Hôpital du Valais
Spital Wallis

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Bienvenue au
4e Symposium Séduno-Fribourgeois
de Médecine Intensive

Sponsorisé par :

Baxter

Edwards

HAMILTON MEDICAL

LÖWENSTEIN medical

MSD INVENTING

Nestlé HealthScience

OrPha Swiss

ORION PHARMA

Hôpital du Valais
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PADIS

Symposium Sion - Fribourg

11.11.2022

Dr Th.Bonjour

Plan

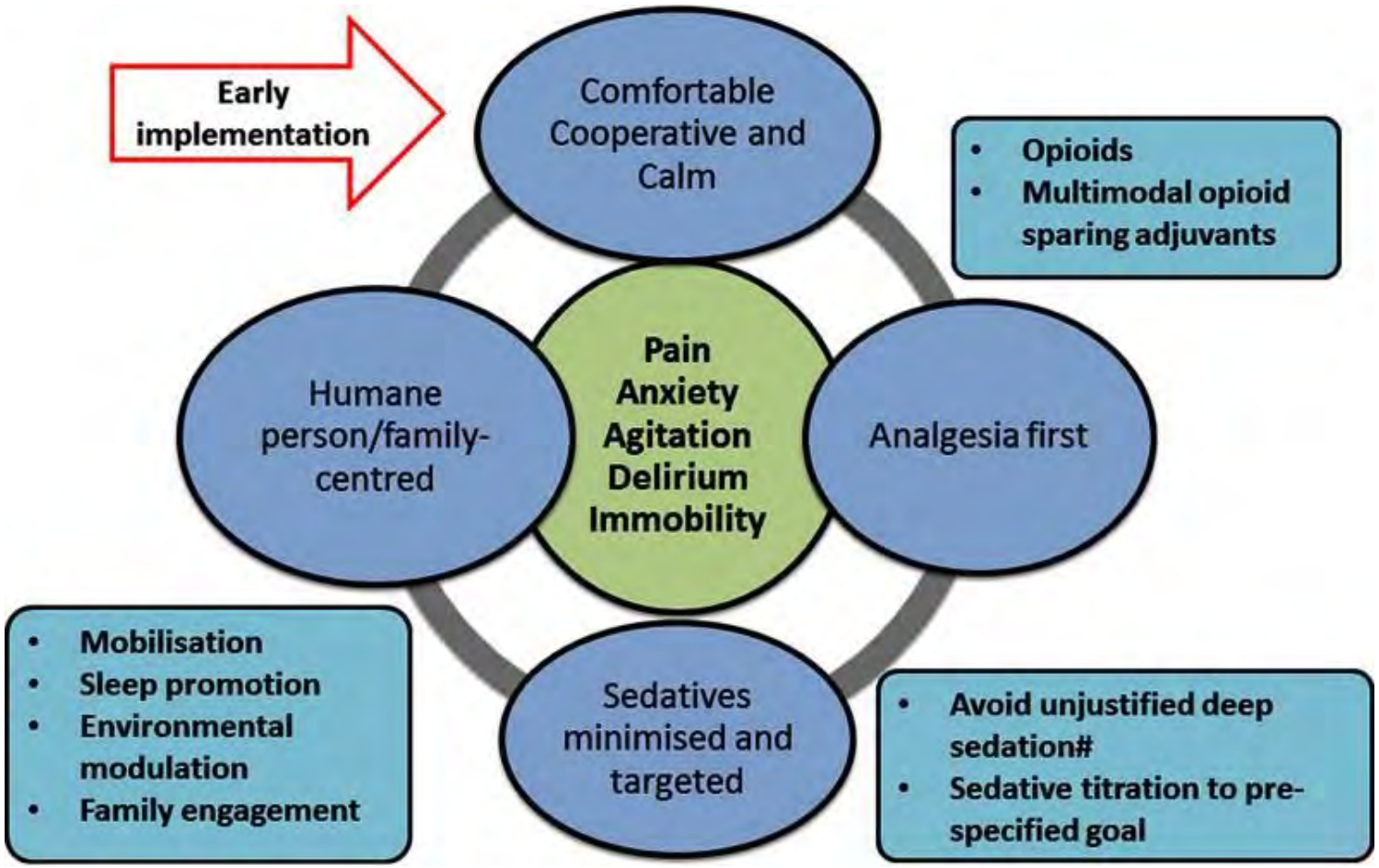
1. Concept global (e-CASH, PAD, PADIS)
2. Douleur et analgésie (P)
3. Agitation et sédation (A)
4. Délirium (D)
5. Immobilité (I)
6. Sommeil (S)
7. Protocole Sédunois

