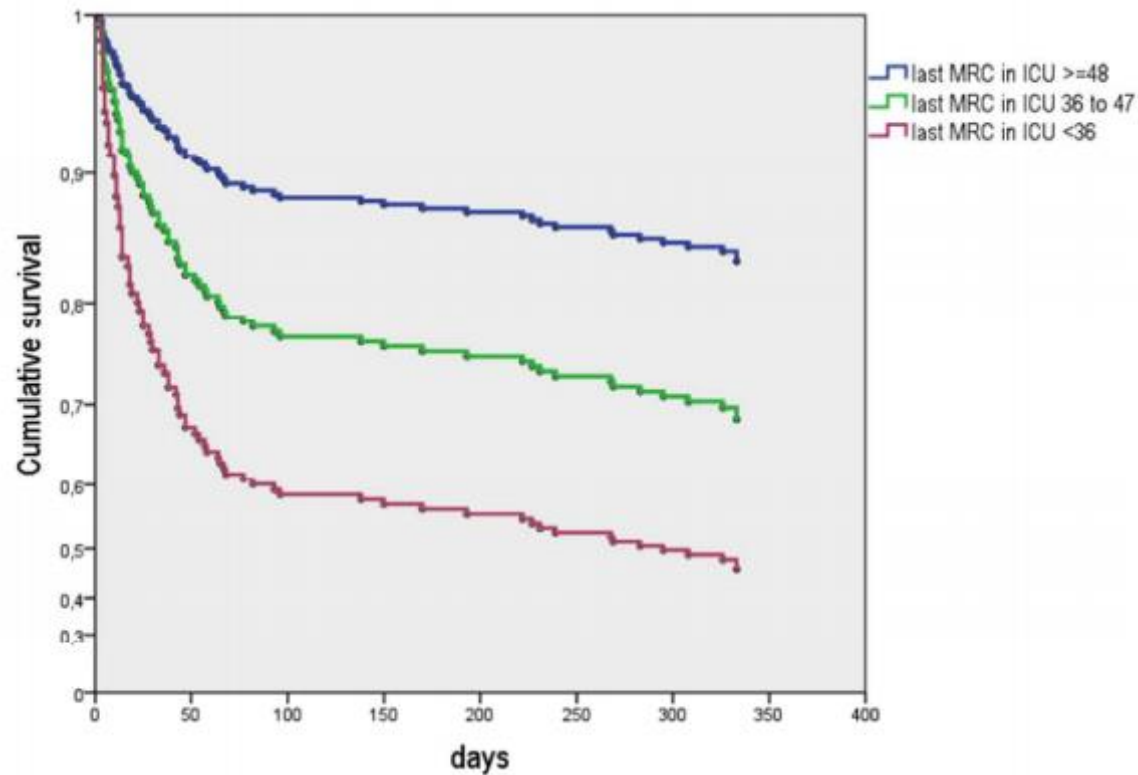
Entre J1 et J7:

- Diminution de 10% de la CSA du Droit Fémoral
- Diminution de 20% de la CSA des Fibres Musc
- Diminution de 30% du Ratio Protéine/ADN

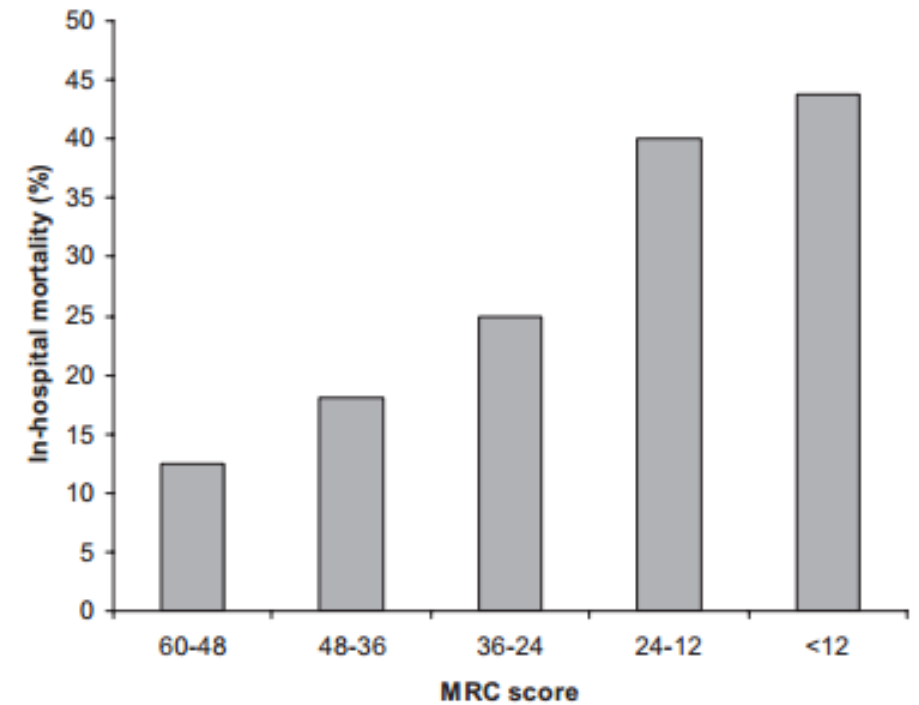
A J10:

- Diminution de 18% de la CSA du Droit Fémoral

...qui entraînent des conséquences à long terme.



Hermans, Am J Respir Crit Care Med, 2014



Sharshar, Crit Care Med, 2009

7 jours pour prévenir l'atteinte musculaire



Merci de votre attention

Sauf que...

