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HOSPITAL GENERAL
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VALÈNCIA

MOVILIZACIÓN PRECOZ

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Medicina Intensiva
Hospital Joan XXIII Tarragona

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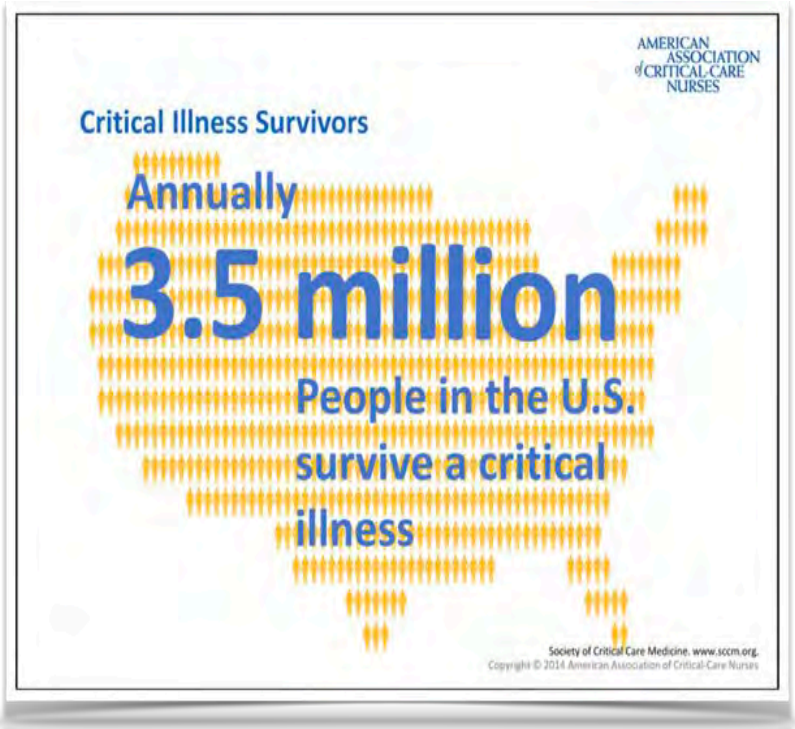
Valencia 11 de Febrero de 2019



Vincent JL et al. Lancet 2010; 376: 1354-1361
Needham DM et al. Crit Care Med 2012; 40: 502–509

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Valencia 11 de Febrero de 2019

COMPLICACIONES TARDÍAS

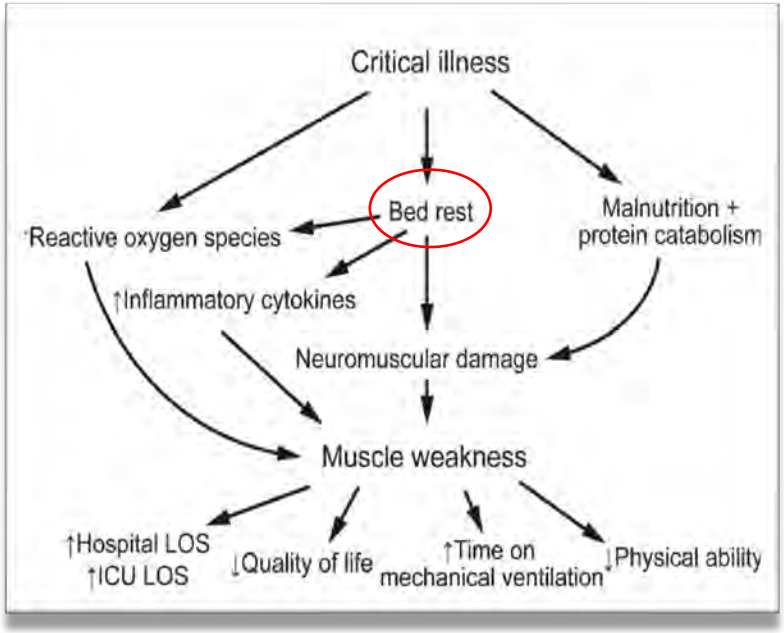
Sanjay V. Desai. Crit Care Med 2011; 39: 371-379

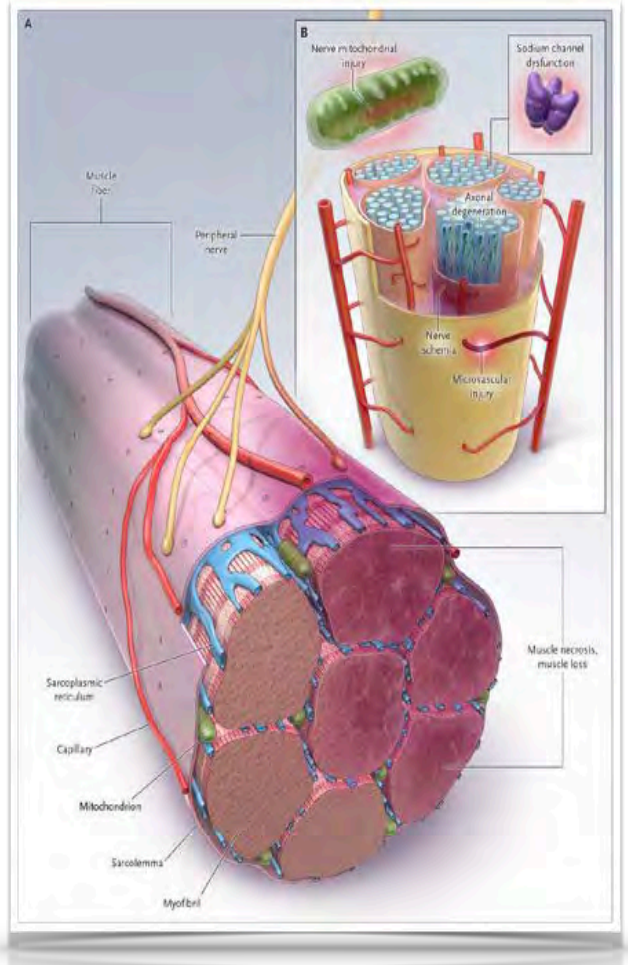
Table 1. Long-term complications, selected risk factors, and management suggestions

Complication	Description	Selected Risk Factors	Natural History	Management Suggestions
Pulmonary	Impairment in spirometry, lung volumes and diffusion capacity	Diffusion capacity: duration of mechanical ventilation	Generally mild and improves during first year, but can persist to ≥5 yrs	
Neuromuscular	Includes critical illness polyneuropathy and myopathy	Hyperglycemia Systemic inflammatory response syndrome Sepsis Multiorgan dysfunction	Polyneuropathy may recover more slowly than myopathy; can extend to 5 yrs	Glycemic control Limit corticosteroids and neuromuscular blockers
	Disuse atrophy	Immobility/bed rest		Early rehabilitation (below)
Physical function	Impairment in activities and instrumental activities of daily living and 6-min walk distance	Systemic corticosteroids ICU-acquired illnesses Slow resolution of lung injury Age Preexisting impairment of instrumental activities of daily living	Some improvement within months, but impairments in activities of daily living may be seen at 1 yr and in instrumental activities of daily living at 2 yrs Long-lasting impairment in 6-min walk distance vs. population norms	Early rehabilitation in ICU continued throughout post-ICU recovery
Psychiatric symptoms	Depression	Traumatic/delusional memories of ICU, sedation, psychiatric symptoms at discharge, impairment of physical function	May decrease over first year	Prevent hypoglycemia
	Posttraumatic stress disorder	Sedation, agitation, physical restraints, traumatic/delusional memories	Little improvement in first year	Limit use of sedation
	Anxiety	Unemployment, duration of mechanical ventilation	May persist past first year	
		Overall risk factors: female sex, younger age, lower education, and pre-ICU psychiatric symptoms and personality		
Cognitive	Impairments in memory, attention, executive function	Lower pre-ICU intelligence ICU delirium Sedation Hypoglycemia	Significant improvement during first year, with residual deficits up to 6 yrs later	Delirium prevention Prevent hypoglycemia
Quality of Life	Deficits most observed in physical domains	Older age Severity of illness Critical illness polyneuropathy Psychiatric symptoms Delusional memories of ICU Pulmonary function abnormalities	Physical deficits improve over first year, but could recur or persist during 5-yr follow-up	Handbook for self-guided rehabilitation

ICU, intensive care unit.

DEBILIDAD MUSCULAR ADQUIRIDA EN LA UCI





Critical illness polineuropathy

Critical illness miopathy

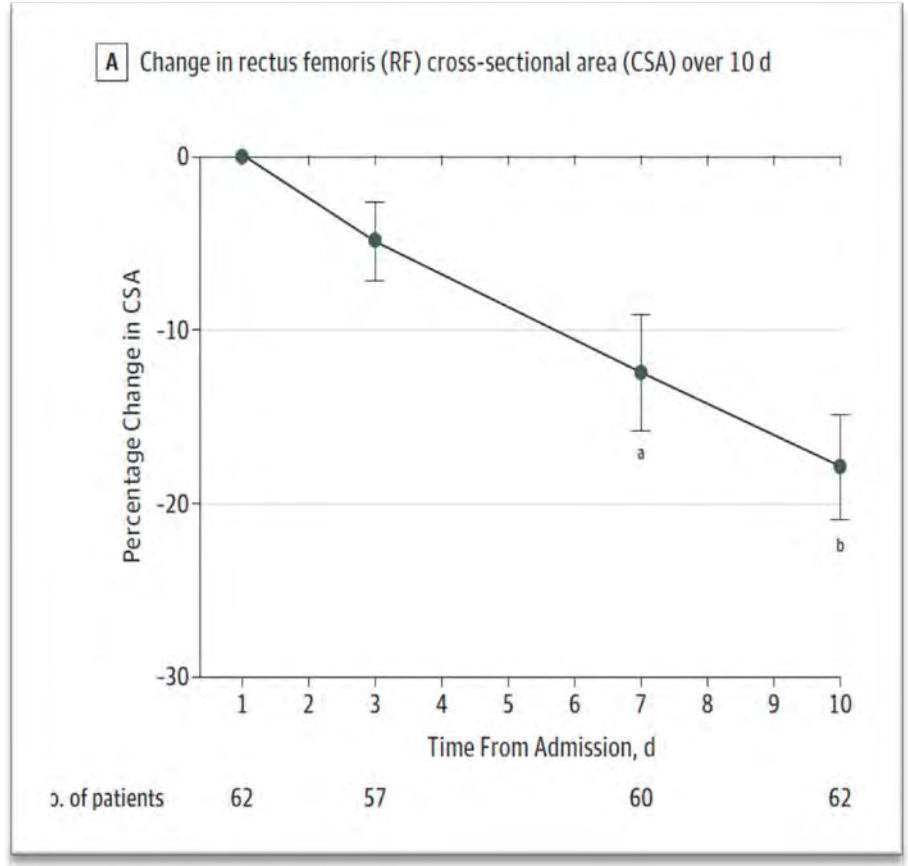
Kress JP. N Engl J Med 2014;370:1626-35

Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Acute Skeletal Muscle Wasting in Critical Illness

Zudin A. Puthucheary, MRCP; Jaikitry Rawal, MRCS; Mark McPhail, PhD; Bronwen Connolly, BSc; Gamunu Ratnayake, MRCP; Pearl Chan, MBBS; Nicholas S. Hopkinson, PhD; Rahul Phadke, FRCPath; Tracy Dew, MSc; Paul S. Sidhu, PhD; Cristiana Velloso, PhD; John Seymour, PhD; Chibeza C. Agley, MSc; Anna Selby, PhD; Marie Limb, PhD; Lindsay M. Edwards, PhD; Kenneth Smith, PhD; Anthea Rowlerson, PhD; Michael John Rennie, PhD; John Moxham, PhD; Stephen D. R. Harridge, PhD; Nicholas Hart, PhD; Hugh E. Montgomery, MD

Puthucheary ZA. JAMA. 2013; 310:1591-1600



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The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 FEBRUARY 20, 2003 VOL. 348 NO. 8

One-Year Outcomes in Survivors of the Acute Respiratory Distress Syndrome

Margaret S. Herridge, M.D., M.P.H., Angela M. Cheung, M.D., Ph.D., Catherine M. Tansey, M.Sc., Andrea Matte-Martyn, B.Sc., Natalia Díaz-Granados, B.Sc., Fatma Al-Saidi, M.D., Andrew B. Cooper, M.D., Cameron B. Guest, M.D., C. David Mazer, M.D., Sangeeta Mehta, M.D., Thomas E. Stewart, M.D., Ayala Barr, Ph.D., Deborah Cook, M.D., and Arthur S. Slutsky, M.D., for the Canadian Critical Care Trials Group

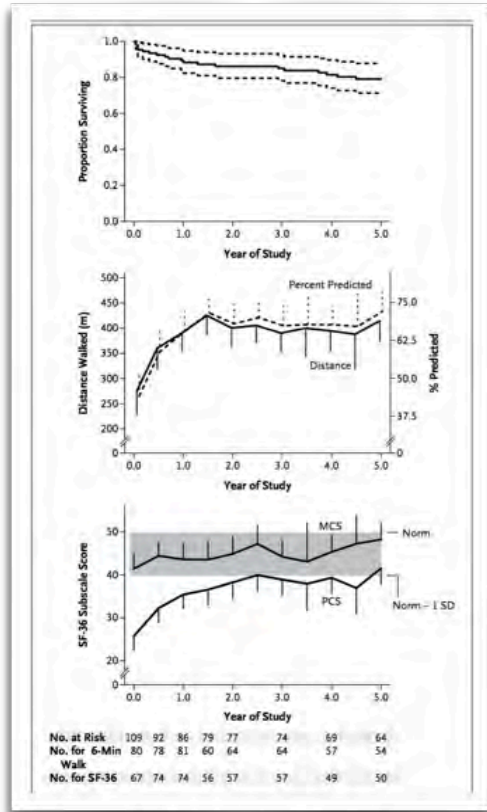
The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 7, 2011 VOL. 364 NO. 14

Functional Disability 5 Years after Acute Respiratory Distress Syndrome

Table 3. Ability to Exercise and Return to Work and Health-Related Quality of Life among Patients with the Acute Respiratory Distress Syndrome during the First 12 Months after Discharge from the ICU.