Concept global

REVIEW

Comfort and patient-centred care without excessive sedation: the eCASH concept

Jean-Louis Vincent[1*], Yahya Shehabi[2], Timothy S. Walsh[3], Pratik P. Pandharipande[4], Jonathan A. Ball[5], Peter Spronk[6], Dan Longrois[7], Thomas Strøm[8], Giorgio Conti[9], Georg-Christian Funk[10], Rafael Badenes[11], Jean Mantz[12], Claudia Spies[13] and Jukka Takala[14]



Intensive Care Med (2016) 42:962–971

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

Juliana Barr, MD, FCCM[1]; Gilles L. Fraser, PharmD, FCCM[2]; Kathleen Puntillo, RN, PhD, FAAN, FCCM[3]; E. Wesley Ely, MD, MPH, FACP, FCCM[4]; Céline Gélinas, RN, PhD[5]; Joseph F. Dasta, MSc, FCCM, FCCP[6]; Judy E. Davidson, DNP, RN[7]; John W. Devlin, PharmD, FCCM, FCCP[8]; John P. Kress, MD[9];

Pain | Agitation | Delirium

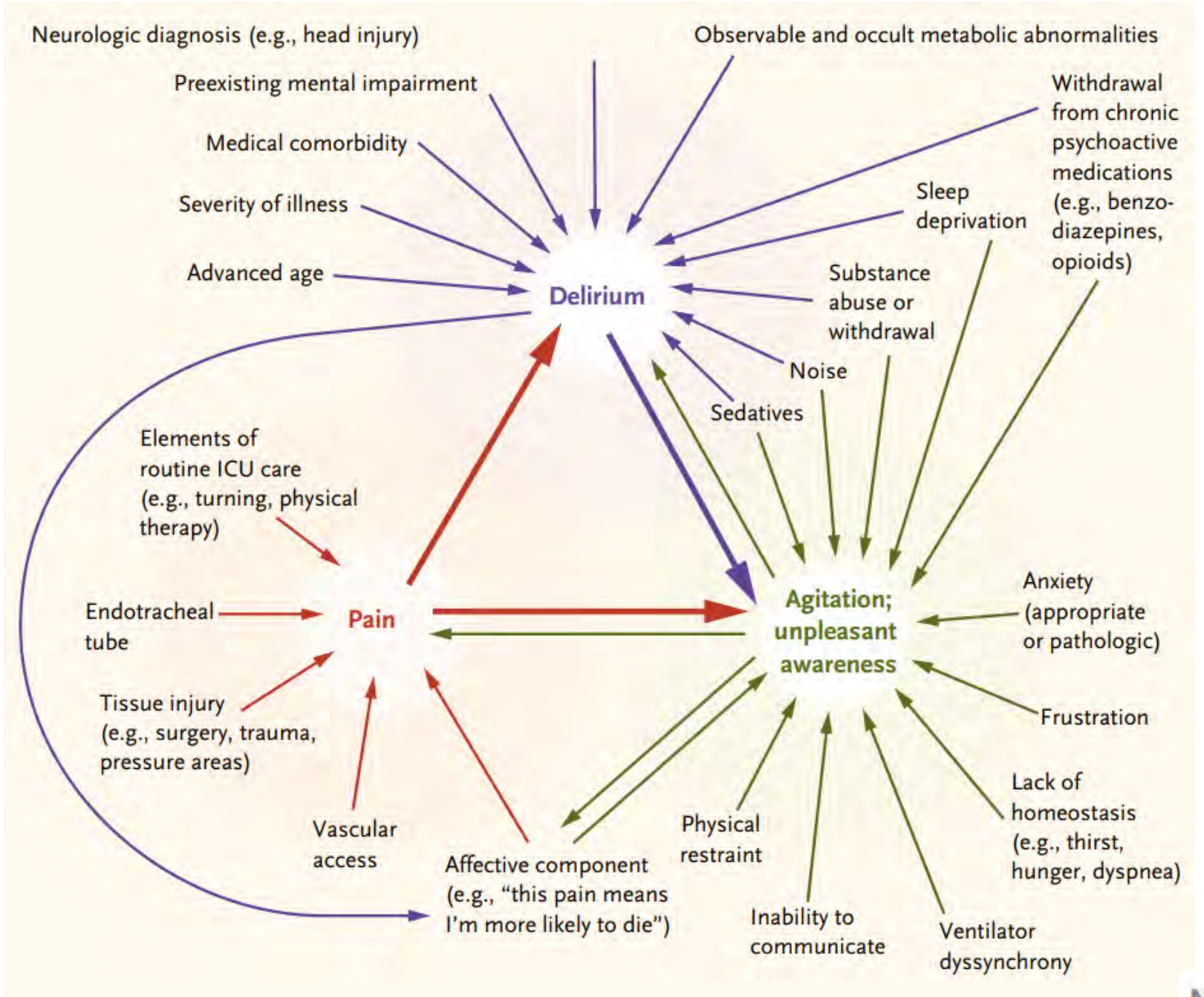
Barr J, et al. Crit Care Med 2013

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

John W. Devlin, PharmD, FCCM (Chair)[1,2]; Yoanna Skrobik, MD, FRCP(c), MSc, FCCM (Vice-Chair)[3,4]; Céline Gélinas, RN, PhD[5]; Dale M. Needham, MD, PhD[6]; Arien J. C. Slooter, MD, PhD[7]; Pratik P. Pandharipande, MD, MSCI, FCCM[8]; Paula L. Watson, MD[9]; Gerald L. Weinhouse, MD[10];

Pain | Agitation | Delirium | Immobility | Sleep

Devlin JW, et al. Crit Care Med 2018



N Engl J Med 2014;370:444-54.

Douleur et analgésie (P)

Définition : International Association for the Study of pain (IASP 1994)

«*expérience sensorielle et émotionnelle désagréable, associée ou non à des lésions réelles ou potentielles, ou décrites en des termes évoquant de telles lésions*»

Effets généraux de la douleur

- Anxiété
- Manque de sommeil
- Delirium
- Réponses de stress ↑ (cortisol, résistance à l'insuline, catabolisme)
- VO_2 ↑
- Complications respiratoires par diminution de la CV et de la toux (atélectasies, mauvais drainage de secrétions)
- Diminution du péristaltisme par augmentation du tonus sympathique (iléus)
- Rétention urinaire
- Immobilité -> stase veineuse

Objectifs analgo-sédation

- Permettre la ventilation mécanique
- Permettre la réalisation de gestes/procédures
- Diminution dyspnée
- Diminution de la VO_2
- Anxiolyse, antalgie et amnésie

Good practice statement

Managment of pain for adult ICU patients should be guided by routine pain assessment and pain should be treated before a sedative agent is considered