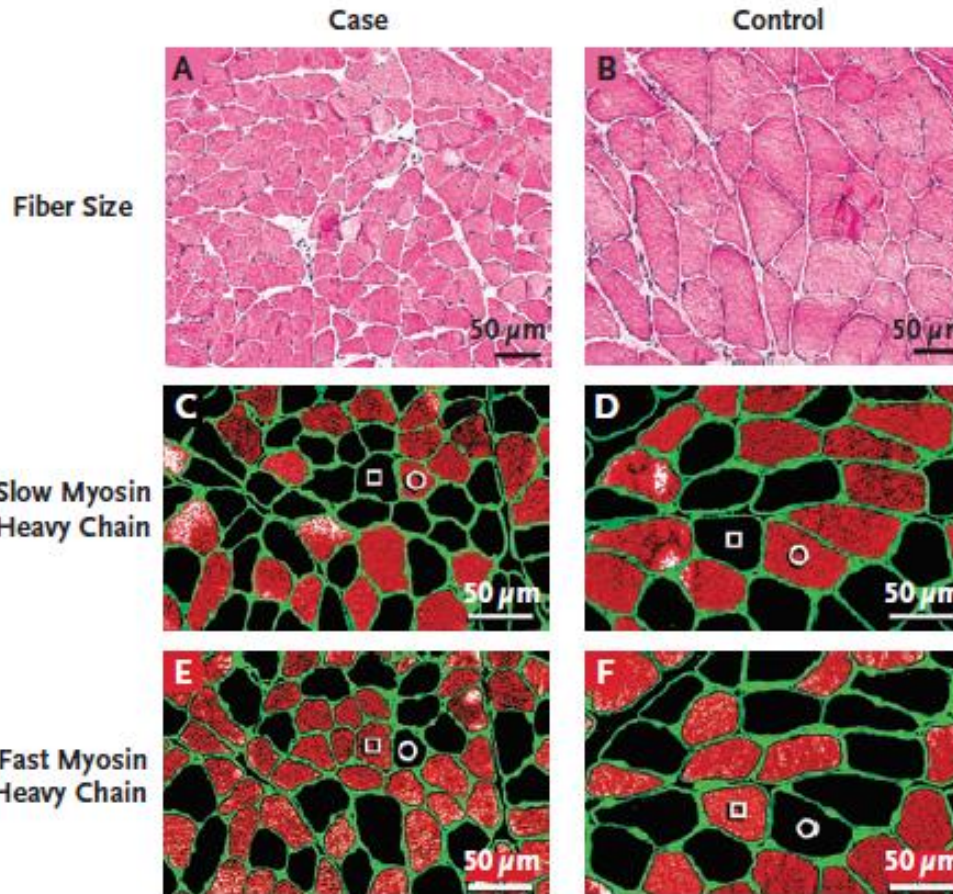
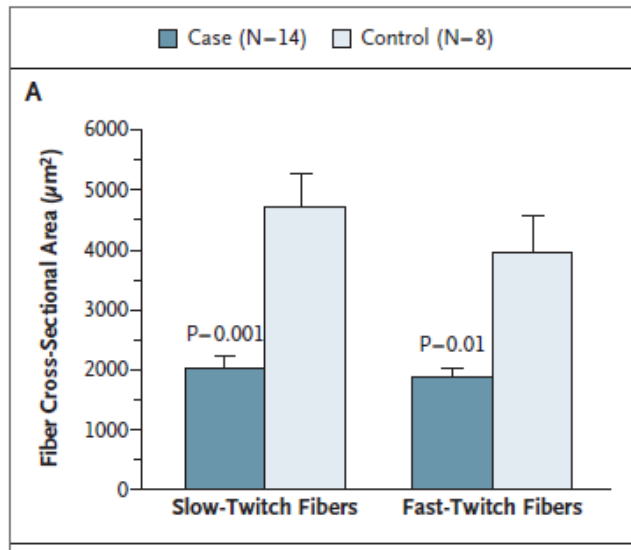
The NEW ENGLAND
JOURNAL of MEDICINE

ESTABLISHED IN 1812

MARCH 27, 2008

VOL. 358 NO. 13

Rapid Disuse Atrophy of Diaphragm Fibers in Mechanically
Ventilated Humans

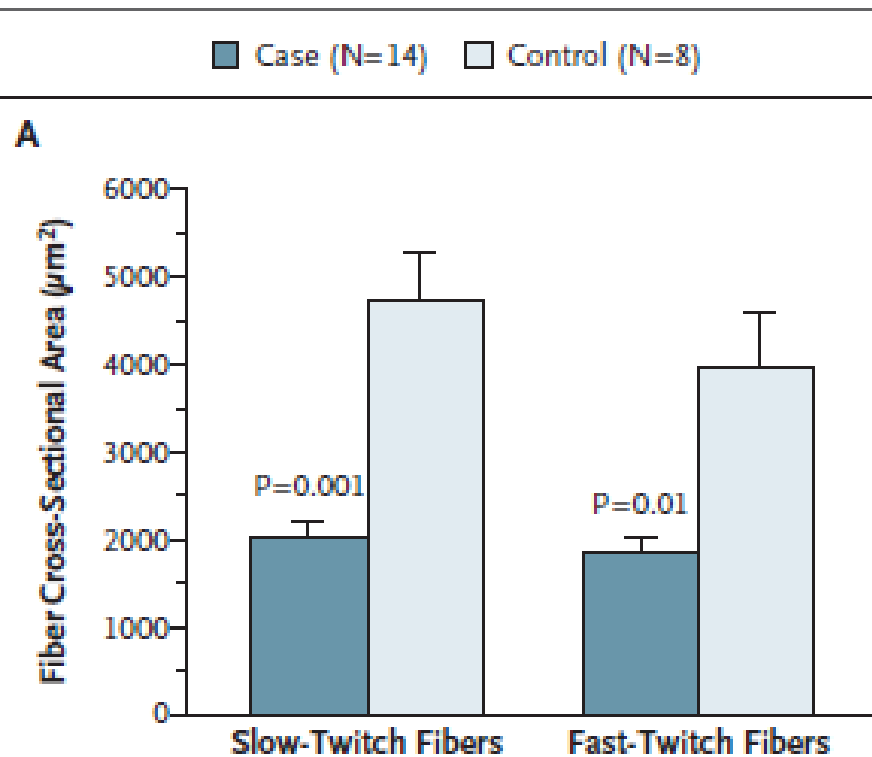


18 à 69h de VM

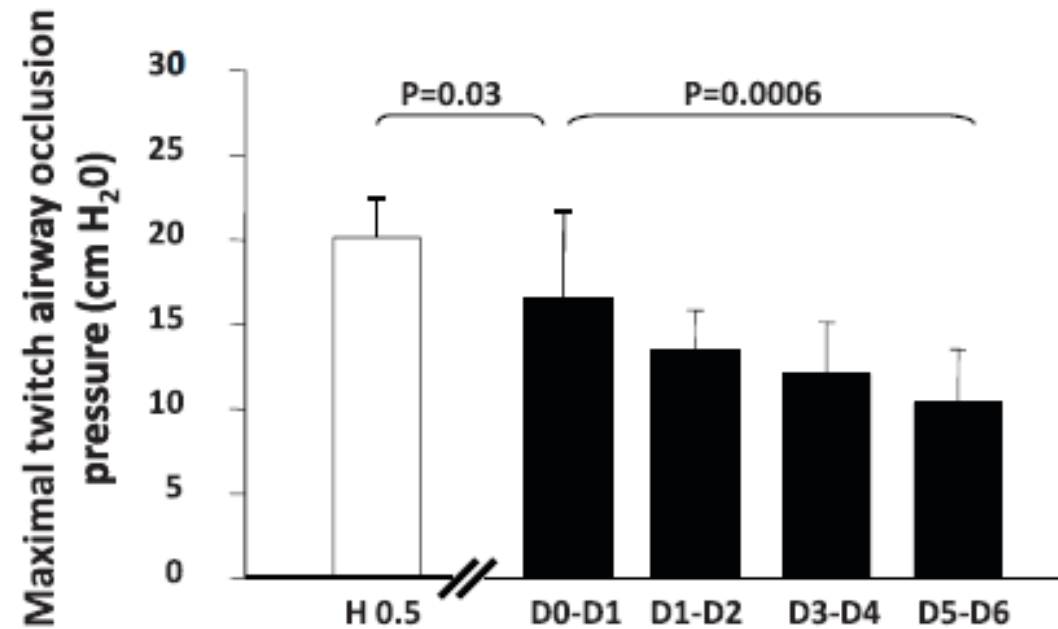
↘ 50% CSA Fibres
I et II

Levine, NEJM, 2008

Une atteinte TRES rapide...