Outcome	3 Months	6 Months	12 Months
Distance walked in 6 min			
No. evaluated	80*	78†	81‡
Median — m	281	396	422
Interquartile range — m	55–454	244–500	277–510
Percentage of predicted value§	49	64	66
Returned to work — no./total no. (%)¶	13/83 (16)	26/82 (32)	40/82 (49)
Returned to original work — no./total no. (%)	10/13 (77)	23/26 (88)	31/40 (78)
SF-36 score**			
Physical functioning			
Median (normal value)	35 (90)	55 (89)	60 (89)
Interquartile range	15–58	30–75	35–85
Physical role			
Median (normal value)	0 (85)	0 (84)	25 (84)
Interquartile range	0–0	0–50	0–100
Pain			
Median (normal value)	42 (77)	53 (77)	62 (77)
Interquartile range	31–73	37–84	41–100
General health			
Median (normal value)	52 (78)	56 (77)	52 (77)
Interquartile range	35–67	36–74	35–77
Vitality			
Median (normal value)	45 (69)	55 (68)	55 (68)
Interquartile range	30–55	28–63	28–63
Social functioning			
Median (normal value)	38 (88)	63 (88)	63 (88)
Interquartile range	19–69	38–88	38–100
Emotional role			
Median (normal value)	33 (84)	67 (84)	100 (84)
Interquartile range	0–100	0–100	17–100
Mental health			
Median (normal value)	68 (78)	70 (78)	72 (78)
Interquartile range	54–80	54–88	52–88



Herridge MS. N Engl J Med 2003; 344: 683-693
Herridge MS. N Engl J Med 2011; 364: 1293-1304

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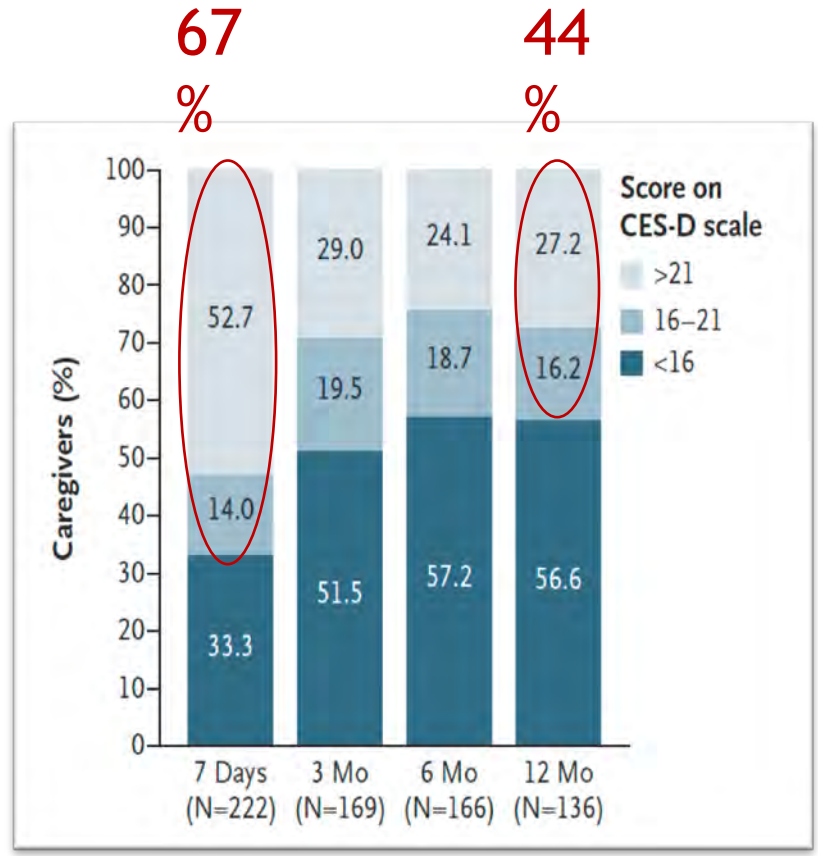
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

One-Year Outcomes in Caregivers of Critically Ill Patients

Jill I. Cameron. NEJM. 2016;374:1831-41



- Hasta el 50% de los supervivientes de UCI requieren rehabilitación a largo plazo que no puede ser cubierta por la aseguradora
- El 31% de los pacientes agota sus cuentas corrientes
- La ayuda del cuidador (familiar) representa 17,4 horas/semana/paciente, lo que resulta en una pérdida sustancial del salario para el paciente y la familia
- El 20% de los cuidadores tendrán que abandonar su actividad profesional para tener cura de ellos

Hopkins RO. Semin Respir Crit Care Med. 2012;33(4):348-356
Iwashyna TJ. Semin Respir Crit Care Med. 2012;33(4):327-338

Improvement in Quadriceps Strength and Dyspnea in Daily Tasks After 1 Month of Electrical Stimulation in Severely Deconditioned and Malnourished COPD*

Isabelle Vivodtzev, MSc; Jean-Louis Pépin, MD, PhD; Gabrielle Vottero, MD; Valerie Mayer, MD; Bernard Porsin, MD; Patrick Lévy, MD, PhD; and Bernard Wuyam, MD, PhD

Anti-Inflammatory Effects of Exercise Training in the Skeletal Muscle of Patients With Chronic Heart Failure

Stephan Gielen, MD,* Volker Adams, PHD,* Sven Möbius-Winkler, MD,* Axel Linke, MD,* Sandra Erbs, MD,* Jiangtao Yu, MD,* Werner Kempf, MD,‡ Andreas Schubert, PHD,† Gerhard Schuler, MD,* Rainer Hambrecht, MD*

Leipzig, Germany; and Zürich, Switzerland

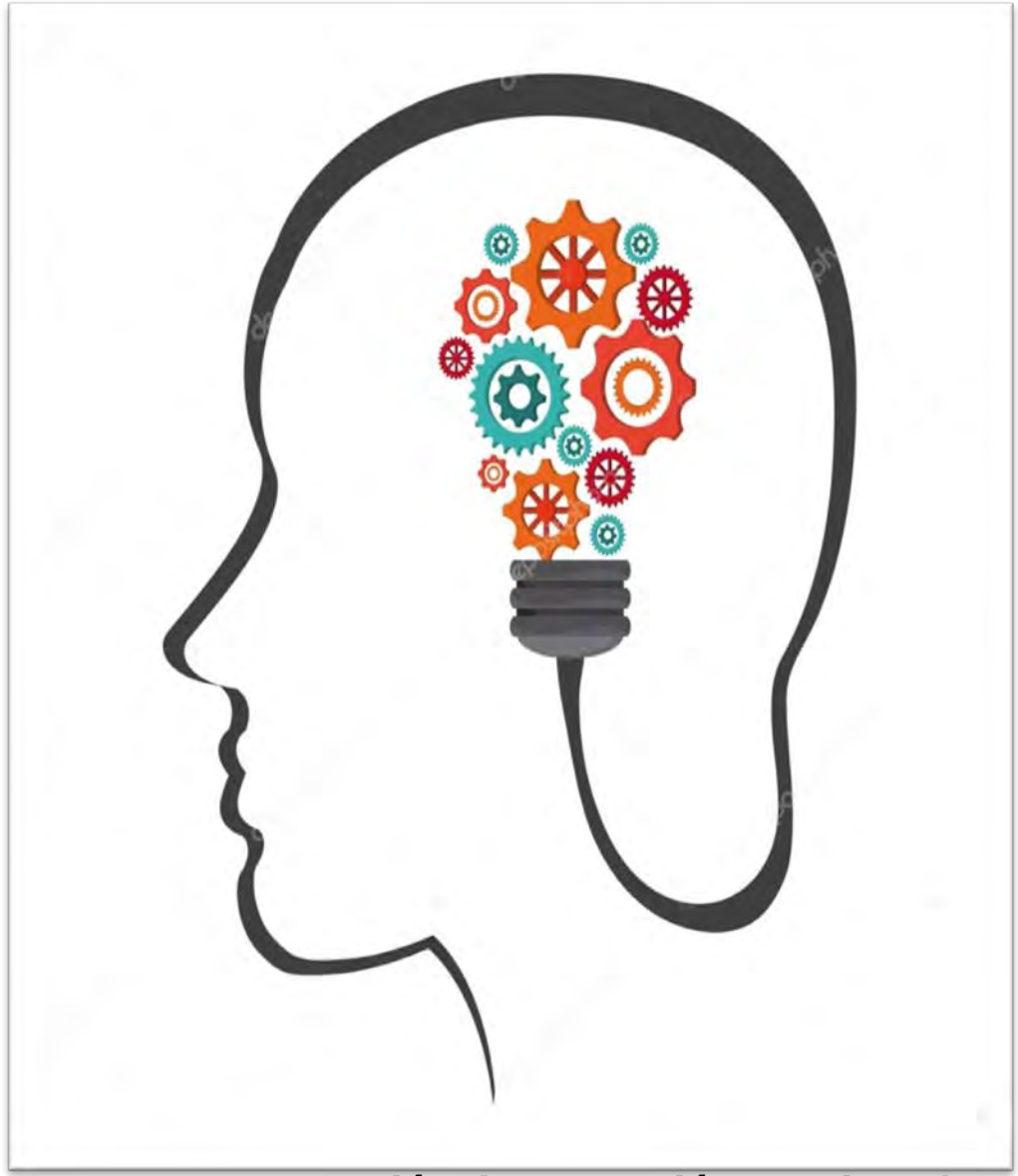
Clinical research

Beneficial effects of chronic low-frequency stimulation of thigh muscles in patients with advanced chronic heart failure

Martin J. Nuhr[a], Dirk Pette[d], Rudolf Berger[b], Michael Quittan[a]*, Richard Crevenna[a], Martin Huelsman[b], Guenther F. Wiesinger[a], Petra Moser[c], Veronika Fialka-Moser[a], Richard Pacher[b,c]

Rehabilitation Decreases Exercise-induced Oxidative Stress in Chronic Obstructive Pulmonary Disease

Evi M. Mercken, Geja J. Hageman, Annemie M. W. J. Schols, Marco A. Akkermans, Aalt Bast, and Emiel F. M. Wouters



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MOVILIZACIÓN PRECOZ

Conjunto de movimientos planificados (ejercicios pasivos y activos) con una progresión determinada, comenzando por los movimientos que el paciente es capaz de hacer, con el objetivo de volver a su estatus inicial antes del ingreso en UCI.

Vollman K.M. Critical Care Nurse 2010; Vol. 2: Supplement S3 – S5

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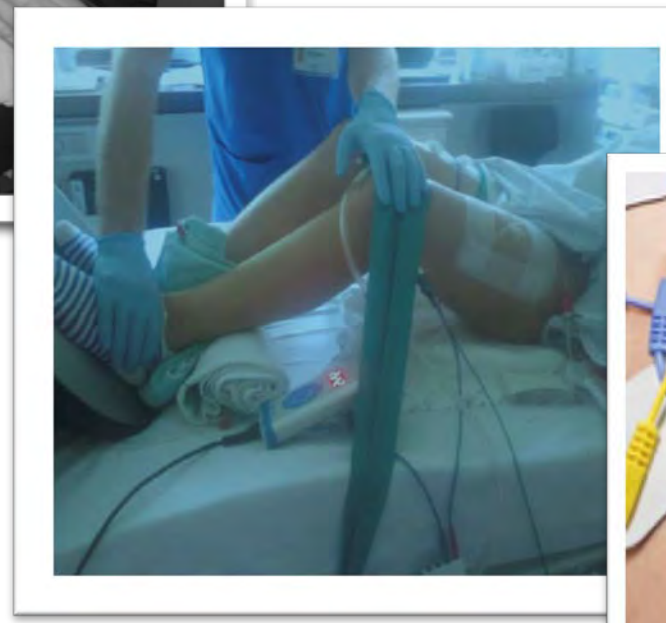

TERAPIAS COADYUVANTES

Burtin C. Crit Care Med 2009; 37: 2499–2505
Wollersheim et al. Critical Care (2017) 21:9

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Viabilidad

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Valencia 11 de Febrero de 2019

Revisión bibliográfica / Evidencia científica

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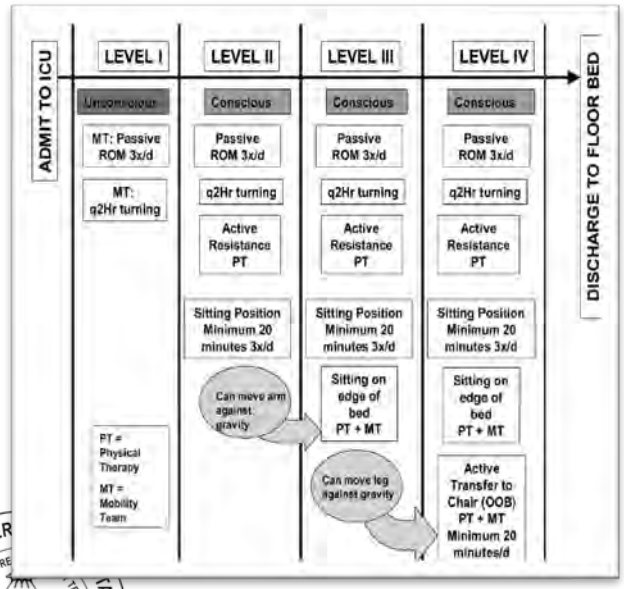
Valencia 11 de Febrero de 2019

Early intensive care unit mobility therapy in the treatment of acute respiratory failure

Peter E. Morris, MD; Amanda Goad, RN; Clifton Thompson, RN; Karen Taylor, MPT; Bethany Harry, MPT; Leah Passmore, MS; Amelia Ross, RN, MSN; Laura Anderson; Shirley Baker; Mary Sanchez; Lauretta Penley; April Howard, RN; Luz Dixon, RN; Susan Leach, RN; Ronald Small, MBA; R. Duncan Hite, MD; Edward Haponik, MD

Morris PE. Crit Care Med 2008: 2008; 36:2238–43



- 1 UCI pacientes respiratorios
- PMP diario vs estándar (3 días/setm)
- Inicio primeras 48h VM

Table 3. Outcomes (survivors)

	Usual Care (n = 135)	Protocol (n = 145)	*p*
Days to first out of bed	13.7 (11.7–15.7)	8.5 (6.6–10.5)	<.001
Days to first out of bed (adjusted*)	11.3 (9.6–13.4)	5.0 (4.3–5.9)	<.001
Ventilator days	9.0 (7.5–10.4)	7.9 (6.4–9.3)	.298
Ventilator days (adjusted*)	10.2 (8.7–11.7)	8.8 (7.4–10.3)	.163
ICU LOS days	8.1 (7.0–9.3)	7.6 (6.3–8.8)	.084
ICU LOS days (adjusted*)	6.9 (5.9–8.0)	5.5 (4.7–6.3)	.025
Hospital LOS days	17.2 (14.2–20.2)	14.9 (12.6–17.1)	.048
Hospital LOS days (adjusted*)	14.5 (12.7–16.7)	11.2 (9.7–12.8)	.006

Early physical and occupational therapy in mechanically ventilated, critically ill patients: a randomised controlled trial

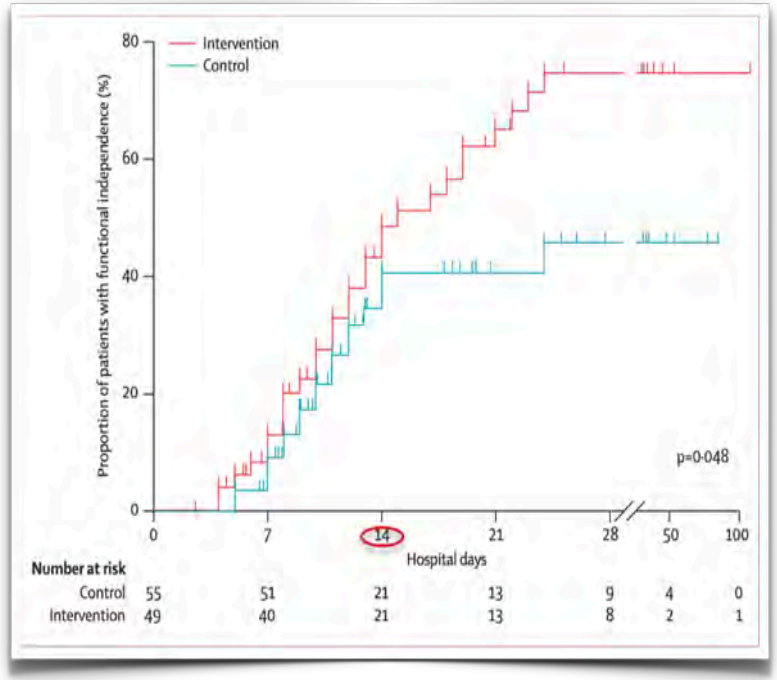
William D Schweickert, Mark C Pohlman, Anne S Pohlman, Celerina Nigos, Amy J Pawlik, Cheryl L Esbrook, Linda Spears, Megan Miller, Mietka Franczyk, Deanna Deprizio, Gregory A Schmidt, Amy Bowman, Rhonda Barr, Kathryn E McCallister, Jesse B Hall, John P Kress

- 2 UCI pacientes médicos
- PMP/IDS vs estándar
- Inicio: VM = 72h (> 24h)

	Intervention (n=49)	Control (n=55)	p value
Return to independent functional status at hospital discharge	29 (59%)	19 (35%)	0·02
ICU delirium (days)	2·0 (0·0–6·0)	4·0 (2·0–7·0)	0·03
Time in ICU with delirium (%)	33% (0–58)	57% (33–69)	0·02
Hospital delirium (days)	2·0 (0·0–6·0)	4·0 (2·0–8·0)	0·02
Hospital days with delirium (%)	28% (26)	41% (27)	0·01
Barthel Index score at hospital discharge	75 (7·5–95)	55 (0–85)	0·05
ICU-acquired paresis at hospital discharge	15 (31%)	27 (49%)	0·09
Ventilator-free days*	23·5 (7·4–25·6)	21·1 (0·0–23·8)	0·05
Duration of mechanical ventilation (days)	3·4 (2·3–7·3)	6·1 (4·0–9·6)	0·02
Duration of mechanical ventilation, survivors (days)	3·7 (2·3–7·7)	5·6 (3·4–8·4)	0·19
Duration of mechanical ventilation, non-survivors (days)	2·5 (2·4–5·5)	9·5 (5·9–14·1)	0·04
Length of stay in ICU (days)	5·9 (4·5–13·2)	7·9 (6·1–12·9)	0·08
Length of stay in hospital (days)	13·5 (8·0–23·1)	12·9 (8·9–19·8)	0·93
Hospital mortality	9 (18%)	14 (25%)	0·53

Data are n (%), median (IQR), or mean (SD). ICU=intensive care unit. *Ventilator-free days from study day 1 to day 28. Barthel Index scale 0–100, APACHE II scale 0–71.