Devlin JW, et al. Crit Care Med 2018

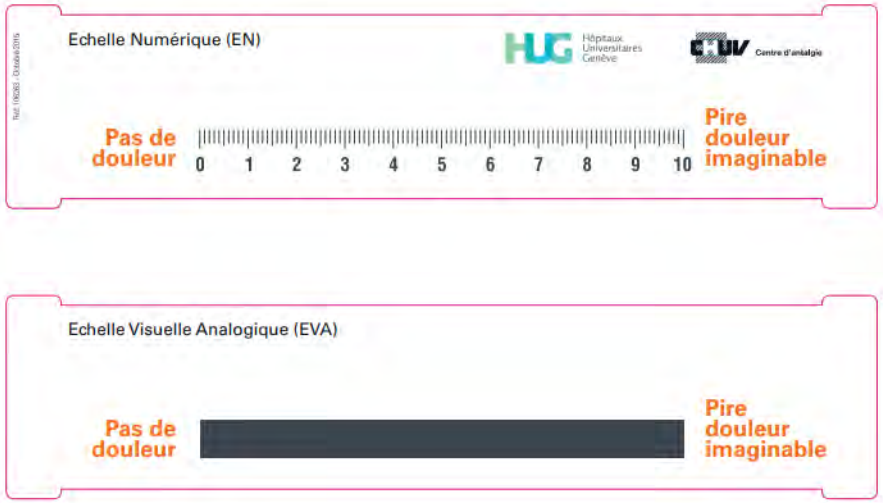


Table 1 Description of the Critical-Care Pain Observation Tool

Indicator	Description	Score	
Facial expression	No muscular tension observed	Relaxed, neutral	0
	Presence of frowning, brow lowering, orbit tightening, and levator contraction	Tense	1
	All of the above facial movements plus eyelid tightly closed	Grimacing	2
Body movements	Does not move at all (does not necessarily mean absence of pain)	Absence of movements	0
	Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements	Protection	1
	Pulling tube, attempting to sit up, moving limbs/ thrashing, not following commands, striking at staff, trying to climb out of bed	Restlessness	2
Muscle tension Evaluation by passive flexion and extension of upper extremities	No resistance to passive movements	Relaxed	0
	Resistance to passive movements	Tense, rigid	1
	Strong resistance to passive movements, inability to complete them	Very tense or rigid	2
Compliance with the ventilator (intubated patients)	Alarms not activated, easy ventilation	Tolerating ventilator or movement	0
	Alarms stop spontaneously	Coughing but tolerating	1
	Asynchrony: blocking ventilation, alarms frequently activated	Fighting ventilator	2
OR			
Vocalization (extubated patients)	Talking in normal tone or no sound	Talking in normal tone or no sound	0
	Sighing, moaning	Sighing, moaning	1
	Crying out, sobbing	Crying out, sobbing	2
Total, range			0-8

Gelinas C et al. 2006 PMID16823021

Demi-vie contextuelle (fentanyl, sufentanyl)

- **<u>Dose unique</u> :** ½-vie effective courte car redistribution rapide notamment dans le tissu adipeux
- **<u>Perfusion continue</u> :** pas de redistribution car tissu adipeux saturé -> ½-vie ↑↑↑