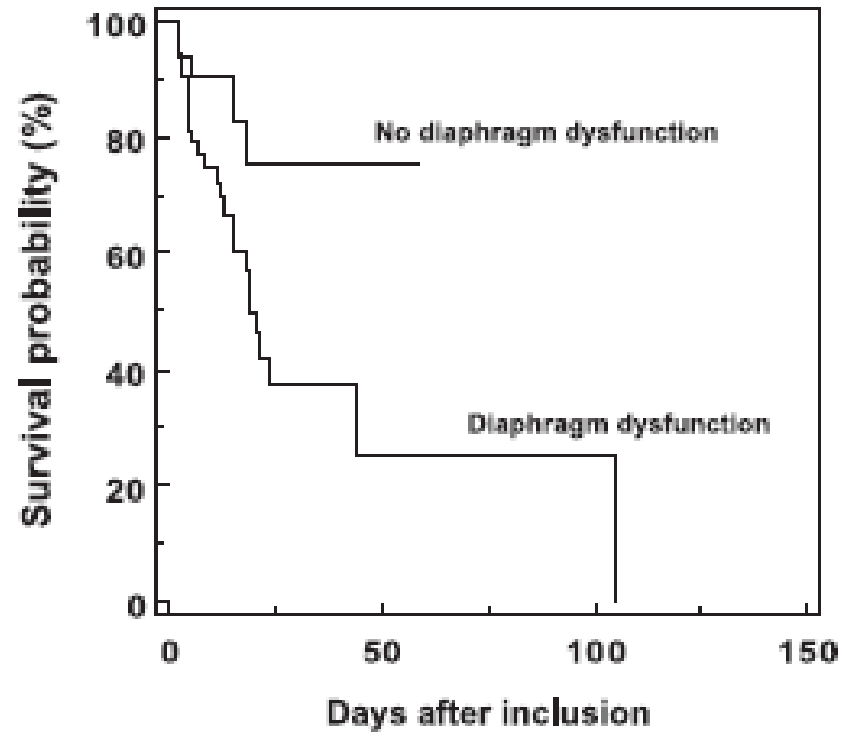
Levine, NEJM, 2008



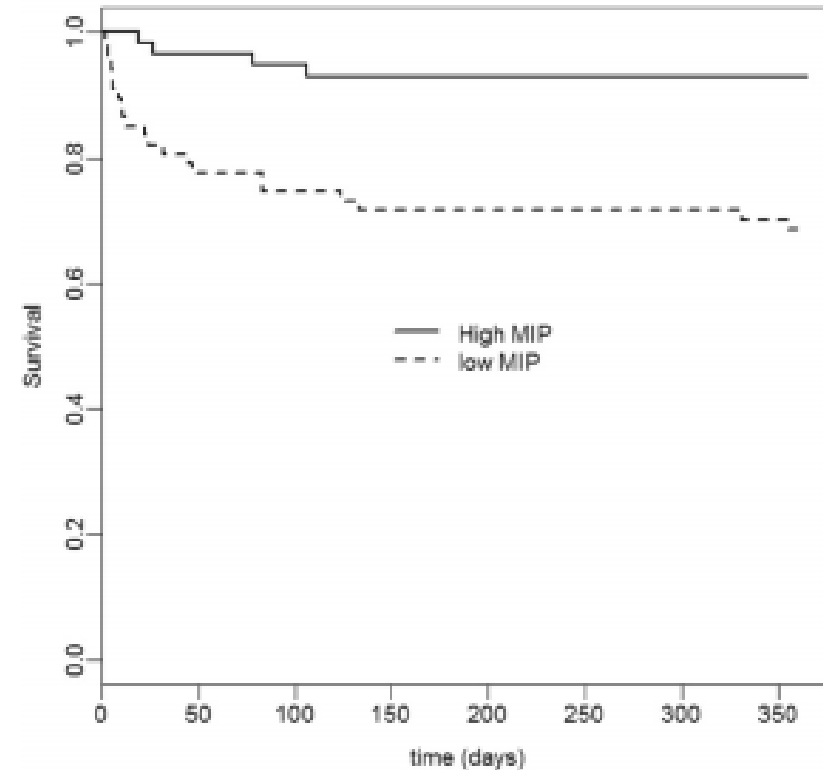
Jaber, Am J Respir Crit Care Med

...avec des conséquences à long terme

ATTEINTE DIAPHRAGMATIQUE PURE



ATTEINTE DE L'ENSEMBLE DES MUSCLES INSPIRATOIRES



Si l'atteinte est mixte

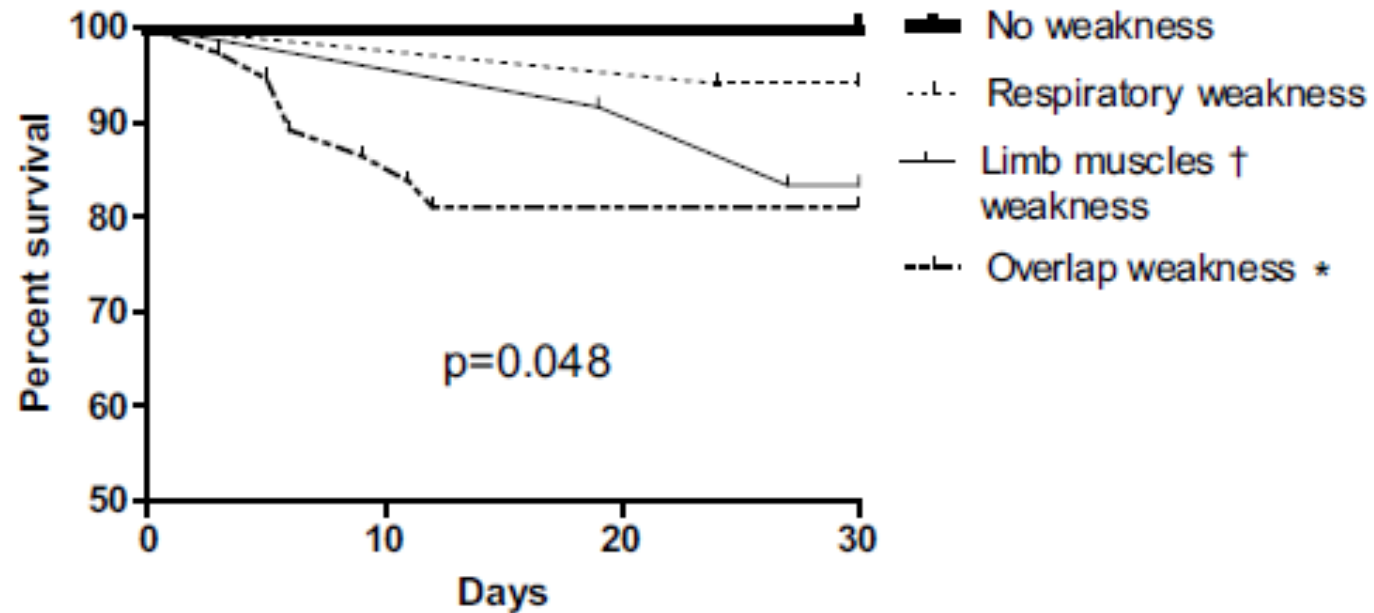


Fig. 1 Death after mechanical ventilation during hospitalization.
† $p < 0.05$ compared with no weakness, * $p < 0.01$ compared with no weakness

Au final



Bellamy, Muse, 2003

La Réhabilitation Précoce: solution ou illusion ?