Table 3: Main outcomes according to study group



Schweickert WD. Lancet 2009; 373: 1874-82

Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

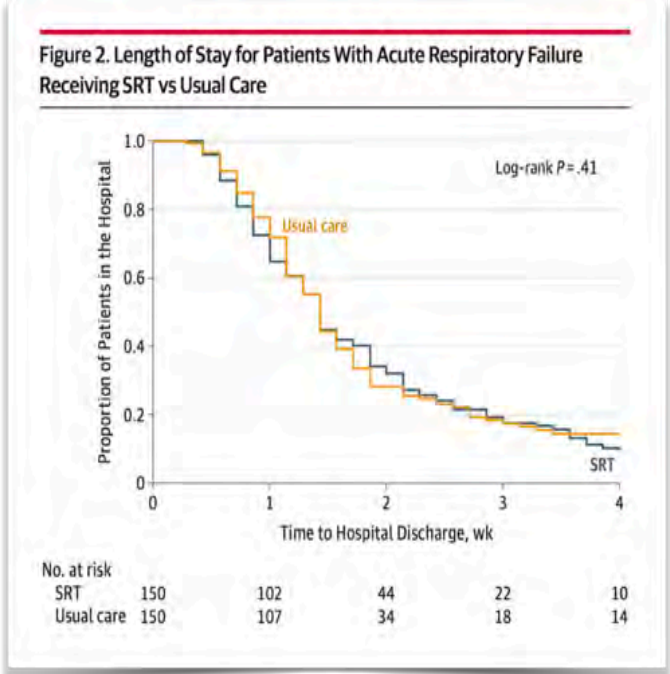
Standardized Rehabilitation and Hospital Length of Stay Among Patients With Acute Respiratory Failure
A Randomized Clinical Trial

Peter E. Morris, MD; Michael J. Berry, PhD; D. Clark Files, MD; J. Clifton Thompson, RN; Jordan Hauser, MS; Lori Flores, RN; Sanjay Dhar, MD; Elizabeth Chmelo, MS; James Lovato, MS; L. Douglas Case, PhD; Rita N. Bakhru, MD, MS; Aarti Sarwal, MD; Selina M. Parry, PhD; Pamela Campbell, RN; Arthur Mote; Chris Winkelman, PhD; Robert D. Hite, MD; Barbara Nicklas, PhD; Arjun Chatterjee, MD, MS; Michael P. Young, MD

Morris PE. JAMA 2016; 315: 2694-2702

- 1 UCI, pacientes respiratorios
- PMP (7 días) vs estándar (5 días)
- VM < 80h
- VMNI, VMI

- Pérdida seguimiento 24%



A Randomized Trial of an Intensive Physical Therapy Program for Patients with Acute Respiratory Failure

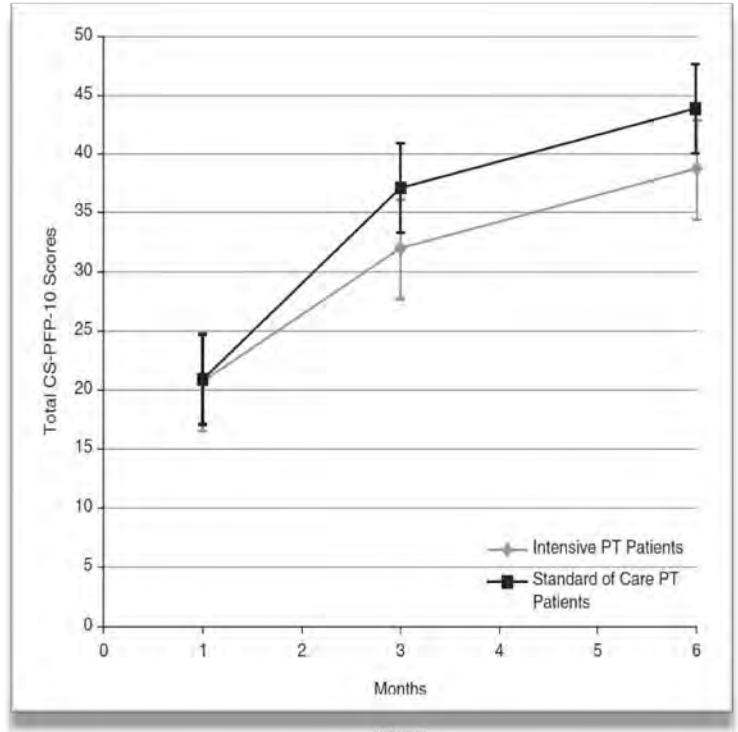
Marc Moss[1], Amy Nordon-Craft[2], Dan Malone[2], David Van Pelt[3], Stephen K. Frankel[4], Mary Laird Warner[4], Wendy Kriekels[2], Monica McNulty[5], Diane L. Fairclough[5], and Margaret Schenkman[2]

[1]Division of Pulmonary Sciences and Critical Care Medicine, Department of Medicine, [2]Physical Therapy Program, and [5]Colorado Health Outcomes Group, University of Colorado School of Medicine, Aurora, Colorado; [3]The Medical Center of Aurora, Aurora, Colorado; and [4]Division of Pulmonary Medicine, National Jewish Health, Denver, Colorado

Moss M. Am J Respir Crit Care Med 2016: 193; 1101–1110

- 5 UCI, pacientes médicos
- PMP (7 días) vs estándar (3 días)
- Inicio: VM > 4 días

- Randomización tardía (7 días)
- Sólo 28 días



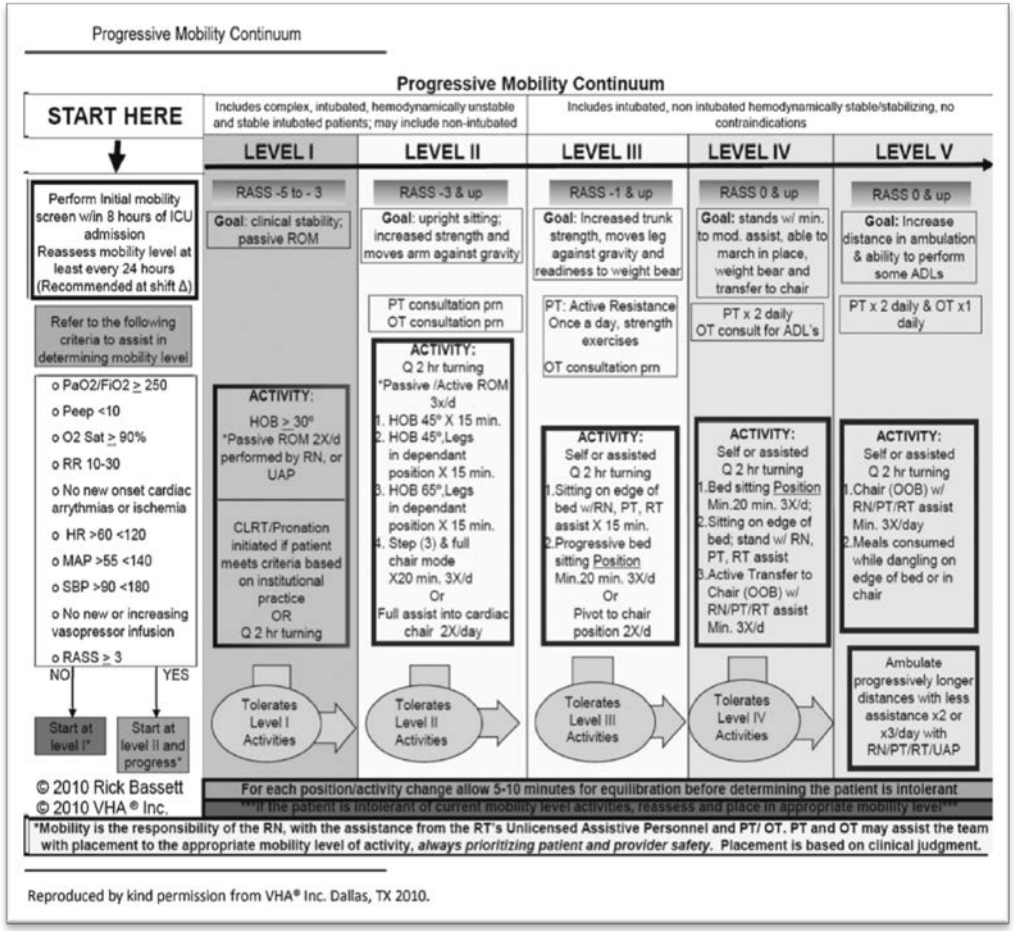
Early, goal-directed mobilisation in the surgical intensive care unit: a randomised controlled trial

Stefan J Schaller, Matthew Anstey, Manfred Blobner, Thomas Edrich, Stephanie D Grabitz, Ilse Gradwohl-Matis, Markus Heim, Timothy Houle, Tobias Kurth, Nicola Latronico, Jarone Lee, Matthew J Meyer, Thomas Peponis, Daniel Talmor, George C Velmahos, Karen Waak, J Matthias Walz, Ross Zafonte, Matthias Eikermann, for the International Early SOMS-guided Mobilization Research Initiative*

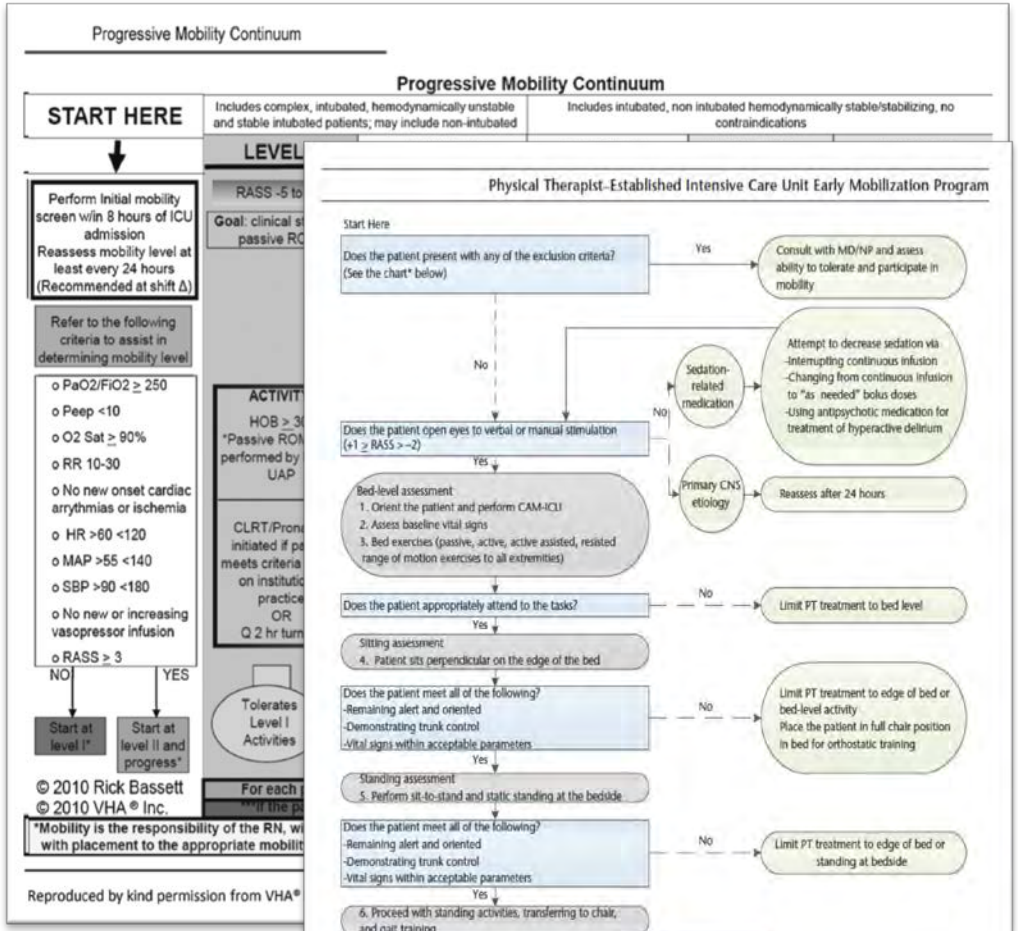
Schaller S. Lancet 2016; 388: 1377–88

- 5 UCI, pacientes quirúrgicos
- PMP (7 días) vs estándar (5 días)
- Inicio: VM = 48 h (> 24 h)

	Intervention group (n=104)	Control group (n=96)	Group difference* (95% CI)	p value
Main outcomes (hierarchically tested in prespecified order)				
Mean achieved SOMS during ICU stay†	2·2 (1·0)	1·5 (0·8)	0·7 (0·4 to 1·0)	<0·0001
ICU LOS, days‡	7 (5–12)	10 (6–15)	−3·0 (−6·0 to −1·0)	0·0054
mmFIM at hospital discharge‡	8 (4–8)	5 (2–8)	3·0 (1·0 to 4·0)	0·0002
Subdomain locomotion	4 (2–4)	2 (1–4)	2·0 (0·0 to 2·0)	0·0003
Subdomain transfer	4 (2–4)	3 (2–4)	1·0 (1·0 to 2·0)	0·0001
Functional independent at hospital discharge	44 (51)	25 (28)	OR 2·6 (1·4 to 4·8)	0·0030
Secondary outcomes				
Quality of life at 3 months after hospital discharge in survivors§	61·3 (18·4)	63·0 (19·9)	−1·7 (−10·1 to 6·7)	0·69
Muscle weakness, defined by MRC scale	50 (69%)	51 (69%)	OR 1·0 (0·5–2·1)	0·95
Tertiary outcomes				
Mobility related				
mmFIM score at ICU discharge	4 (2–5)	3 (1–4)	1·0 (0·0 to 2·0)	0·009
Subdomain locomotion	2 (1–3)	2 (0–2)	0·0 (0·0 to 1·0)	0·024
Subdomain transfer	2 (1–3)	2 (1–2)	0·0 (0·0 to 1·0)	0·010
ICU LOS until discharge readiness, days	5 (3–8)	7 (5–13)	−2·0 (−4·0 to −1·0)	0·0006
Hospital LOS, days	15 (11–27)	21·5 (15–30)	−6·5 (−11·0 to −1·5)	0·011
In-hospital mortality	17 (16%)	8 (8%)	OR 2·1 (0·9 to 5·2)	0·09



Basset et al. Intensive Crit Care 2012; 28: 88-97
Engel HJ et al. Phys Ther 2013; 93: 975-985
Engel HJ et al. Crit Care Med 2013; 41. S69-s80
Titsworth WL et al. Neurosurg 2012; 116:1379–1388