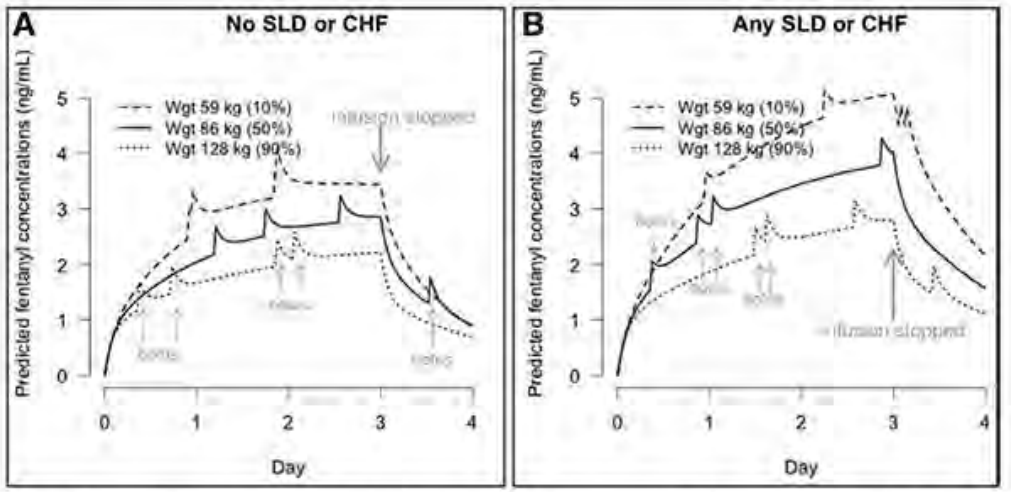
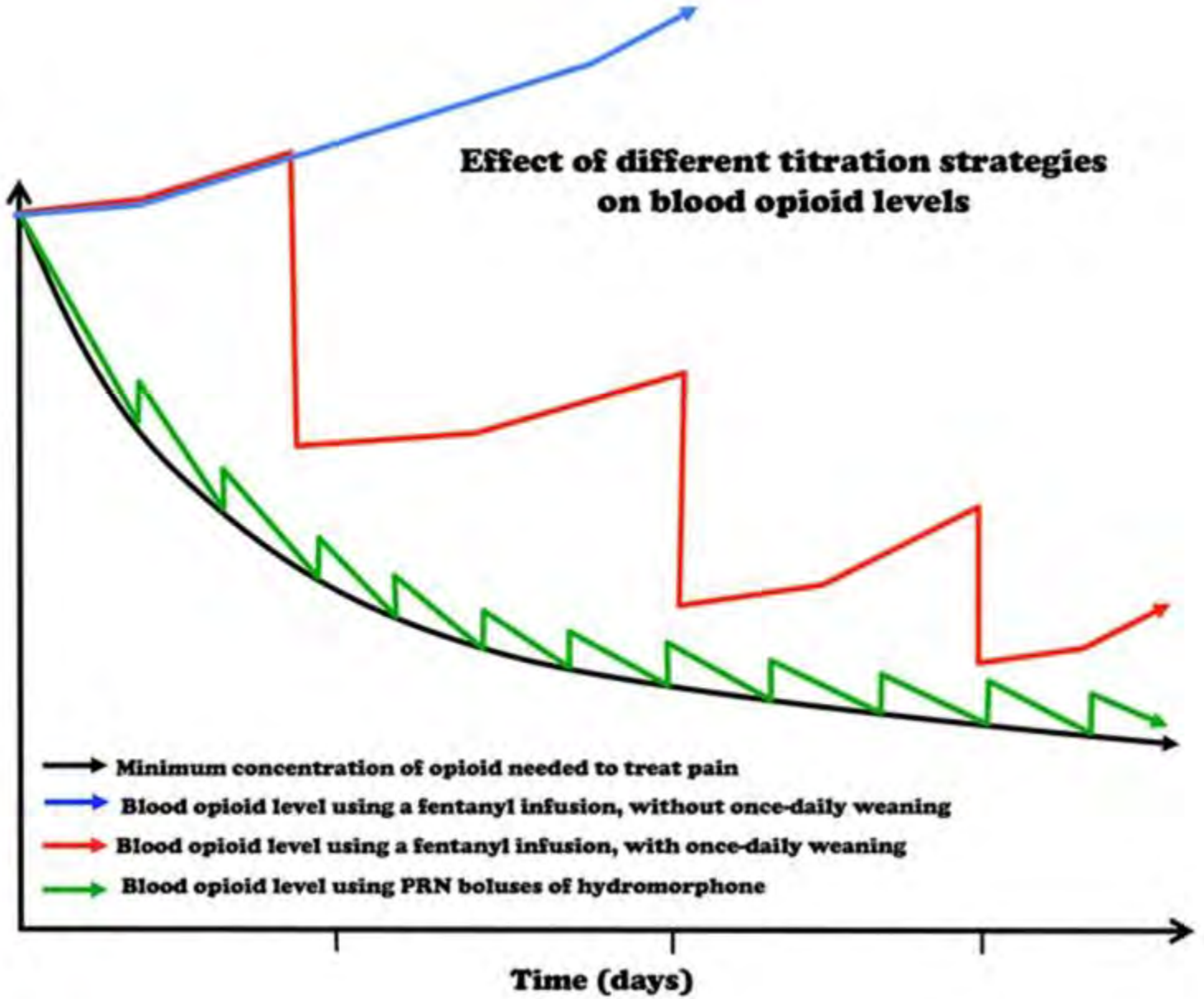


Figure 3. Predicted fentanyl concentrations over time for patients weighing 59, 86, or 128 kg, which were the 10th, 50th, and 90th percentiles in our study population: no history of severe liver disease (SLD) or congestive heart failure (CHF) (**A**); any history of SLD or CHF (**B**). In these simulations, fentanyl is continuously infused at 100 μg/hr for 3 d, after which the infusion is stopped (*large dark gray arrow*), and four 100 mg bolus doses (some of which are indicated by *small light gray arrow*) are given at random times.