MUSCLES PÉRIPHÉRIQUES



MUSCLES RESPIRATOIRES

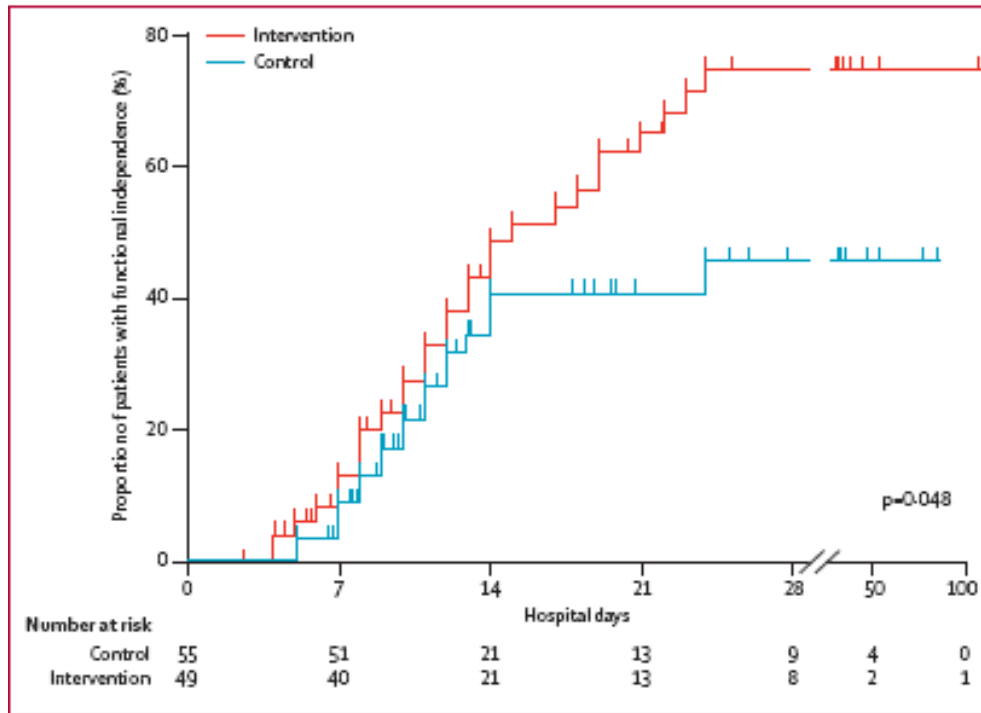


Sonde d'intubation

Raccord annelé

Valve threshold

Une solution?



Schweickert, Lancet, 2009

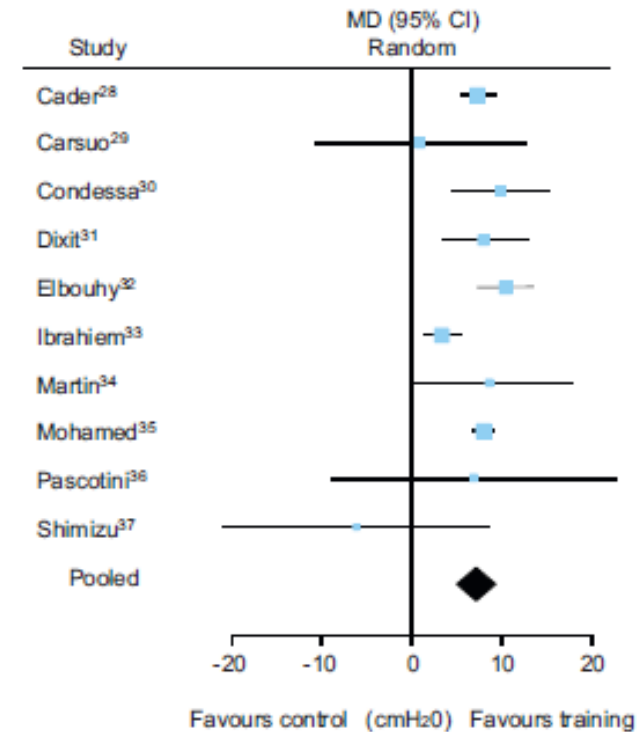
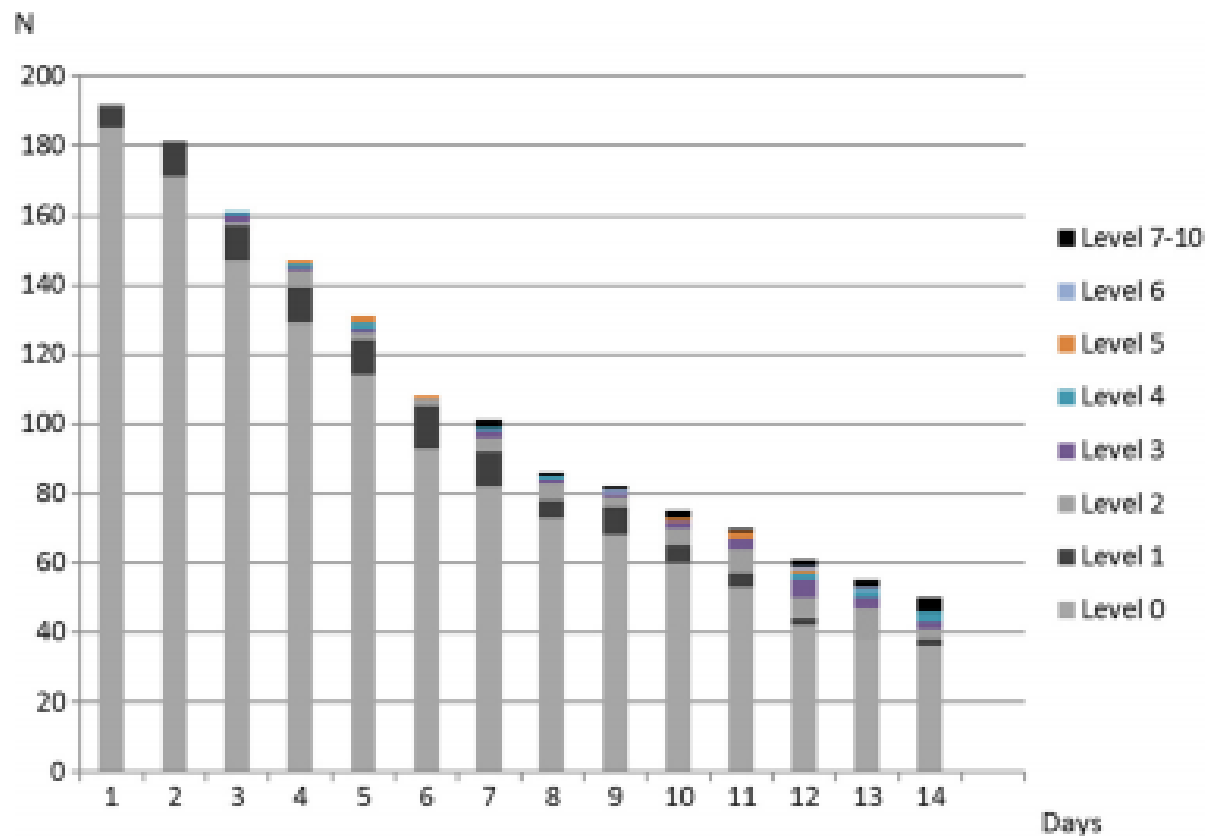


Figure 2. Mean difference (95% CI) in maximal inspiratory pressure (in cmH₂O) due to inspiratory muscle training, estimated by pooling data from ten studies (n = 366).

Elkins, J Physiother, 2015

Une illusion?