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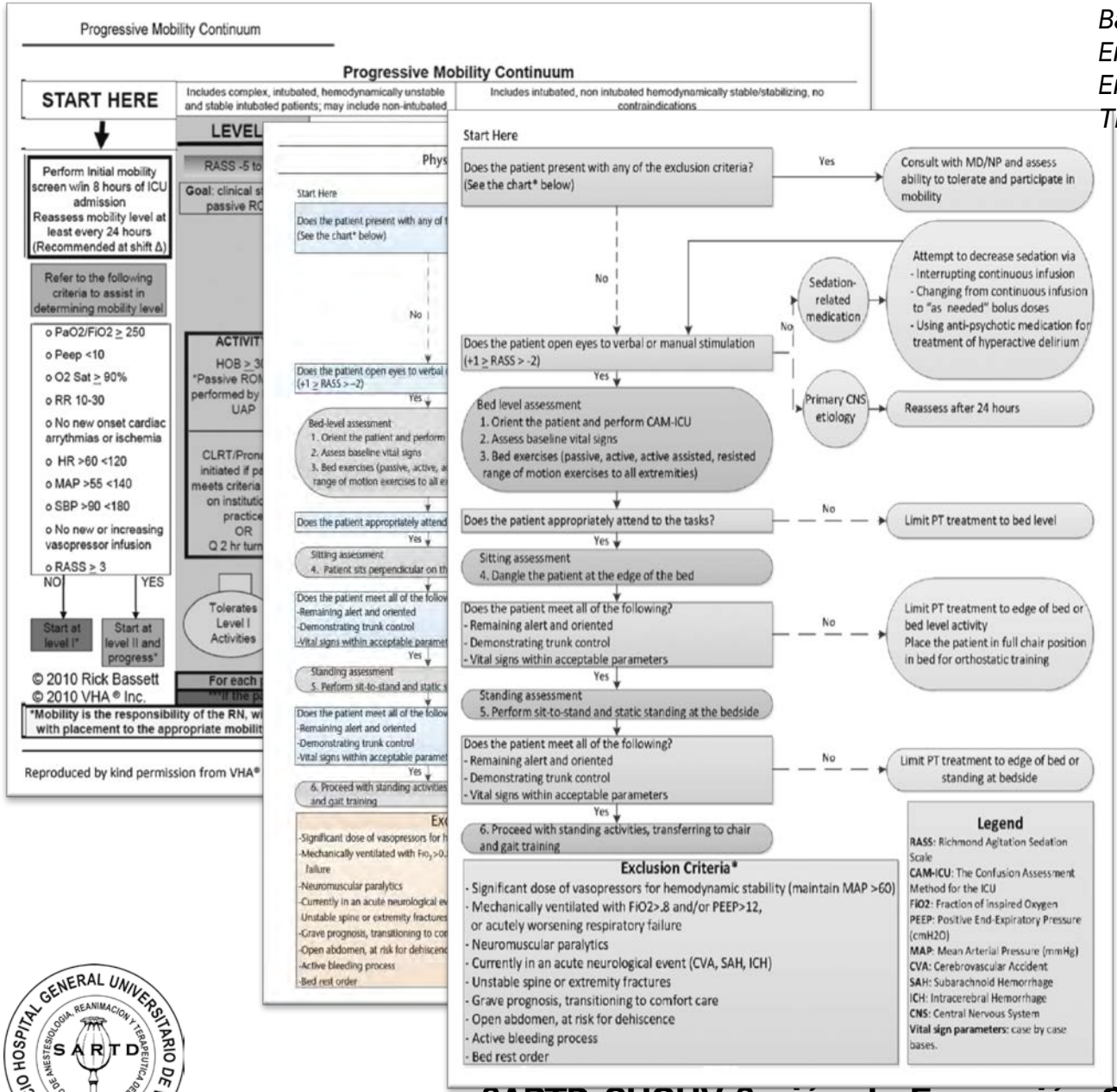
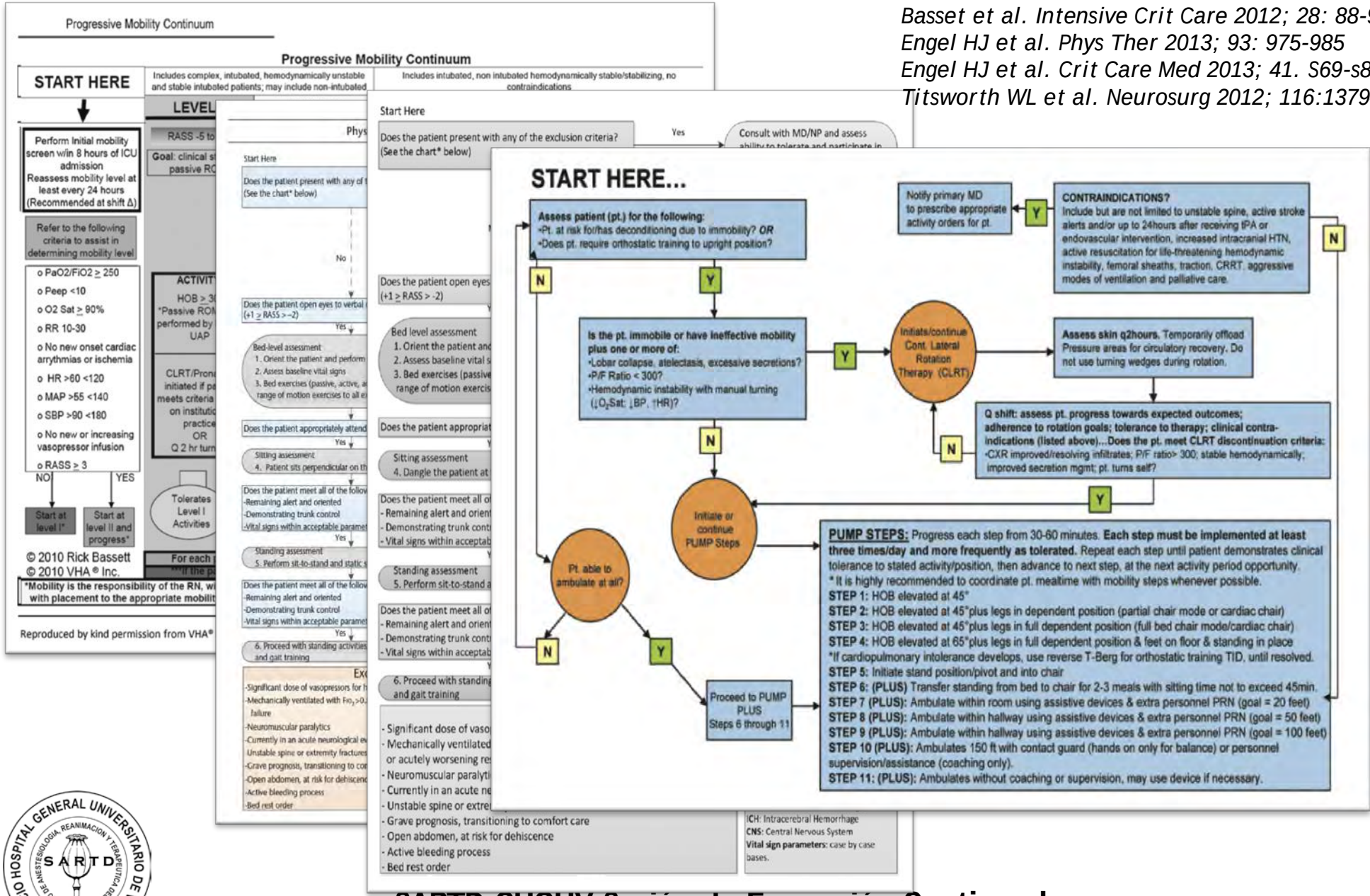
Engel HJ et al. Phys Ther 2013; 93: 975-985
Engel HJ et al. Crit Care Med 2013; 41. S69-s80
Titsworth WL et al. Neurosurg 2012; 116:1379–1388



Basset et al. Intensive Crit Care 2012; 28: 88-97
Engel HJ et al. Phys Ther 2013; 93: 975-985
Engel HJ et al. Crit Care Med 2013; 41. S69-s80
Titsworth WL et al. Neurosurg 2012; 116:1379–1388



Basset et al. Intensive Crit Care 2012; 28: 88-97
Engel HJ et al. Phys Ther 2013; 93: 975-985
Engel HJ et al. Crit Care Med 2013; 41. S69-s80
Titsworth WL et al. Neurosurg 2012; 116:1379–1388

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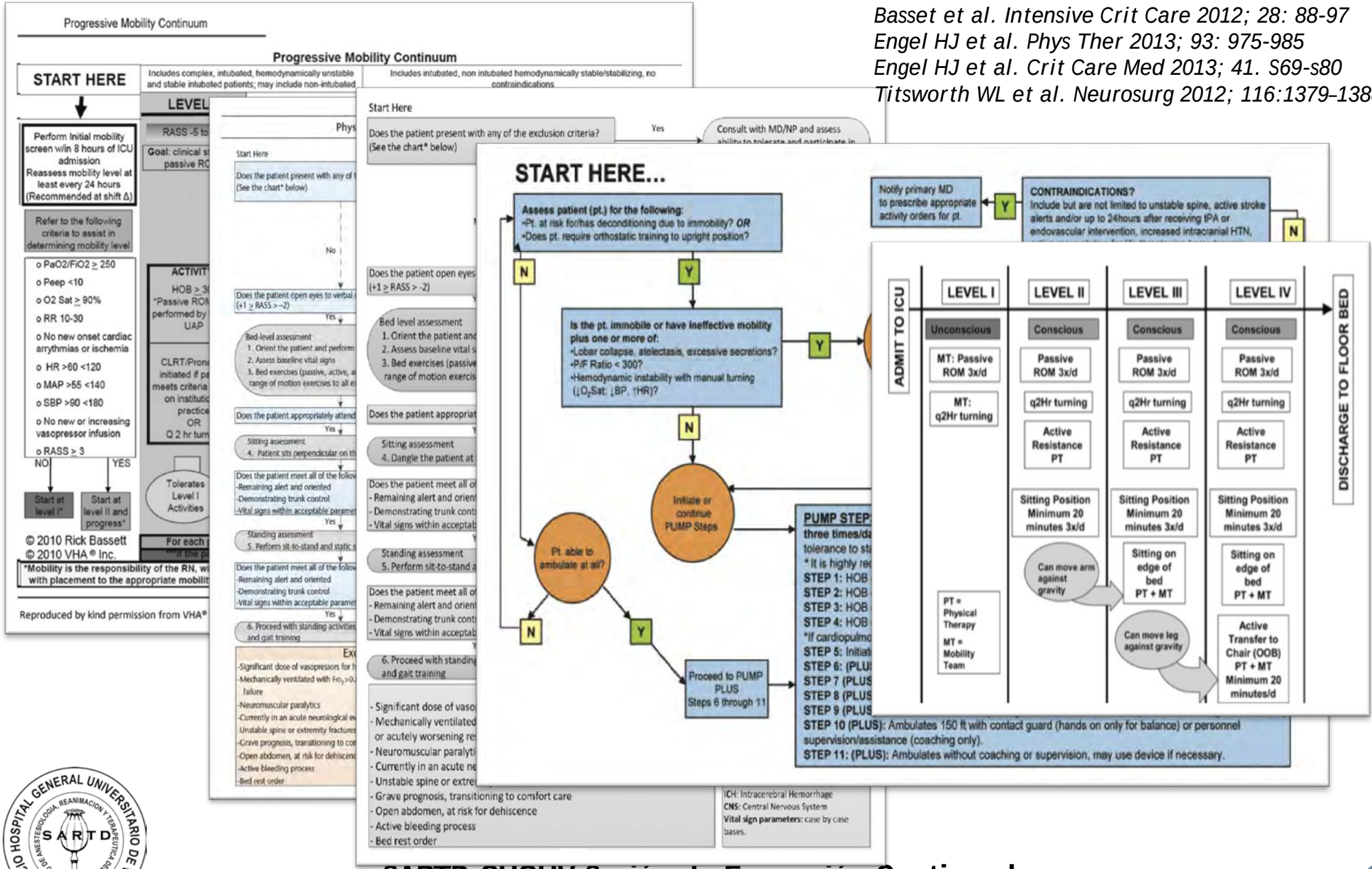

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Engel HJ et al. Phys Ther 2013; 93: 975-985
Engel HJ et al. Crit Care Med 2013; 41. S69-s80
Titsworth WL et al. Neurosurg 2012; 116:1379–1388

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Valencia 11 de Febrero de 2019

Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patients in the Intensive Care Unit

Barr J et al. Crit Care Med 2013; 14:263–306

d. Delirium prevention

i. We recommend performing early mobilization of adult ICU patients whenever feasible to reduce the incidence and duration of delirium (+1B).

Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU

Delvin JW et al. Crit Care Med 2018; 46:1532–1548

Immobility (rehabilitation/mobilization)				
For critically ill adults, is rehabilitation or mobilization (performed either in-bed or out-of-bed) beneficial in improving patient, family, or health system outcomes compared with usual care, a different rehabilitation/mobilization intervention, placebo, or sham intervention?	We suggest performing rehabilitation or mobilization in critically ill adults (conditional recommendation, low quality of evidence). Remarks: Rehabilitation is a "set of interventions designed to optimize functioning and reduce disability in individuals with a health condition." Mobilization is a type of intervention within rehabilitation that facilitates the movement of patients and expends energy with a goal of improving patient outcomes. This recommendation supports performing rehabilitation/mobilization interventions over usual care or similar interventions with a reduced duration, reduced frequency, or later onset. The implementation of this recommendation will be influenced by feasibility-related issues, particularly related to variability in the availability of appropriate staffing and resources to perform rehabilitation/mobilization interventions across ICUs.	Conditional	Low

¿A quién va destinada la MP?

- VM 48-72h
- Criterios exclusión (pacientes excluídos)
- Criterios estabilidad clínica
- Diferentes niveles
- Equipo multidisciplinar

Basset et al. Intensive Crit Care 2012; 28: 88-97
Engel HJ et al. Phys Ther 2013; 93: 975-985
Engel HJ et al. Crit Care Med 2013; 41. S69-s80
Titsworth WL et al. Neurosurg 2012; 116:1379–1388

Seguridad

Early activity is feasible and safe in respiratory failure patients*

Polly Bailey, RN, APRN; George E. Thomsen, MD; Vicki J. Spuhler, RN, MS; Robert Blair, PT; James Jewkes, PT; Louise Bezdjian, RN, BSN; Kristy Veale, RN, BSN; Larissa Rodriquez, AS; Ramona O. Hopkins, PhD

Bailey P. Crit Care Med 2007; 35: 139-145

Mobilizaciones activas

- Sedestación en cama
- Sedestación en silla
- Deambulación

14/1449 : 0,96% EA

Eventos adversos

- TAS > 200 mmHg / TAS < 90 mmHg
- Desaturación (<80%)
- Retirada accidental de dispositivos (catéteres, drenajes, sondas..)
- Extubaciones
- Caídas de rodil

Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults

Hodgson et al. Critical Care 2014; 18: 658 - 667

a

Cardiovascular Considerations	In-bed exercises	Out-of-bed exercises
Blood pressure		
Intravenous antihypertensive therapy for hypertensive emergency [a]	🔴	🔴
MAP [b]:		
Below target range and causing symptoms	🔺	🔴
Below target range despite support (vasoactive and/or mechanical)	🔺	🔴
Greater than lower limit of target range while receiving no support or low level support	🟢	🟢
Greater than lower limit of target range while receiving moderate level support	🔺	🔺
Greater than lower limit of target range on high level support	🔺	🔴
Known or suspected severe pulmonary hypertension	🔺	🔺
Cardiac arrhythmias		
Bradycardia:		
Requiring pharmacological treatment (e.g., isoprenaline) or awaiting emergency pacemaker insertion	🔴	🔴
Not requiring pharmacological treatment and not awaiting emergency pacemaker insertion	🔺	🔺
Transvenous or epicardial pacemaker:		
Dependent rhythm	🔺	🔴
Stable underlying rhythm	🟢	🟢

b

Any stable tachyarrhythmia:		
Ventricular rate >150 bpm	🔺	🔴
Ventricular rate 120 to 150 bpm	🔺	🔺
Any tachyarrhythmia with ventricular rate < 120 bpm	🟢	🟢
Devices		
Femoral IABP [c]	🟢	🔴
ECMO:		
Femoral [c] or subclavian (not single bicaval dual lumen cannulae)	🟢	🔴
Single bicaval dual lumen cannulae inserted into a central vein	🟢	🔺
Ventricular assist device	🟢	🟢
Pulmonary artery catheter or other continuous cardiac output monitoring device	🟢	🔺
Other cardiovascular considerations		
Shock of any cause with lactate >4mmol/L	🔺	🔺
Known or suspected acute DVT/PE	🔺	🔺
Known or suspected severe aortic stenosis	🟢	🔺
Cardiac ischemia (defined as ongoing chest pain and/or dynamic EKG changes)	🔺	🔴

IABP = intra-aortic balloon pump; ECMO = extracorporeal membrane oxygenation; bpm = beats per minute; MAP = mean arterial pressure; DVT = deep vein thrombosis; PE = pulmonary embolus.