Choi L et al. Crit Care Med 2016; 44:64

La demi-vie contextuelle d'un médicament est le temps nécessaire pour que la concentration plasmatique diminue de 50% après l'arrêt d'une perfusion continue de longue durée, réglée pour atteindre une concentration plasmatique constante



https://emcrit.org/pulmcrit/pulmcrit-fentanyl-infusions-sedation-opioid-pendulum-swings-astray/

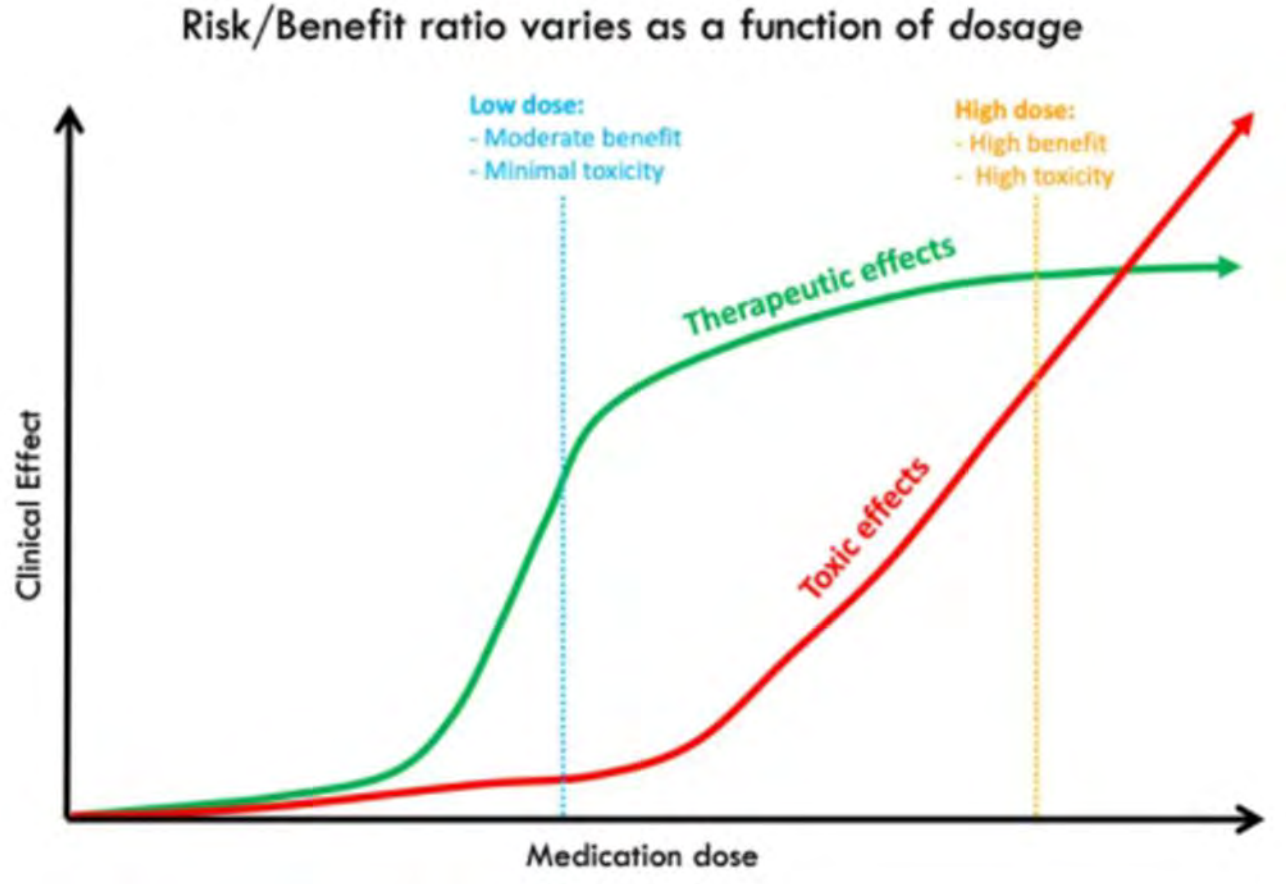
Analgésie multi-modale (= analgésie balancée)

- **<u>Définition</u> :**
  - Combinaison de différents techniques d'analgésie qui agissent par des mécanismes différents et à différents niveaux du système nerveux, résultant en un effet additif ou synergique avec une diminution des doses individuelles et une diminution des effets indésirables

- Concept apparu en 1993
- Recommandé dans tous les guidelines de prise en charge post-opératoire
- Moins de littérature aux soins intensifs

Analgésie balancée /multi-modale

- **<u>Concept</u> :** Combiner différentes classes pharmacologiques dans le but d'obtenir une analgésie efficace sans effets secondaires



Agitation et sédation (A)

Ungraded statement:

DSI protocols and nurse-protocolized targeted sedation can achieve and maintain a light level of sedation.