Hodgson, Crit Care, 2015

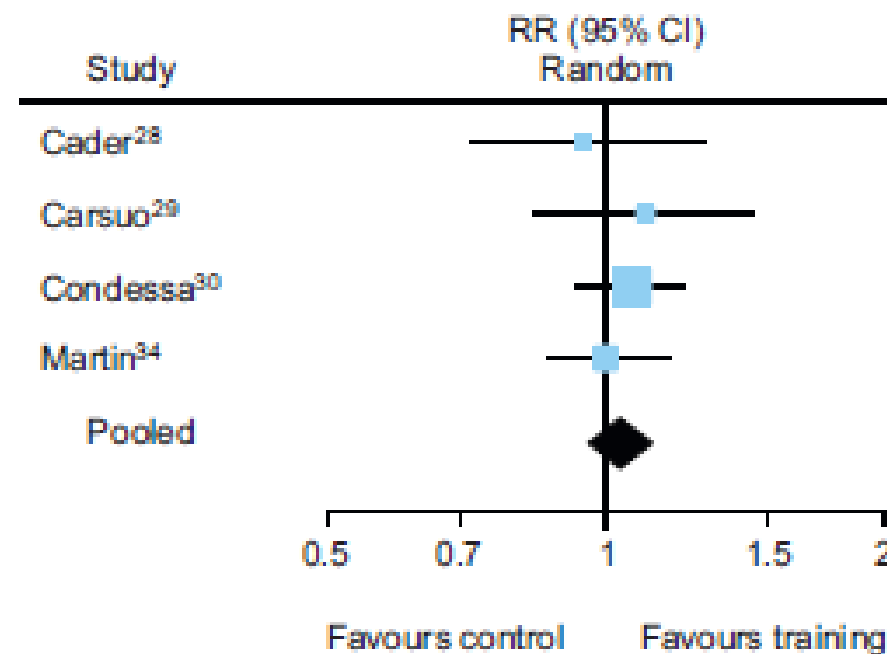


Figure 14. Relative risk (95% CI) of survival if weaning with inspiratory muscle training, estimated by pooling data from four studies (n = 242).

Elkins, J Physiother, 2015

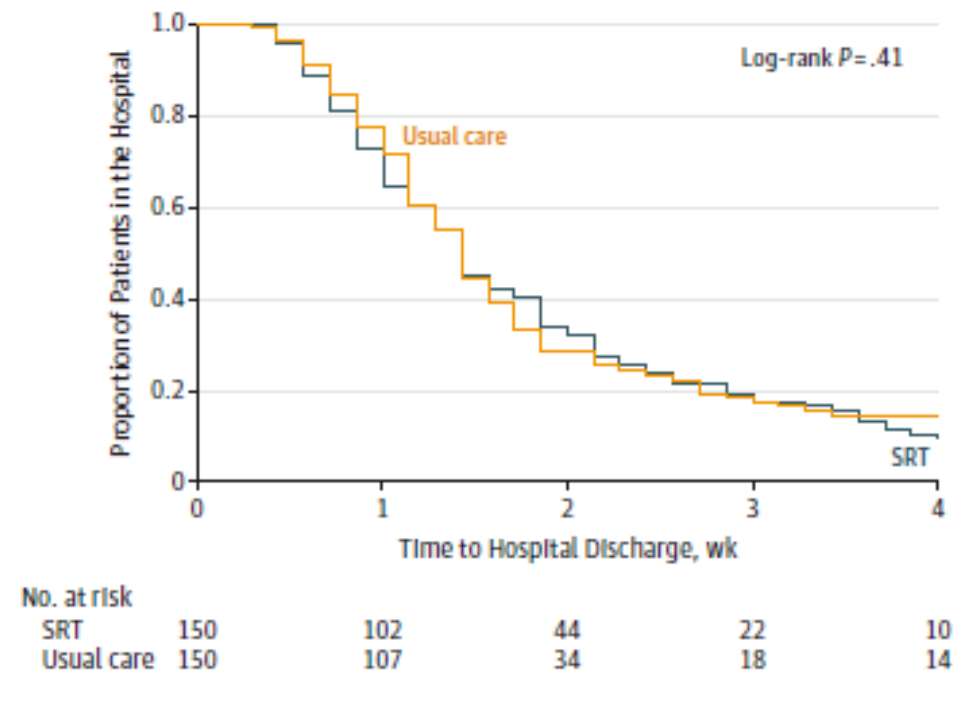
Standardized Rehabilitation and Hospital Length of Stay Among Patients With Acute Respiratory Failure

A Randomized Clinical Trial

Table 3. Secondary Outcomes: Physical Function Measures and Health-Related Quality of Life for Patients

| Measurement | Group | ICU Discharge | | Hospital Discharge | |
|---|----------------------|-----------------------------|--------------------------------|-----------------------------|--------------------------------|
| | | Least Square Means (95% CI) | No. of Patients Providing Data | Least Square Means (95% CI) | No. of Patients Providing Data |
| Physical Function | | | | | |
| Short Physical Performance Battery score ^a | SRT | 1.6 (1.0 to 2.2) | 86 | 4.7 (4.0 to 5.4) | 106 |
| | Usual care | 1.9 (1.3 to 2.4) | 98 | 4.7 (4.0 to 5.4) | 98 |
| | Difference | -0.3 (-1.1 to 0.5) | | -0.01 (-1.0 to 0.9) | |
| | P Value ^b | .46 | | .97 | |
| Dynamometer strength, lb | SRT | 20.3 (17.9 to 22.8) | 67 | 23.7 (21.6 to 25.8) | 100 |
| | Usual care | 22.8 (20.4 to 25.1) | 77 | 23.9 (21.7 to 26.2) | 86 |
| | Difference | -2.4 (-5.8 to 1.0) | | -0.2 (-3.3 to 2.9) | |
| | P Value ^b | .16 | | .90 | |
| Handgrip strength, kg | SRT | 20.0 (17.8 to 22.3) | 78 | 22.6 (20.6 to 24.6) | 104 |
| | Usual care | 20.9 (18.7 to 23.1) | 88 | 24.3 (22.2 to 26.4) | 94 |
| | Difference | -0.8 (-4.0 to 2.3) | | -1.7 (-4.6 to 1.2) | |
| | P Value ^b | .60 | | .25 | |

Figure 2. Length of Stay for Patients With Acute Respiratory Failure Receiving SRT vs Usual Care



SRT indicates standardized rehabilitation therapy. Time zero indicates time of randomization.



0 jour

09:10:00

Une réhabilitation précoce à haute intensité?