[a] This may be a yellow (pause) for in-bed activities if the blood pressure is within target range as documented by the medical team.

[b] Experienced ICU practitioners were considered to have good judgment about the impact of cardiovascular instability and low, medium or high levels of hemodynamic support, on the ability to exercise. However, in the case of uncertainty or lack of experience, it is recommended that the decision to mobilize a patient is discussed with appropriate experienced ICU staff. The target mean arterial pressure is determined by the treating ICU team.

[c] Cycling and hip flexion may be contraindicated in the leg where the IABP/ECMO is inserted. If so, in-bed exercises may need to be modified to limit hip flexion.

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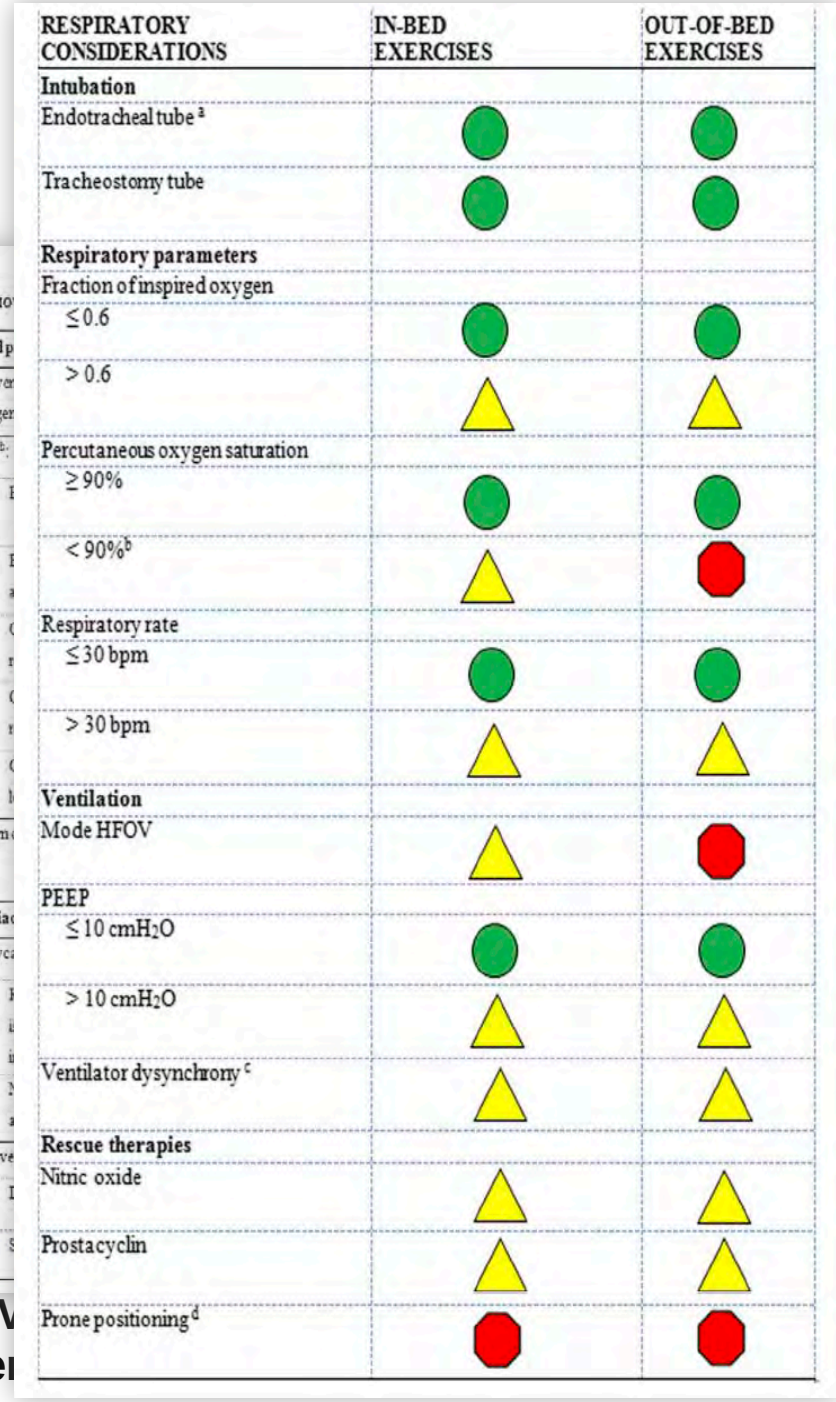

RESPIRATORY CONSIDERATIONS	IN-BED EXERCISES	OUT-OF-BED EXERCISES
Intubation		
Endotracheal tube [a]	●	●
Tracheostomy tube	●	●
Respiratory parameters		
Fraction of inspired oxygen		
≤ 0.6	●	●
> 0.6	▲	▲
Percutaneous oxygen saturation		
≥ 90%	●	●
< 90% [b]	▲	■
Respiratory rate		
≤ 30 bpm	●	●
> 30 bpm	▲	▲
Ventilation		
Mode HFOV	▲	■
PEEP		
≤ 10 cmH_2O	●	●
> 10 cmH_2O	▲	▲
Ventilator dysynchrony [c]	▲	▲
Rescue therapies		
Nitric oxide	▲	▲
Prostacyclin	▲	▲
Prone positioning [d]	■	■

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Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults

Hodgson et al. Critical Care 2014; 18: 658 - 667

NEUROLOGICAL CONSIDERATIONS	IN-BED EXERCISES	OUT-OF-BED EXERCISES
Level of consciousness		
Patient drowsy, calm or restless (e.g., RASS -1 to +1)	🟢	🟢
Patient lightly sedated or agitated (e.g., RASS -2 or +2)	🟡	🟡
Patient unrousable or deeply sedated (e.g., RASS <-2)	🟡	🔴
Patient very agitated or combative (e.g., RASS >+2)	🔴	🔴
Delirium		
Delirium tool (e.g., CAM-ICU) –ve	🟢	🟢
Delirium tool +ve and able to follow simple commands	🟢	🟡
Delirium tool +ve and not able to follow commands	🟡	🟡
Intracranial pressure		
Active management of intracranial hypertension, with ICP not in desired range	🔴	🔴
Intracranial pressure monitoring without active management of intracranial hypertension	🟢	🟡
Other neurological considerations		
Craniectomy	🟢	🟡
Open lumbar drain (not clamped)	🟢	🔴
Subgaleal drain	🟢	🟡
Spinal precautions (pre-clearance or fixation)	🔴	🔴
Acute spinal cord injury	🟢	🟡
Subarachnoid haemorrhage with unclipped aneurysm	🟢	🟡
Vasospasm post-aneurysmal clipping	🟢	🟡
Uncontrolled seizures	🔴	🔴

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Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults

Hodgson et al. Critical Care 2014; 18: 658 - 667

Other considerations	In-bed exercises	Out-of-bed exercises
Surgical		
Unstable/unstabilized major fracture Pelvic Spinal Lower limb long bone	▲	●
Large open surgical wound Chest/sternum[a] Abdomen[a]	●	●
Medical		
Known uncontrolled active bleeding	●	●
Suspicion of active bleeding or increased bleeding risk[b]	●	▲
Patient is febrile with a temperature exceeding acceptable maximum despite active physical or pharmacological cooling management	▲	▲
Active hypothermia management	▲	▲
Other considerations		
ICU-acquired weakness	●	●
Continuous renal replacement therapy (including femoral dialysis catheters)	●	●
Venous and arterial femoral catheters	●	●
Femoral sheaths	▲	●
All other drains and attachments, e.g., Nasogastric tube Central venous catheter Pleural drain Wound drain Intercostal catheter Urinary catheter	●	●

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Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults

Hodgson et al. Critical Care 2014; 18: 658 - 667

Other considerations	In-bed exercises	Out-of-bed exercises
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Suspicion of active bleeding or increased bleeding risk[b]	●	▲
Patient is febrile with a temperature exceeding acceptable maximum despite active physical or pharmacological cooling management	▲	▲
Active hypothermia management	▲	▲
Other considerations		
ICU-acquired weakness	●	●
Continuous renal replacement therapy (including femoral dialysis catheters)	●	●
Venous and arterial femoral catheters	●	●
Femoral sheaths	▲	●
All other drains and attachments, e.g., Nasogastric tube Central venous catheter Pleural drain Wound drain Intercostal catheter Urinary catheter	●	●

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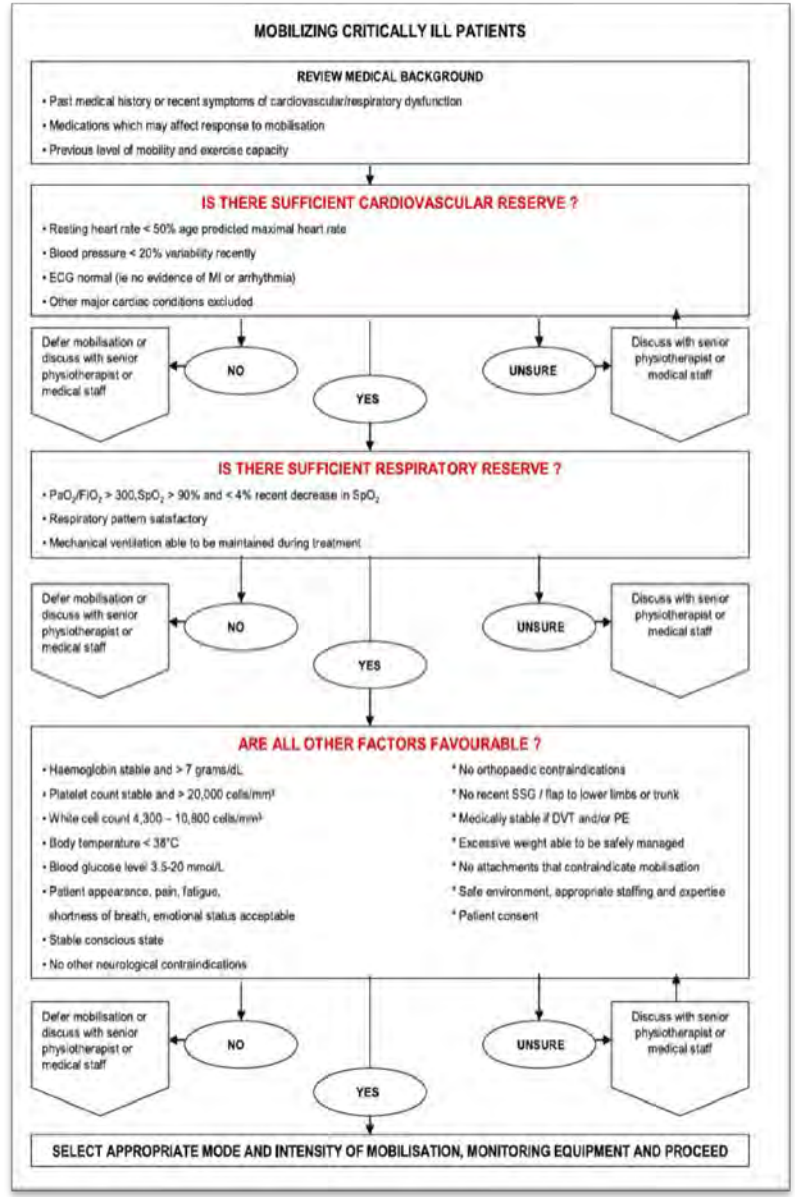
Viabilidad: Recursos humanos/ Recursos materiales

R. Gosselink
J. Bott
M. Johnson
E. Dean
S. Nava
M. Norrenberg
B. Schönhofer
K. Stiller
H. van de Leur
J. L. Vincent

Physiotherapy for adult patients with critical illness: recommendations of the European Respiratory Society and European Society of Intensive Care Medicine Task Force on Physiotherapy for Critically Ill Patients

Gosselink et al. ICM 2008; 34: 1188-1199



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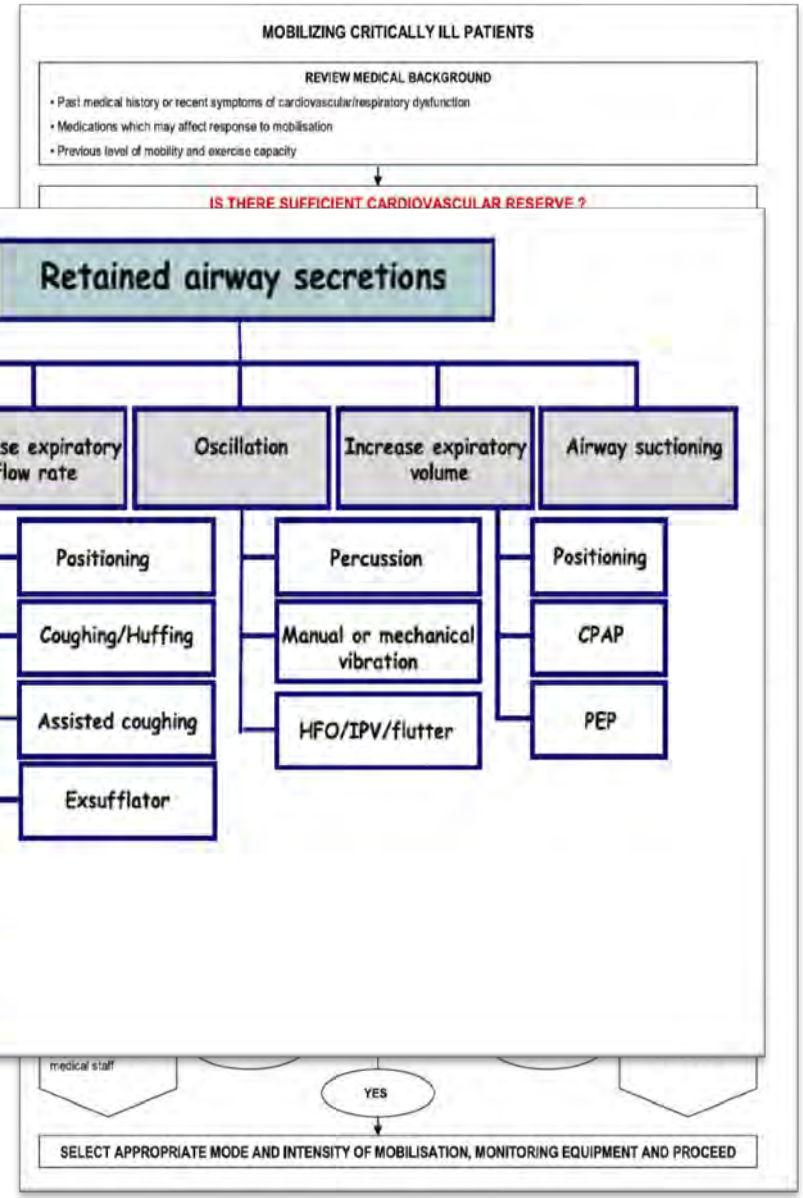

Gosselink et al. ICM 2008; 34: 1188-1199

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Physiotherapy in the intensive care unit: an evidence-based, expert driven, practical statement and rehabilitation recommendations