Richmond Agitation Sedation Scale (RASS)

+4	Combative	Violent, immediate danger to staff	OBSERVATION
+3	Very agitated	Pulls or removes tube(s) or catheter(s); aggressive	
+2	Agitated	Frequent non-purposeful movement, fights ventilator	
+1	Restless	Anxious but movements not aggressive, vigorous	
0	Alert and calm	Spontaneously pays attention to care giver	
-1	Drowsy	Not fully alert, but has sustained awakening (eye-opening/eye contact) to voice (>10 seconds)	VOICE
-2	Light sedation	Briefly awakens with eye contact to voice (<10 seconds)	
-3	Moderate sedation	Movement or eye opening to voice (but no eye contact)	
-4	Deep sedation	No response to voice, but movement or eye opening to physical stimulation	TOUCH
-5	Unarousable	No response to voice or physical stimulation	

Recommendation:

We **suggest** using **either** propofol or dexmedetomidine over benzodiazepines for sedation in critically ill mechanically ventilated adults (conditional recommendation, low quality of evidence).

Propofol

Bénéfices

- On/off permet évaluation neuro
- Propriétés antiépileptique
- Neuroprotecteur (↓PIC)
- ⊘tolérance, ⊘ sevrage
- Supprime respiration (↓ assynchronies)

Risques

- Nécessite une intubation
- Effet hypotenseur
- PRIS (max 4 mg/kg/h, nutrition entérale précoce, monitoring triglycérides aux 48h)

Recommendation:

We **suggest** using **either** propofol or dexmedetomidine over benzodiazepines for sedation in critically ill mechanically ventilated adults (conditional recommendation, low quality of evidence).

Dexmedetomidine

Bénéfices

- Ne supprime pas la respiration
  - Utilisable chez patient non intubé et en phase de sevrage
- Architecture du sommeil plus physiologique

Risques

- Hypotension et bradycardie
- Usage prolongé peut induire une tolérance et un risque de sevrage à l'arrêt
- Ne permet souvent pas une sédation profonde

Kétamine

Bénéfices

- Stabilité HD
- Ne supprime pas la respiration
- Bronchodilatation
- Propriétés antiépileptique
- Effet anti-dépresseur ?
- A dose dissociative permet sédation ET analgésie

Risques

- Hallucinations à doses partiellement dissociatives
- Hypersalivation (VNI)
- **Peu de données sur usage prolongé à dose dissociative (1-5 mg/kg/h)**
- BIS inutilisable

- Envisageable dans situations suivantes :
  - Status asthmatique
  - Sédation réfractaire aux autres agents
  - Hypotension profonde

Délirium (D)

Détection du délirium : CAM-ICU

Echelle	Etiquette	Description	
+4	Combatif	Combatif, danger immédiat envers l'équipe	VOIX
+3	Très agité	Tire, arrache tuyaux ou cathéters et/ou agressif envers l'équipe	
+2	Agité	Mouvements fréquents sans but précis et/ou désadaptation au respirateur	
+1	Ne tient pas en place	Anxieux ou craintif, mais mouvements orientés, peu fréquents, non vigoureux, non agressifs	
0	Eveillé et calme		
-1	Somnolent	Pas complètement éveillé, mais reste éveillé avec contact visuel à l'appel (>10s)	
-2	Diminution légère de la vigilance	Reste éveillé brièvement avec contact visuel à l'appel (<10s)	
-3	Diminution modérée de la vigilance	N'importe quel mouvement à l'appel (ex: ouverture des yeux), mais pas de contact visuel.	

Si RASS ≥ -3 procéder au CAM-ICU (Le patient est-il CAM-ICU positif ou négatif ?)