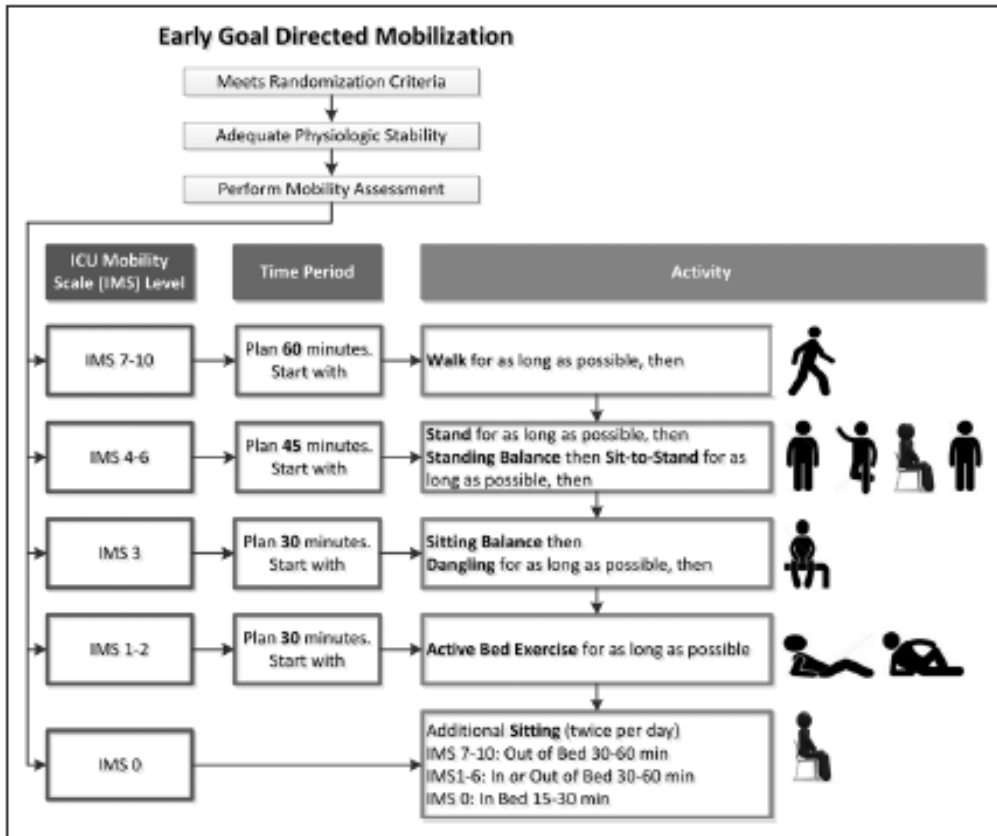


Figure 1. Early goal-directed mobilization algorithm. Once randomized and physiological stability is achieved, the mobility team assessed the ICU mobility scale (IMS) and targeted exercise at the highest possible level of the IMS for as long as possible.

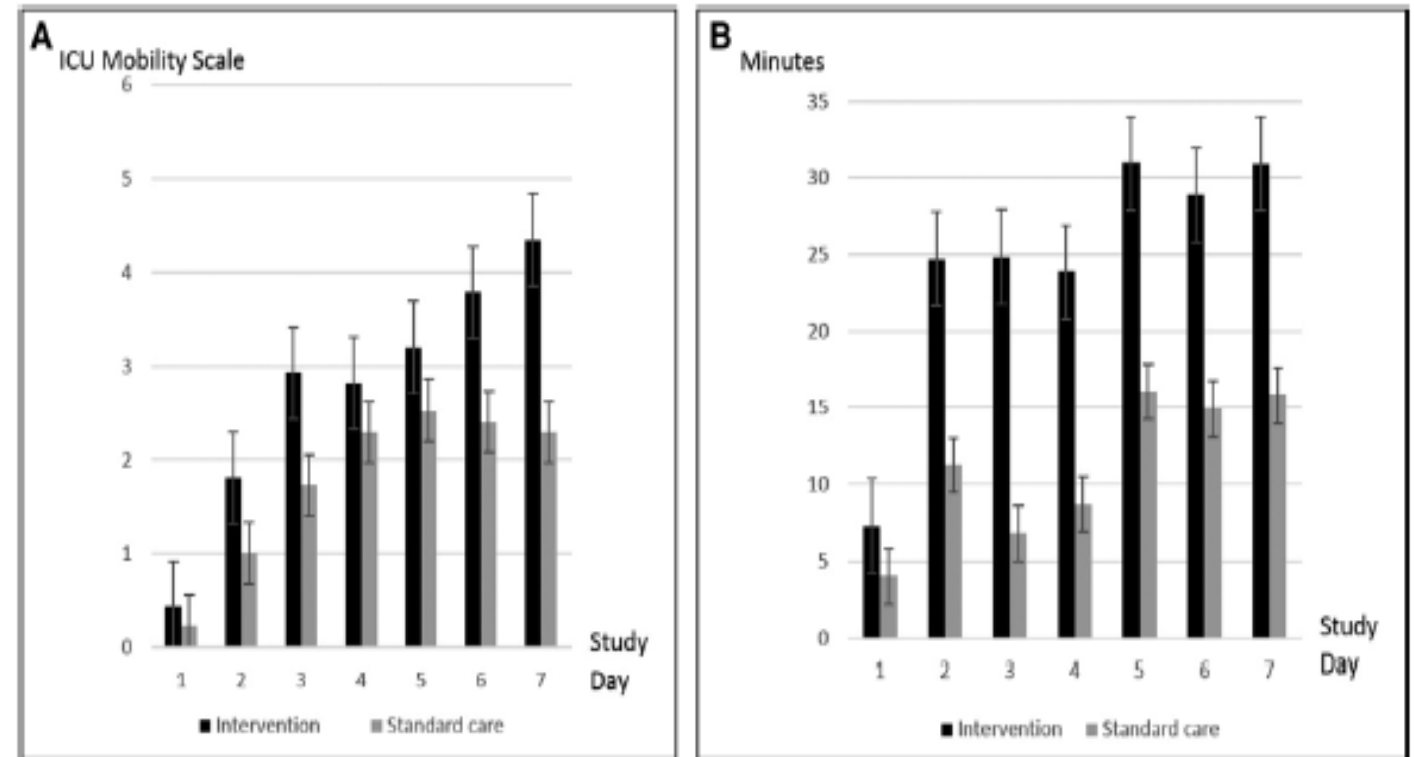
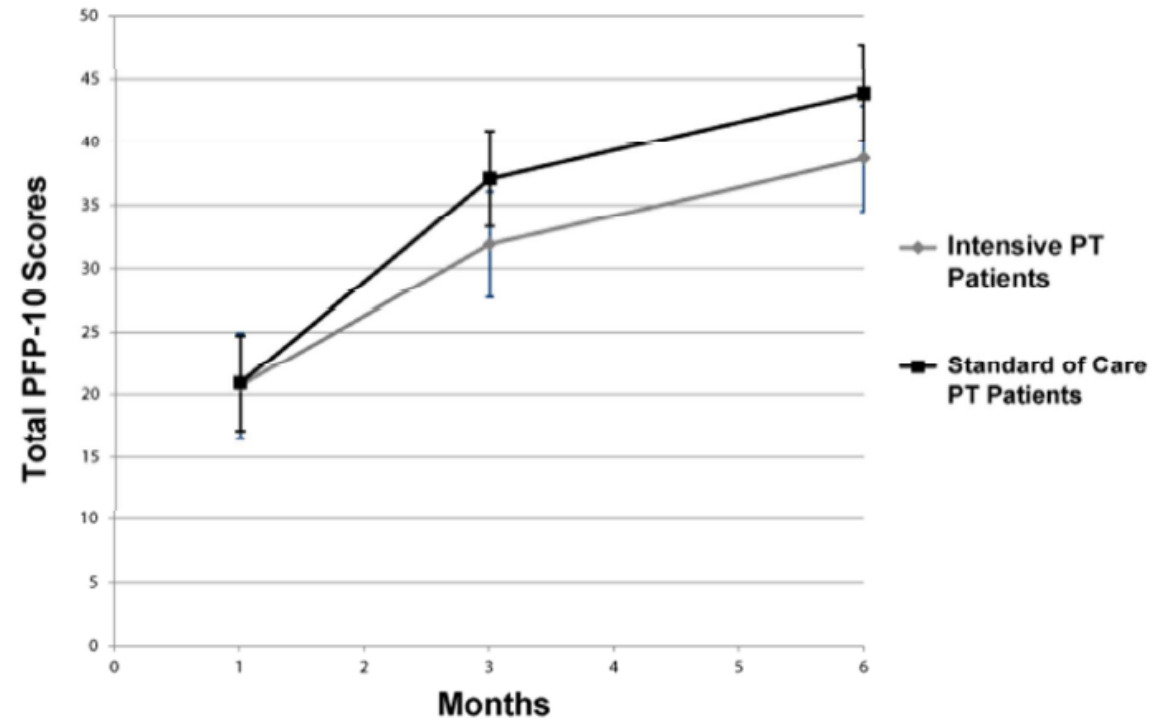