Sommers J et al. Clinical Rehabilitation 2015; 29: 1051-1063

It is recommended to screen every patient on the presence of red flags (contra-indications) and relative contra-indications to consider (possible) risks and benefits before and during every physiotherapy treatment session.
The criteria mentioned below are (relative) contra-indications for mobilizations out of bed and physical activities of intensive care patients and have to be taken into consideration during the clinical reasoning process.
An intensivist needs to be consulted in case of a patient showing one of the following conditions before mobilization /physical activities.
Red Flags (level 1)

ardial ischemia
40 and >130 beats/min

al Pressure (MAP) < 60 mmHg and > 110 mmHg

ion
ncentration of inspired oxygen (FiO_2) ≥ 0.6
Expiratory Pressure (PEEP): ≥ 10 cm H_2O

Frequency > 40 breath/min
of patient
gitation Sedation Scale (RASS) score: -4, -5, 3, 4

e doses
pamine ≥ 10 mcg/kg/min
r/adrenaline ≥ 0,1 mcg/kg/min

tions (level 3 and 4)

creased level of awareness/consciousness
eating
normal face color
in
tigue
ctures
lines that make mobilization unsafe.
instability: Intra Cranial Pressure (ICP) ≥ 20 cmH_2O

It is recommended to use these clinimetrics when needed to evaluate impairments and activities restrictions within the ICF classification.

rmities, bed sores, decubitus, wounds

SS; level 1)

l 4)
otion (ROM)

score (level 2)
trength (Jamar) if MRC score of 3 has been

)

ent (NSA) (level 4)

vel 4)

el 4)

Non-responsive and non-cooperative patient	Responsive and adequate patient
• RASS Score < -2 (level 2) • S5Q < 3 (level 4)	• RASS Score ≥ -2 (level 2) • S5Q≥ 3 (level 4)

Passive (Note 3)

- Passive Exercise (level 2)
  - Repetitions: 5 times/joint
  - Sets: 1
  - Frequency: Once daily
- Stretching (level 2)
  - Duration: 20 minutes
- Passive cycling (level 2)
  - Duration: 20 minutes
- EMS (level 1 and 2)
  - Duration: 60 minutes
  - Intensity: 45 Hz
  - Frequency: Daily
- CPM (level 2)
  - 3 x 3 hours daily
- Splinting (level 4)
  - Duration: 2 hours on and 2 hours off

Active (Note 3)

- Exercise Therapy (level 4)
  - Intensity: (level 4)
    - BORG 11 – 13
  - Duration: (level 4)
    - Repetitions: 8-10
  - Sets: 3 (level 4)
  - Frequency: 1-2 times daily (level 4)
  - Build up: (level 4)
    - Step 1: Increase duration
      - Increase repetitions to 10
    - Step 2: Increase number of sets
      - From 1 set to 3 sets
    - Step 3: Increase intensity
      - From Borg score 11 to 13
    - Step 4: Increase frequency
      - From once daily to twice daily
- ADL training: Balance, standing, walking (level 3)
- Out of bed mobilization (level 2)
- Cycling (level 2)
  - Duration: 20 minutes
  - Build up: Build up interval training towards 20 minutes

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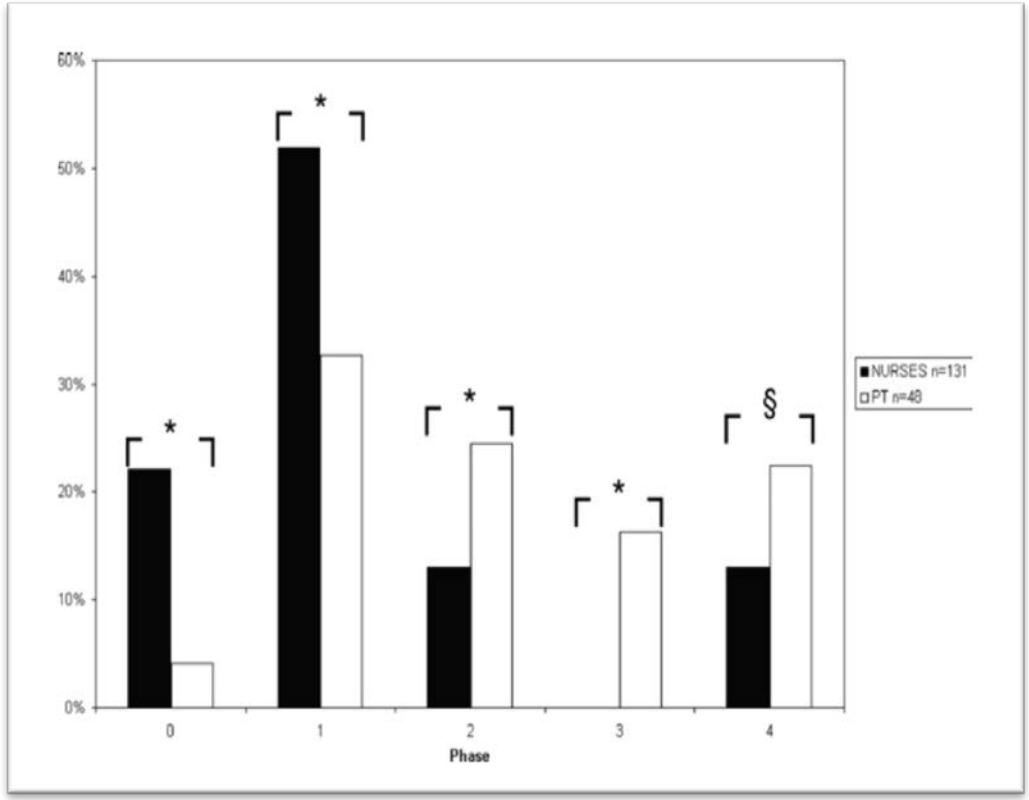
Early Mobilization in Critically Ill Patients: Patients' Mobilization Level Depends on Health Care Provider's Profession

Garzon Serrano J et al. PM R 2011;3:307-313



REVISIÓN

Fisioterapia en Unidades de Cuidados Intensivos

R. Fernández-Blanco[1], R. Corrochano Cardona[2], P. Raga Poveda[2]

[1]Servicio de Fisioterapia y Rehabilitación. Hospital Universitario Gregorio Marañón. Madrid. [2]Fisioterapia en Clínica privada.

Blanco-Fernández R et al. Rev Patol Resp 2017; 20:130-137

Conclusión

En los artículos analizados se pone de manifiesto que el tratamiento con fisioterapia se asocia a un número menor de infecciones respiratorias, un menor tiempo de extubación, una mortalidad más reducida y un menor número de días de ingreso en UCI, lo que supone un importante ahorro sanitario.

Los estudios analizados describieron en su mayoría tratamientos de fisioterapia respiratoria y de movilización; alguno también de electroestimulación y terapia cognitiva.

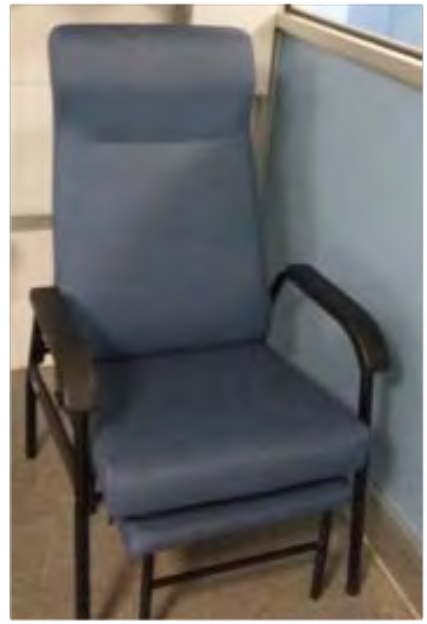
Además de su efectividad, la aplicación de tratamientos de Fisioterapia en UCI es segura, no provocando efectos adversos significativos. Es necesario seguir investigando en este campo y realizar estudios adicionales que avalen su empleo generalizado en las Unidades de Cuidados Intensivos.

EQUIPO MULTIDISCIPLINAR

Aux Enfermería
Celadores
Fisioterapeutas
Enfermeras
Intensivistas
Rehabilitadores

FAMILIA

RECURSOS MATERIALES



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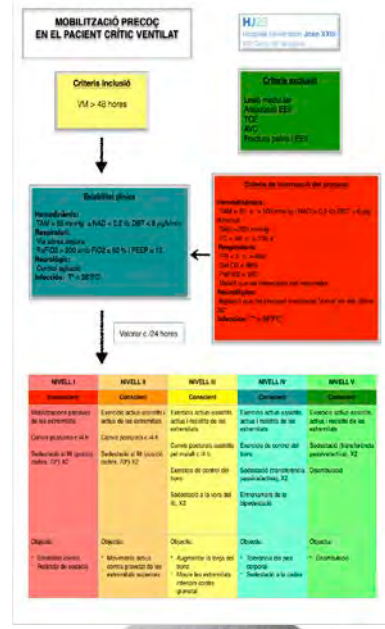
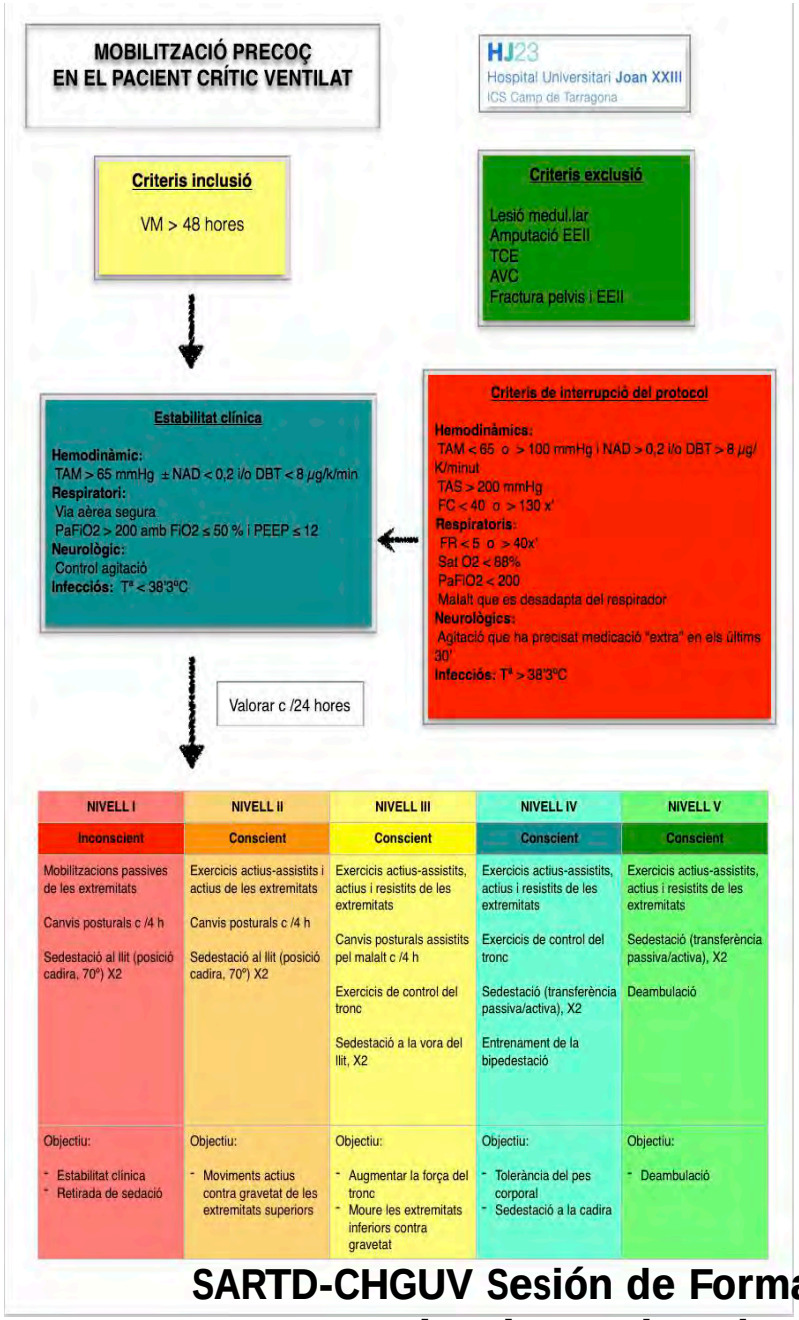
- ¿Tipo de intervención?
- ¿Frecuencia intervención?
- ¿Tiempo de la intervención?
- ¿Intensidad de la intervención?
- ¿Tipo de enfermo?
- ¿Heterogeneidad en *outcomes*
- ¿Tiempo de inicio ?
- ¿Qué entendemos por “usual care”?



PROTOCOLO MP



NIVELL I	NIVELL II	NIVELL III	NIVELL IV	NIVELL V
Inconscient	Conscient	Conscient	Conscient	Conscient
Mobilitzacions passives de les extremitats Canvis posturals c /4 h Sedestació al llit (posició cadira, 70º) X2	Exercicis actius-assistits i actius de les extremitats Canvis posturals c /4 h Sedestació al llit (posició cadira, 70º) X2	Exercicis actius-assistits, actius i resistits de les extremitats Canvis posturals assistits pel malalt c /4 h Exercicis de control del tronc Sedestació a la vora del llit, X2	Exercicis actius-assistits, actius i resistits de les extremitats Exercicis de control del tronc Sedestació (transferència passiva/activa), X2 Entrenament de la bipedestació	Exercicis actius-assistits, actius i resistits de les extremitats Sedestació (transferència passiva/activa), X2 Deambulació
Objectiu: - Estabilitat clínica - Retirada de sedació	Objectiu: - Moviments actius contra gravetat de les extremitats superiors	Objectiu: - Augmentar la força del tronc - Moure les extremitats inferiors contra gravetat	Objectiu: - Tolerància del pes corporal - Sedestació a la cadira	Objectiu: - Deambulació

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ICS Camp de Tarragona

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MOBILITZACIÓ PRECOÇ EN EL PACIENT CRÍTIC VENTILAT

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Criteris inclusió

VM > 48 hores

Criteris exclusió

Lesió medul.lar
Amputació EEII
TCE
AVC
Fractura pelvis i EEII

Estabilitat clínica

Hemodinàmic:
TAM > 65 mmHg ± NAD < 0,2 i/o DBT < 8 µg/k/min
Respiratori:
Via aèrea segura
PaFiO2 > 200 amb FiO2 ≤ 50 % i PEEP ≤ 12
Neurològic:
Control agitació
Infeccions: T⁴ < 38'3ºC

Criteris de interrupció del protocol

Hemodinàmics:
TAM < 65 o > 100 mmHg i NAD > 0,2 i/o DBT > 8 µg/K/minut
TAS > 200 mmHg
FC < 40 o > 130 x'
Respiratoris:
FR < 5 o > 40x'
Sat O2 < 88%
PaFiO2 < 200
Malalt que es desadapta del respirador
Neurològics:
Agitació que ha precisat medicació "extra" en els últims 30'
Infeccions: T⁴ > 38'3ºC