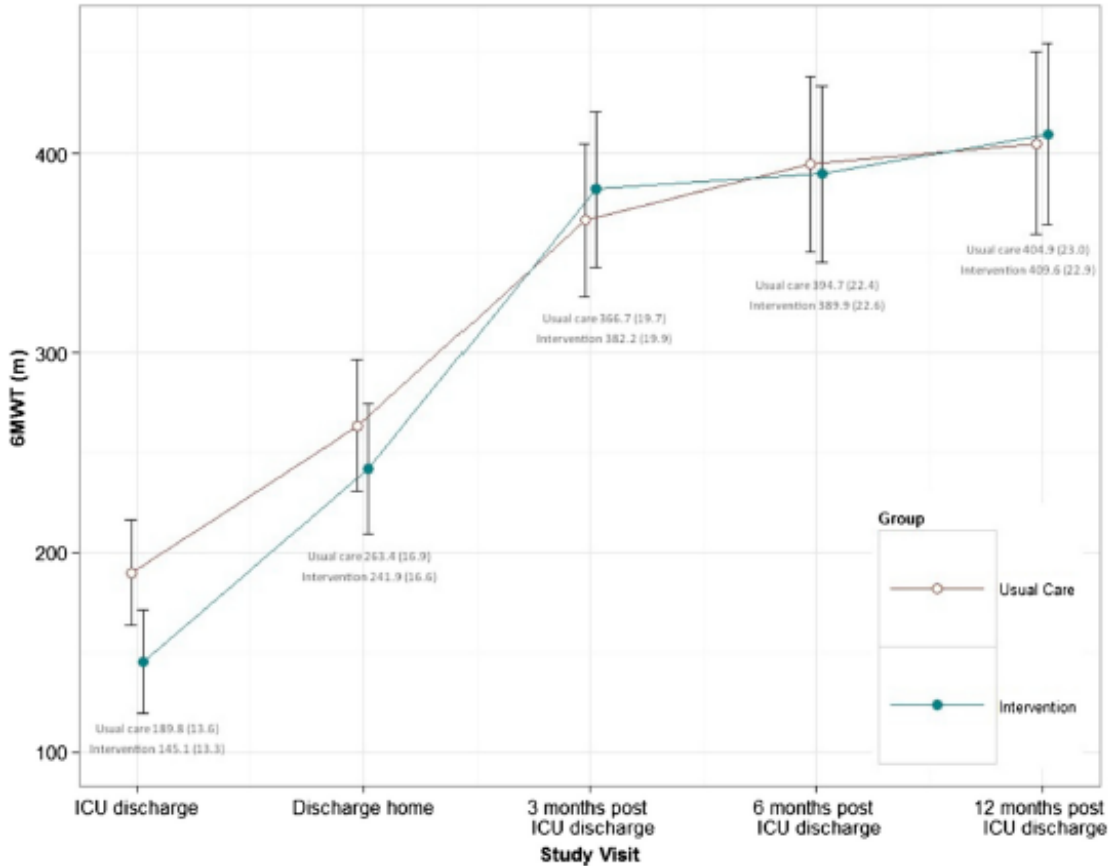
Figure 3. A, ICU mobility scale (mean ± SE) for control group patients vs intervention group patients on days 1–7 for mechanically ventilated patients. **B,** Time (min, mean ± SE) for control group patients vs intervention group patients on days 1–7. EGDM = early goal-directed mobilization.

Une réhabilitation précoce à haute intensité?

| | Intensive PT Patients (n=59) | Standard of Care PT Patients (n=61) | P-Value |
|--|------------------------------|-------------------------------------|---------|
| Total Time in Physical Therapy (in minutes) | 408 ± 261 | 86 ± 63 | < 0.001 |
| Total Number of Sessions | 12.4 ± 6.5 | 6.1 ± 3.8 | < 0.001 |
| ICU sessions | 6.4 ± 5.3 | 3.8 ± 2.4 | 0.002 |
| Hospital ward sessions | 6.2 ± 4.7 | 3.8 ± 3.0 | 0.003 |
| Outpatient sessions | 3.7 ± 2.8 | 0 | |
| Average Duration of Individual Sessions (in minutes) | 39.4 ± 11.0 | 21.8 ± 3.5 | < 0.001 |
| ICU sessions | 31.3 ± 7.0 | 21.0 ± 3.2 | < 0.001 |
| Non-ICU sessions | 45.3 ± 13.4 | 22.0 ± 4.8 | < 0.001 |



Poursuivre la réhabilitation à la sortie de réanimation?



Denehy, Crit Care, 2013

Original Investigation

Increased Hospital-Based Physical Rehabilitation and Information Provision After Intensive Care Unit Discharge The RECOVER Randomized Clinical Trial

Table 3. Primary and Secondary Outcome Measures

| Outcome (No. of Patients With Evaluable Data in Usual Care/Intervention Groups) | Treatment Group | | |
|---|--------------------|---------------------|---------|
| | Usual Care | Intervention | P Value |
| RMI at 3 mo (110/118) ^a | 13 (10 to 14) | 13 (10 to 14) | .71 |
| Hospital Discharge Outcome | | | |
| Post-ICU hospital length of stay, d (119/119) ^c | 10 (6 to 23) | 11 (6 to 22) | .90 |
| RMI (84/83) ^d | 8 (5 to 10) | 8 (6 to 11) | .20 |
| Handgrip strength, kg (82/82) ^e | 15.0 (9.7 to 22.6) | 14.7 (10.0 to 22.0) | .36 |

Walsh, JAMA Intern Med, 2015

Au final...

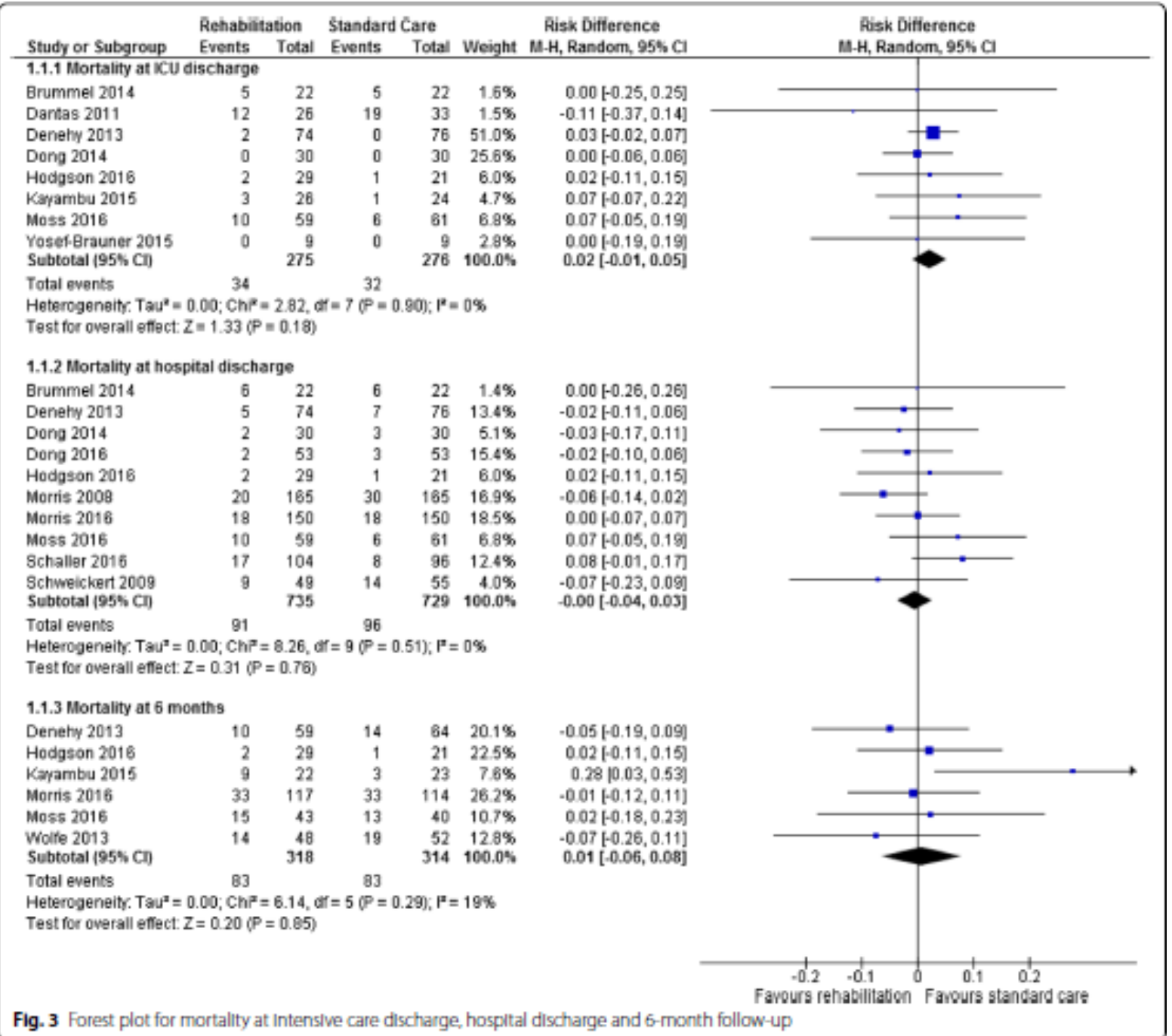
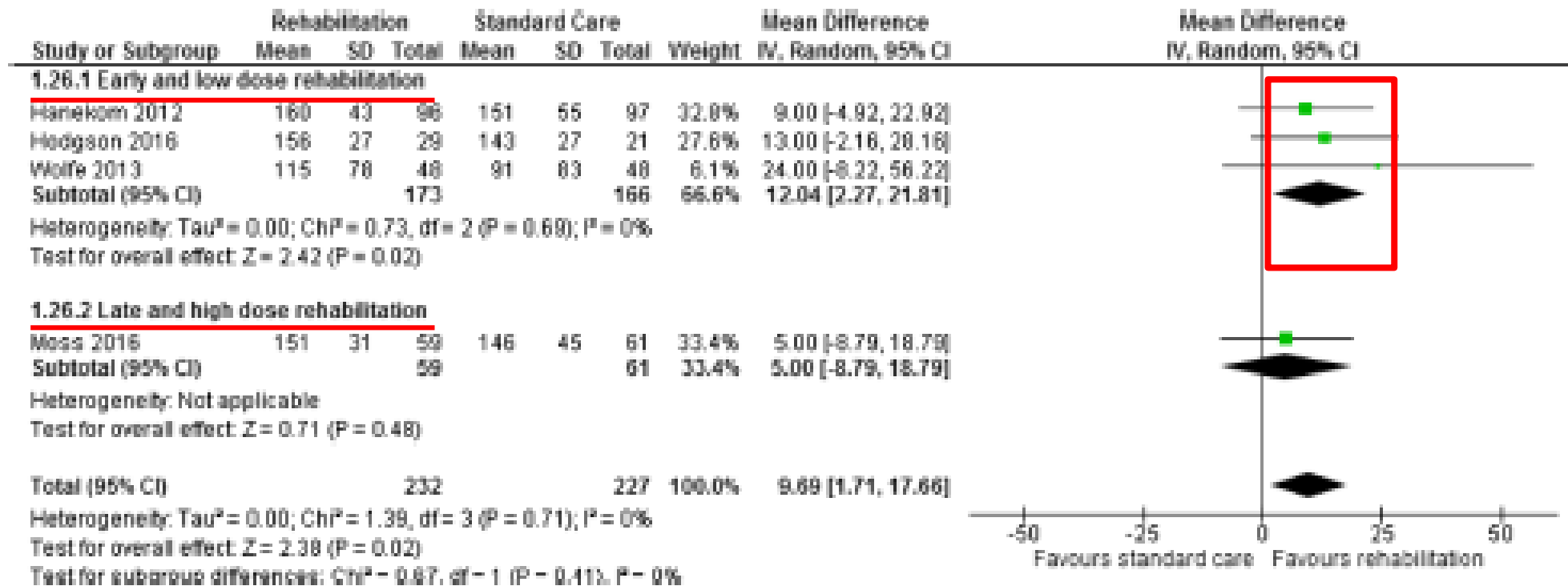


Fig. 3 Forest plot for mortality at intensive care discharge, hospital discharge and 6-month follow-up

Mais...



?

La réhabilitation précoce est vraiment mise en place en Urgence?

| Etude | Jour post VM | Intensité |
|--|--|--|
| Morris (JAMA 2016) | Mob Passive : J1 Mob Active + lever : J3 Résistance : J4 | Mob Passive : 87% (8J) Mob Active + lever : 54% (5J) Résistance : 35% (3J) |
| Hodgson (Crit Care Med 2016) | J3 | 90% levés actifs Durée moyenne 20min |
| Moos (Am J Respir Crit Care Med 2016) | J8 | 73% levés actifs Durée moyenne 40min |
| Denehy (Crit Care 2016) | J5 minimum | Standard Durée moyenne 15min |

Conclusion

- L'atteinte musculaire débute précocement en réanimation et est majorée par certains facteurs de risques.
- 52% des patients sortent de réanimation avec une neuro-myopathie.
- L'atteinte des muscles respiratoires est 5 fois plus rapide (96H vs. 18H).
- La littérature actuelle sur la réhabilitation précoce n'est pas concluante.
- Les protocoles avec une mise en place urgente semblent positifs.
- L'intensité et l'efficacité des techniques de réhabilitation doivent être étudiées urgemment.



Time is running out



Merci de votre attention