Valorar c /24 hores

NIVELL I	NIVELL II	NIVELL III	NIVELL IV	NIVELL V
Inconscient	**Conscient**	**Conscient**	**Conscient**	**Conscient**
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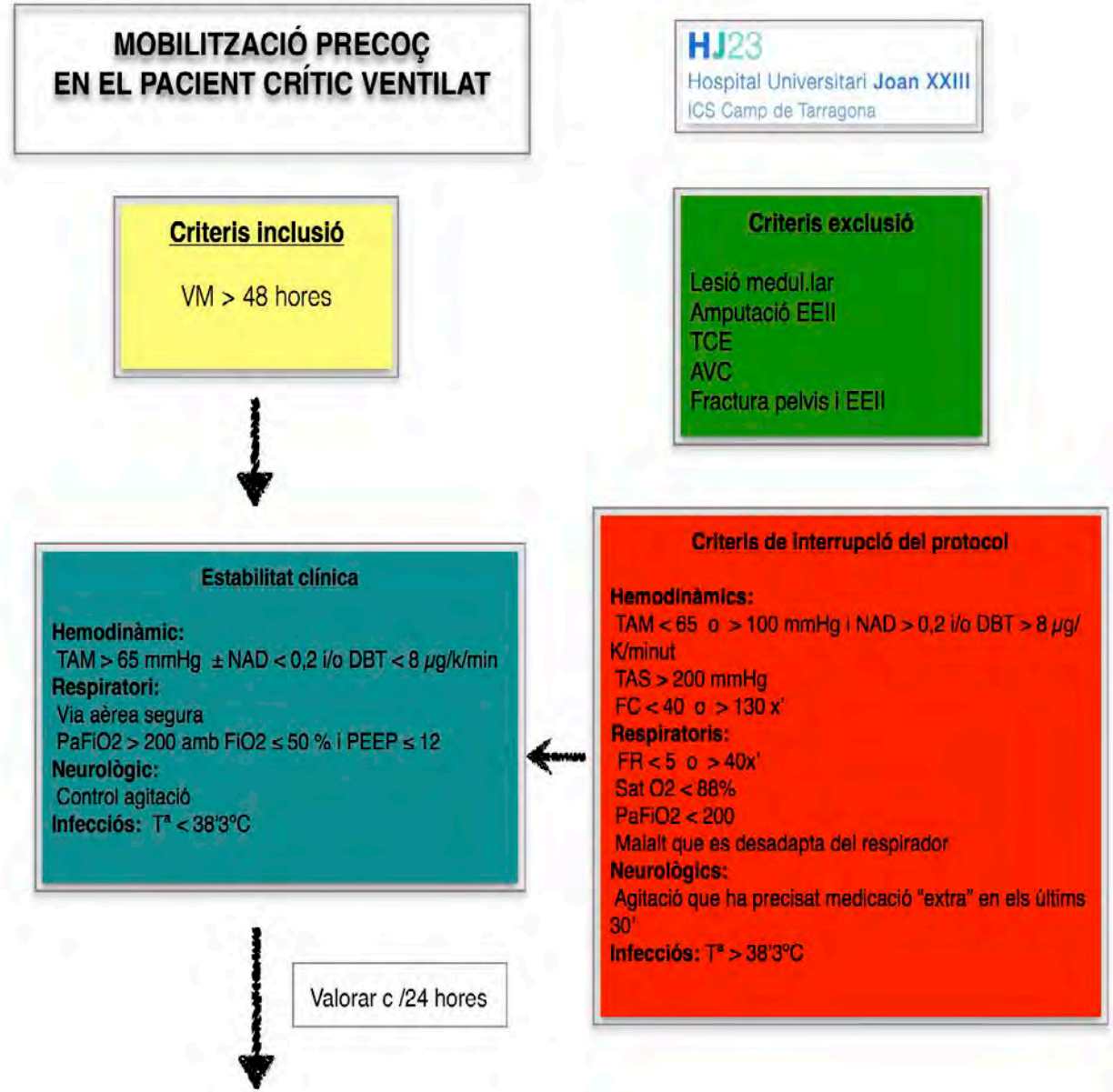
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NIVELL I

Inconscient

Mobilitzacions passives de les extremitats

Canvis posturals c /4 h

Sedestació al llit (posició cadira, 70º) X2

Objectiu:

- Estabilitat clínica
- Retirada de sedació

NIVELL I

Inconscient

Mobilitzacions passives de les extremitats

Canvis posturals c /4 h

Sedestació al llit (posició cadira, 70º) X2

Objectiu:

- Estabilitat clínica
- Retirada de sedació

NIVELL I

Inconscient

Mobilitzacions passives de les extremitats

Canvis posturals c /4 h

Sedestació al llit (posició cadira, 70º) X2

Objectiu:

- Estabilitat clínica
- Retirada de sedació

NIVELL I

Inconscient

Mobilitzacions passives de les extremitats

Canvis posturals c /4 h

Sedestació al llit (posició cadira, 70º) X2

Objectiu:

- Estabilitat clínica
- Retirada de sedació

NIVELL II

Conscient

Exercicis actius-assistits i actius de les extremitats

Canvis posturals c /4 h

Sedestació al llit (posició cadira, 70º) X2

Objectiu:

- Moviments actius contra gravetat de les extremitats superiors

DEBILIDAD MUSCULAR ADQUIRIDA EN LA UCI

Intensive Care Unit–Acquired Weakness

Table 1.
Medical Research Council Scoring System[13]

Strength of Muscle Groups for the Following Motions:	Strength Grades
Shoulder abduction	5=normal muscle strength/power
Elbow flexion	4=active movement against gravity with resistance
Wrist extension	3=active movement against gravity
Hip flexion	2=active movement with gravity eliminated
Knee extension	1=flicker/trace muscle contraction
Ankle dorsiflexion	0=no active muscle contraction

De Jonghe B. JAMA 2002; 288:2859-67

0 to 60 scale
Bilateral
≤ 48 sumscore = ICUAW

- Estiramento articular y muscular
- Aumenta la resistencia
- Entrenamiento vestibular
- Expansión pulmonar
- Clearence secreciones
- Mejora la movilidad GI
- Orientación

NIVELL III

Conscient

Exercicis actius-assistits, actius i resistits de les extremitats

Canvis posturals assistits pel malalt c /4 h

Exercicis de control del tronc

Sedestació a la vora del llit, X2

Objectiu:

- Augmentar la força del tronc
- Moure les extremitats inferiors contra gravetat

NIVELL IV

Conscient

Exercicis actius-assistits, actius i resistits de les extremitats

Exercicis de control del tronc

Sedestació (transferència passiva/activa), X2

Entrenament de la bipedestació

Objectiu:

- Tolerància del pes corporal
- Sedestació a la cadira

NIVELL IV

Conscient

Exercicis actius-assistits, actius i resistits de les extremitats

Exercicis de control del tronc

Sedestació (transferència passiva/activa), X2

Entrenament de la bipedestació

Objectiu:

- Tolerància del pes corporal
- Sedestació a la cadira

NIVELL V

Conscient

Exercicis actius-assistits, actius i resistits de les extremitats

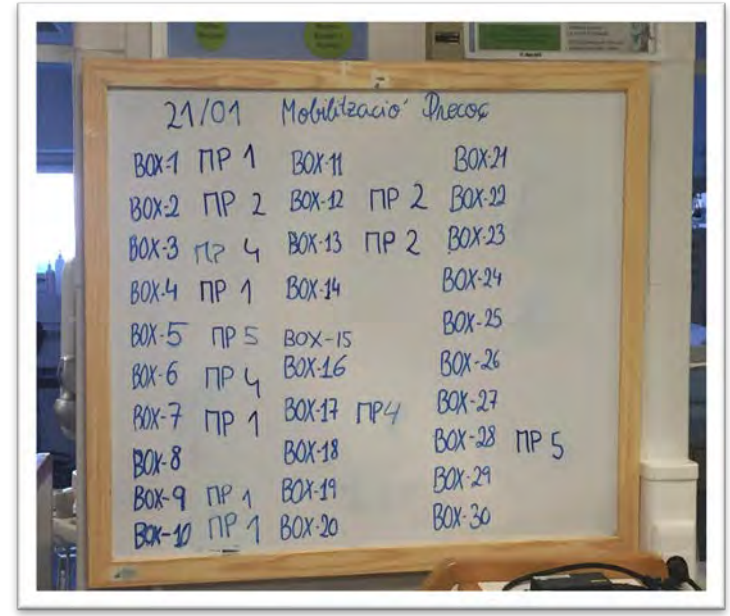
Sedestació (transferència passiva/activa), X2

Deambulació

Objectiu:

- Deambulació

CAMBIO DE GUARDIA CON PRESENCIA DEL FISIOTERAPEUTA



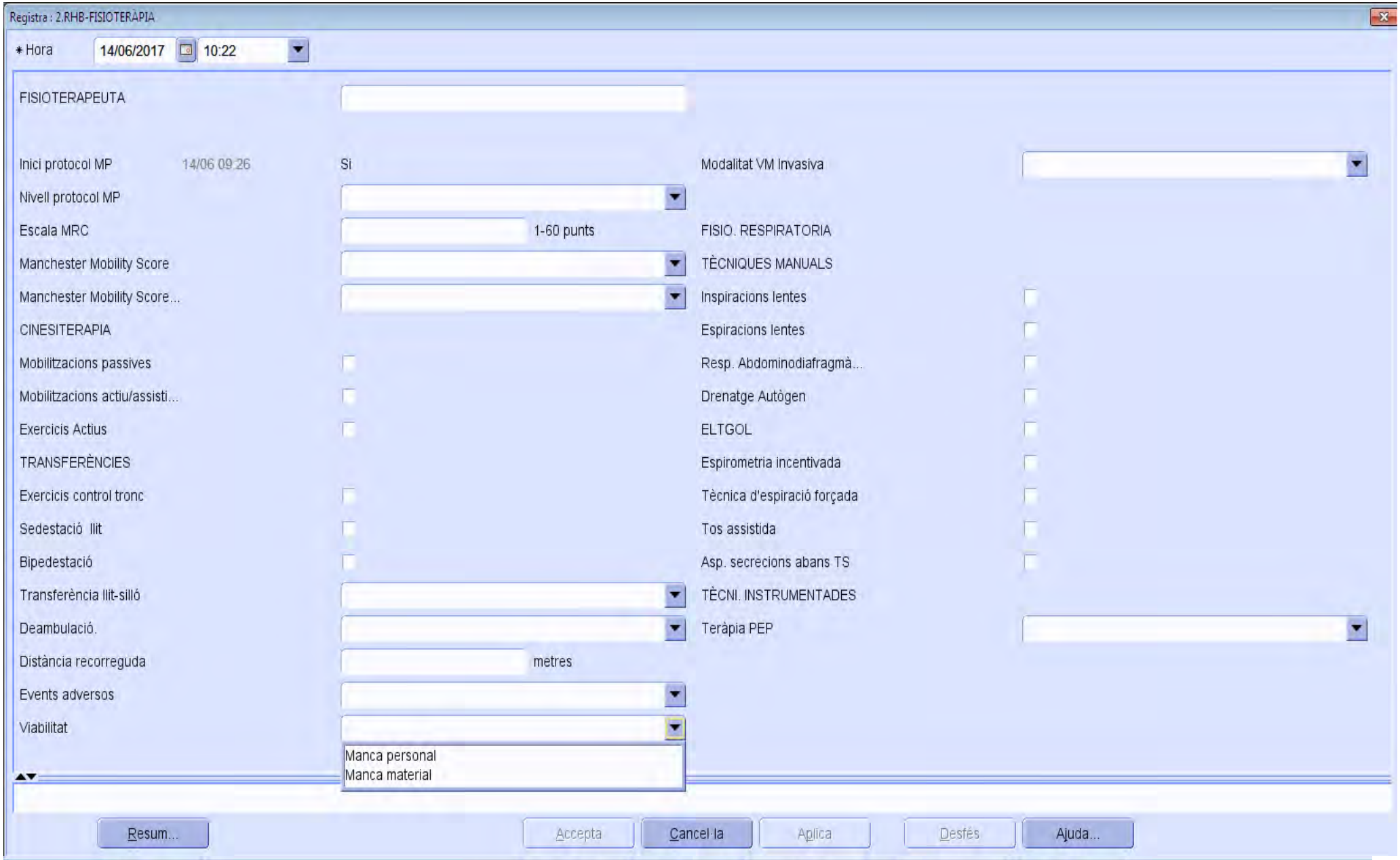
- VALORACIÓN CONJUNTA PACIENTES INCLUÍDOS

  - CAMBIO NIVEL

  - INTERRUPCIÓN DEL PROTOCOLO

- VALORACIÓN NUEVOS PACIENTES CANDIDATOS A MP

  - INTERCONSULTA A REHABILITACIÓN


Registra : 2.RHB-FISIOTERÀPIA
* Hora
14/06/2017
10:22
FISIOTERAPEUTA
Inici protocol MP
14/06 09:26
Si
Nivell protocol MP
Escala MRC
1-60 punts
Manchester Mobility Score
Manchester Mobility Score...
CINESITERAPIA
Mobilitzacions passives
Mobilitzacions actiu/assisti...
Exercicis Actius
TRANSFERÈNCIES
Exercicis control tronc
Sedestació llit
Bipedestació
Transferència llit-silló
Deambulació.
Distància recorreguda
metres
Events adversos
Viabilitat
Manca personal
Manca material
Modalitat VM Invasiva
FISIO. RESPIRATORIA
TÈCNIQUES MANUALS
Inspiracions lentes
Espiracions lentes
Resp. Abdominodiafragmà...
Drenatge Autògen
ELTGOL
Espirometria incentivada
Tècnica d'espiració forçada
Tos assistida
Asp. secrecions abans TS
TÈCNI. INSTRUMENTADES
Teràpia PEP
Resum...
Accepta
Cancel·la
Aplica
Desfés
Ajuda...

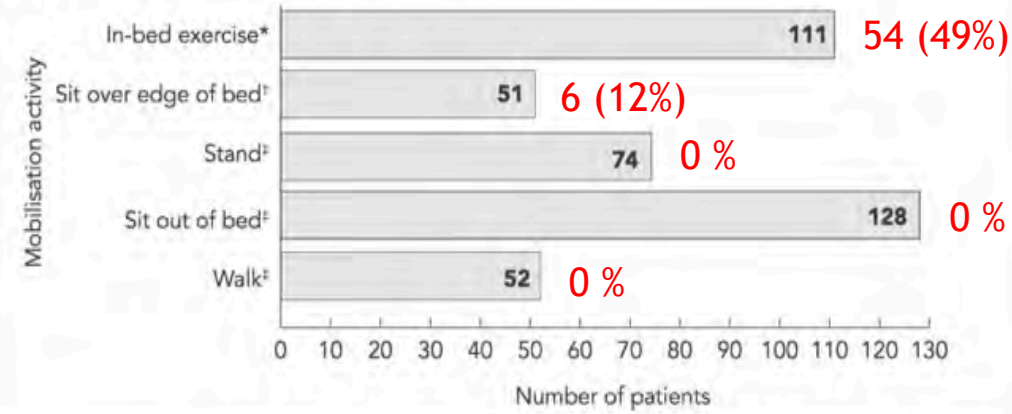
Práctica clínica habitual/ Barreras

Intensive care unit mobility practices in Australia and New Zealand: a point prevalence study

Susan C Berney, Megan Harrold, Steven A Webb, Ian Seppelt, Shane Patman, Peter J Thomas and Linda Denehy

Berney SC, Crit Care Resusc 2013; 15: 260–265

Figure 3. Frequency of mobilisation activities undertaken by patients in the intensive care unit for > 48 hours



MV = mechanical ventilation. * Fifty-four patients of 111 (49%) were on MV. † Six patients of 51 (12%) were on MV. ‡ No patient on MV stood, sat out of bed or walked.

Early Mobilization of Mechanically Ventilated Patients: A 1-Day Point-Prevalence Study in Germany*

Peter Nydahl, RN, BScN[1]; A. Parker Ruhl, MD[2,3]; Gabriele Bartoszek, MSc[4]; Rolf Dubb, BSc, CCRN[5]; Silke Filipovic, BSc[6]; Hans-Jürgen Flohr, RN, CCRN[7]; Arnold Kaltwasser, BSc, CCRN[8]; Hendrik Mende, MD[9]; Oliver Rothaug, BSc, CCRN[10]; Danny Schuchhardt, RN[11]; Norbert Schwabbauer[12]; Dale M. Needham, FCA, MD, PhD[2,13]

TABLE 3. Highest Level of Mobilization Achieved on Study Day

Level of Mobilization	Total ($n = 775$) (%)[a]	Airway Type[a]		
		Endotracheal Tube ($n = 401$) (%)[b]	Tracheostomy ($n = 308$) (%)[c]	Noninvasive Ventilation ($n = 66$) (%)
Remaining in bed[d]	590 (76)	370 (92)	189 (61)	31 (47)
No mobilization	81 (11)	61 (15)	18 (6)	2 (3)
Turning in bed	342 (44)	224 (56)	110 (36)	8 (12)
Sitting in bed	167 (22)	85 (21)	61 (20)	21 (32)
Mobilized out of bed[d]	185 (24)	31 (8)	119 (39)	35 (53)
Sitting on edge of bed	73 (9)	22 (6)	41 (13)	10 (15)
Sitting in a chair	76 (10)	8 (2)	52 (17)	16 (24)
Standing out of bed	18 (2)	0 (0)	14 (4)	4 (6)
Marching in place	8 (1)	1 (0)	5 (2)	2 (3)
Walking	10 (1)	0 (0)	7 (2)	3 (4)

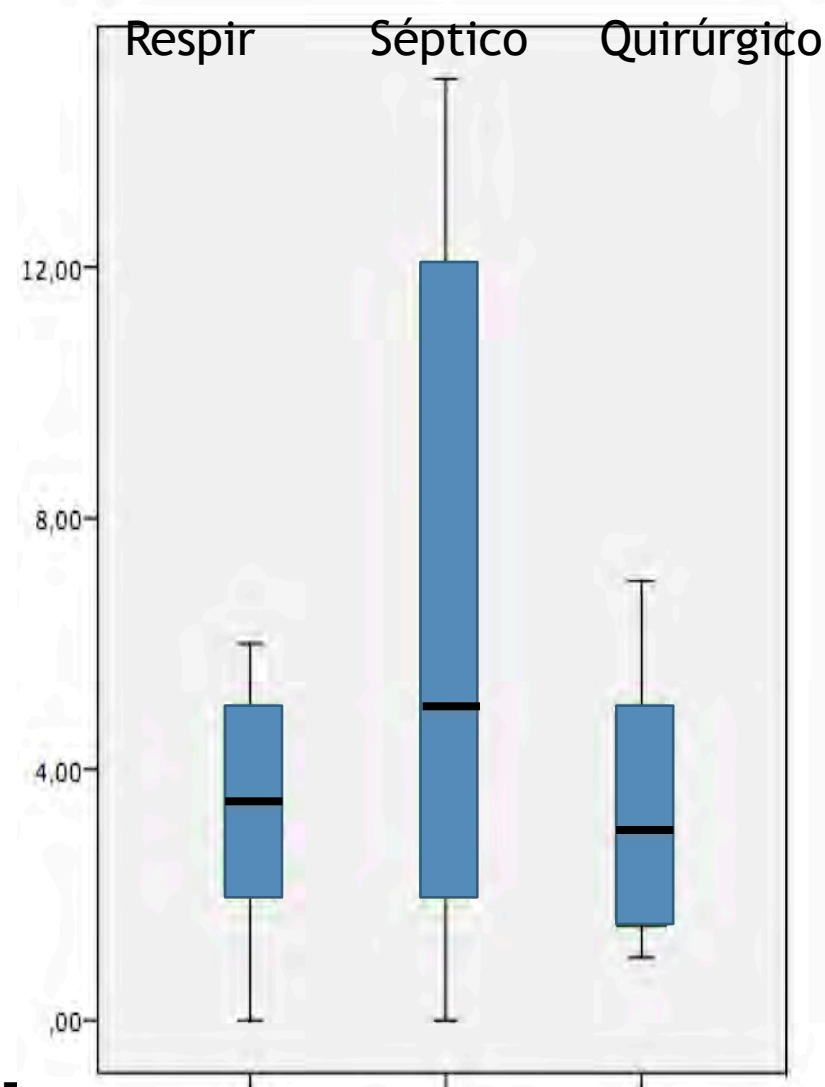
p < 0,001

4 %

Nydahl P, Crit Care Med 2014; 32: 1178-1186

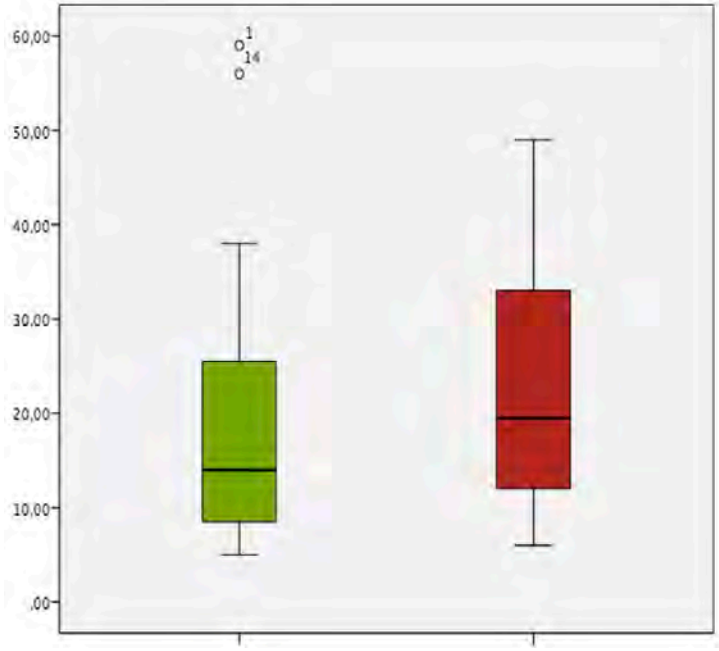
RESULTADOS

DÍA INICIO MP



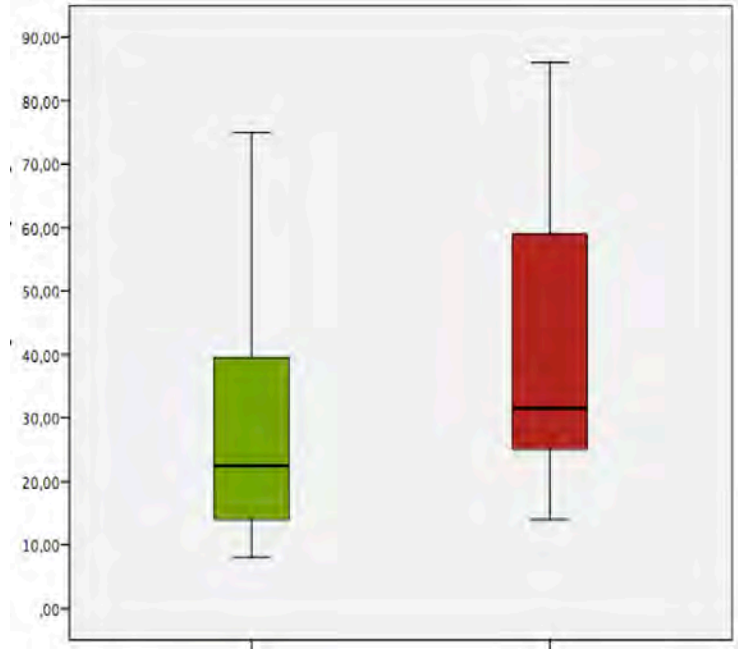
N = 24

ESTANCIA UCI



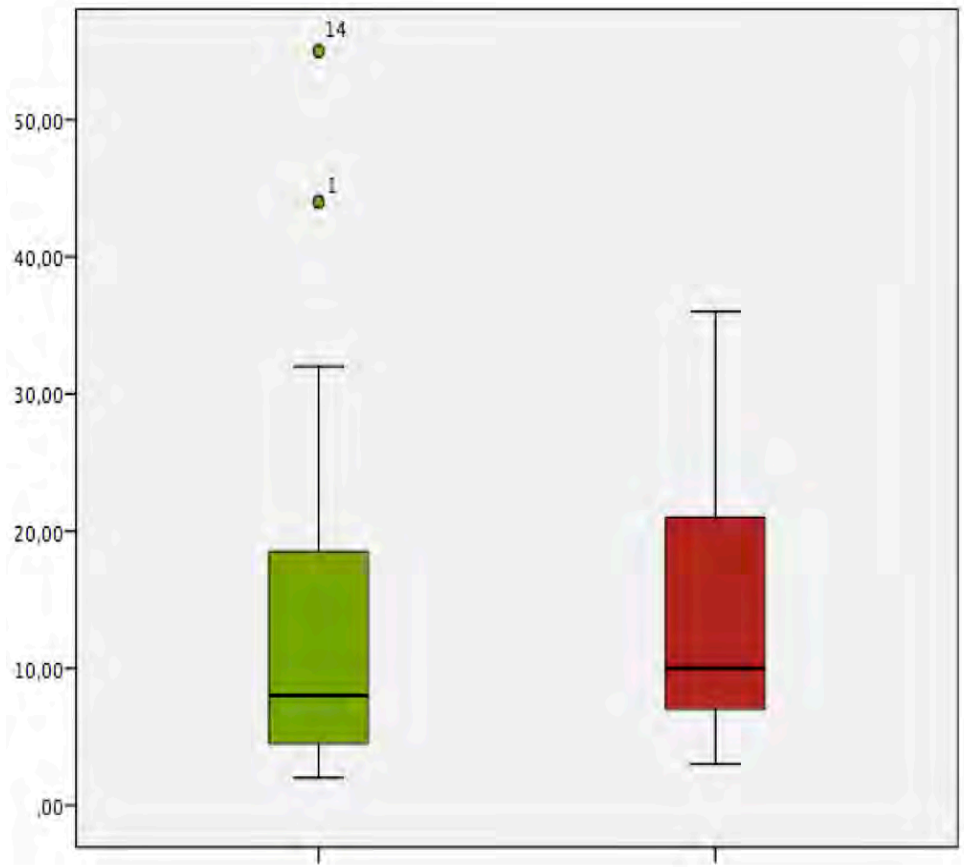
p < 0,88

ESTANCIA HOSPITALARIA



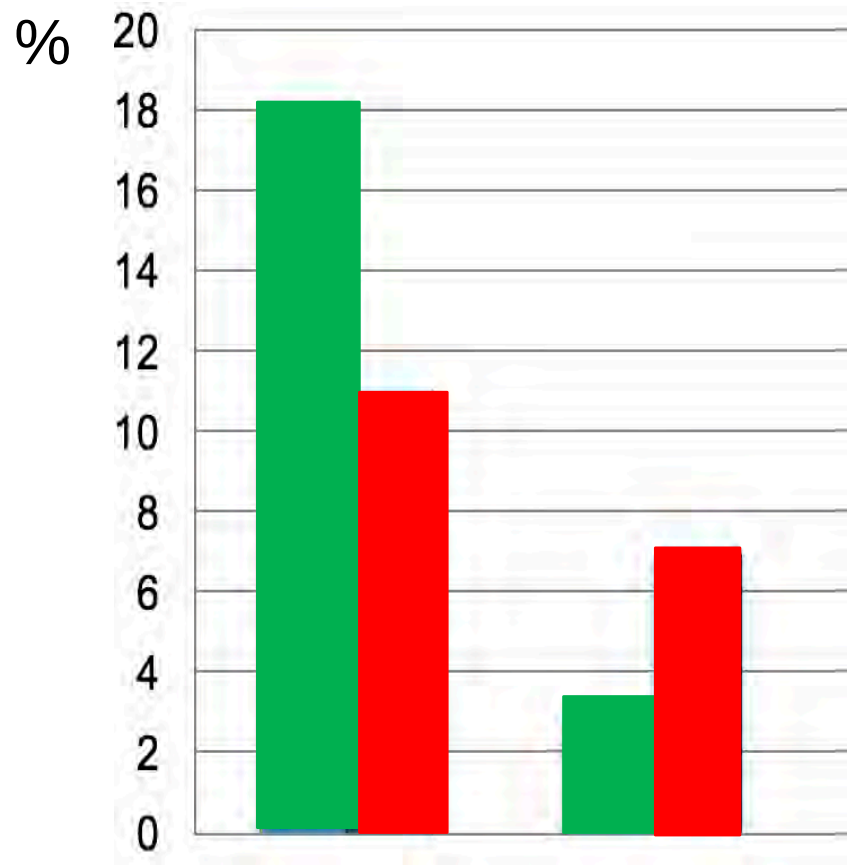
p < 0,73

DÍAS DE VM



$p < 0,07$

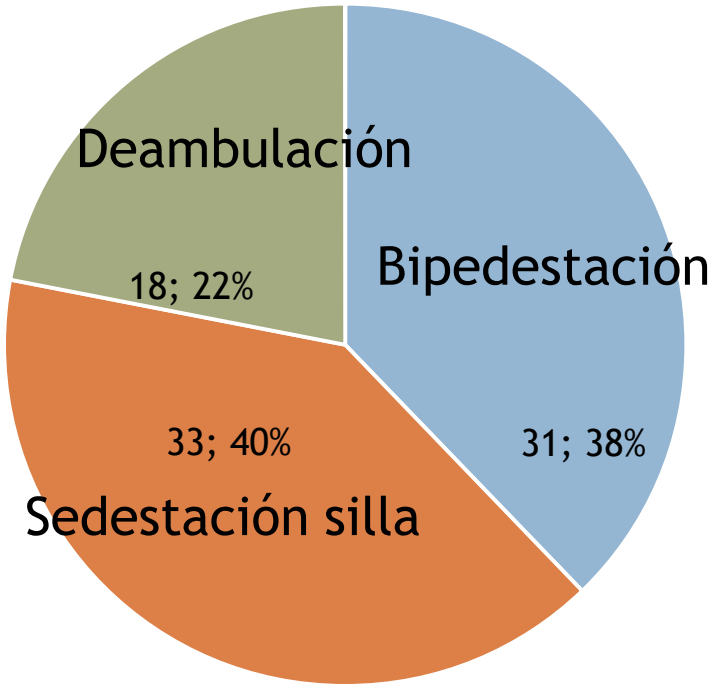
DESTINO AL ALTA



p < 0,036

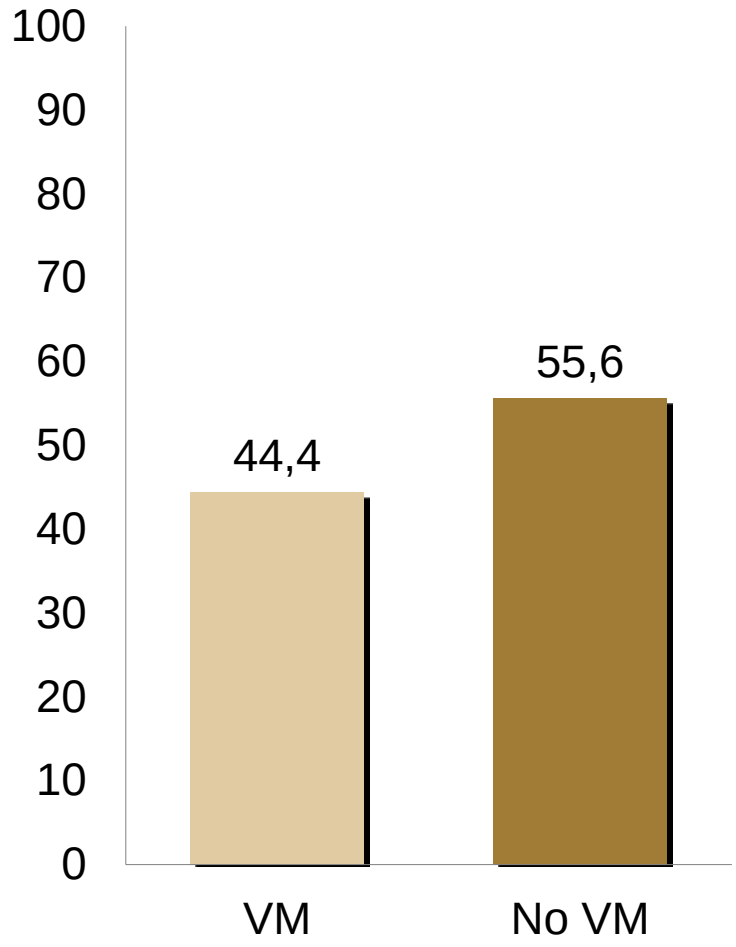
SEGURIDAD

Movilizaciones activas: 82



Evento adverso: 1 desaturación (1,2%)

DEAMBULACIONES (%):



Distancia media recorrida: **75.7metros**

La MP en UCI necesita…

Delvin JW et al. Crit Care Med 2018; 46:1532–1548

- Encontrar defensores y partidarios de la MP
- Creación equipo multidisciplinar:
  - Establecer directrices
  - Formación transversal
  - Promoción
  - Detección barreras
- Ver es creer
- Empezar por un caso fácil