-4	Diminution profonde de la vigilance	Aucun mouvement à l'appel, n'importe quel mouvement à la stimulation physique (friction non nociceptive de l'épaule ou du sternum)	TOUCHER
-5	Non réveillable	Aucun mouvement, ni à l'appel, ni à la stimulation physique (friction non nociceptive de l'épaule ou du sternum)	

Si RASS est -4 ou -5→ STOP (patient inconscient) Réévaluer plus tard

[3] Sessler, et al. AJRCCM 2002; 166:1338-1344. [4]Ely, et al. JAMA 2003; 289:2983-2991.
[21] Traduction française validée : Chanques, et al. An Fr AnesthRéanim 2006; 25:696-701.
*Pour les équivalents RASS des autres échelles de sédation/ niveau de conscience regarder FAQ page 20-21.

Organigramme de la méthode d'évaluation de la confusion mentale pour la réanimation (CAM-ICU)

1. Changement aigu ou fluctuation de l'état mental :
- Y-a-t il un changement brutal par rapport à l'état mental habituel ? **OU**
- Le patient a-t-il montré une fluctuation de son état mental dans les 24 dernières heures ?

NON → **CAM-ICU Négatif** — Pas de confusion mentale

OUI ↓

2. Inattention :
- « *Serrez ma main quand je dis la lettre 'A'.* »
  Lisez la séquence de lettres suivante :
  C A S A B L A N C A
  Erreurs : Ne pas serrer la main à un 'A' et serrer la main à une autre lettre que 'A'
- Si incapacité à accomplir le test des lettres → le test des images

0-2 Erreurs → **CAM-ICU Négatif** — Pas de confusion mentale

>2 erreurs ↓

3. Niveau de conscience altérée :
Niveau RASS actuel

RASS autre que 0 → **CAM-ICU Positif** = Confusion mentale

RASS=0 ↓

4. Pensée désorganisée :
1. Une pierre flotte-t-elle sur l'eau ?
2. Y a t-il des poissons dans la mer ?
3. Un kilogramme pèse-t-il plus que deux kilogrammes ?
4. Pouvez-vous utiliser un marteau pour enfoncer un clou ?

Ordre : « *Levez autant de doigts que moi* » (levez 2 doigts)
« *Maintenant, faites la même chose avec l'autre main* » (ne pas montrer)
OU « *Ajoutez un doigt de plus* » (si le patient est incapable de bouger les 2 bras)

>1 Erreur → **CAM-ICU Positif** = Confusion mentale

0-1 Erreur → **CAM-ICU Négatif** — Pas de confusion mentale

Prévention du délirium

- **Plusieurs molécules ont été étudiées** :
  - **Corticoïdes :** Pas d'effet
  - **Halopéridol :** Pas d'effet
  - **Dexmédétomidine :** Bénéfice potentiel
  - **Gabapentine :** Pas d'effet
  - **Statines :** Pas d'effet
  - **Nicotine :** Effet potentiellement délétère
  - **Mélatonine :** Pas d'effet (pro-MEDIC, ICM 2022)

Recommendation:

We **suggest** using a multicomponent, nonpharmacologic intervention that is focused on, but not limited to, **reducing modifiable risk factors** for delirium, improving cognition, and optimizing sleep, mobility, hearing, and vision in critically ill adults (conditional recommendation, low quality of evidence).

Table 1 Non-pharmacological interventions to prevent and treat ICU delirium

Categories	Examples
Reorientation	Orient patient to time, place, and situation. Redirect, normalize fear, assure patient they are safe and being cared for and discuss their important people, places, pets to promote sense of self and connection. Involve family in their care.
Cognition	Engage in conversations. Books, puzzles, music.
Mobility	Sitting up. Early ambulation. Physical Therapy.
Sensorium	Glasses. Hearing aids. Interpreter assistance.
Sleep	Eye mask. Earplugs. Minimize unnecessary lab draws, procedures, or disruptions during the targeted sleep period, and optimize light and dark exposures to regulate sleep/wake patterns.
Agency and independence	Prompt removal of physical restraints. Review needs for foley, rectal tube, telemetry, and other tubes and catheters daily.
Nutrition and hydration	Provide assistance with drinking and eating, as appropriate.

Chou et al. Intensive Care Med 2022

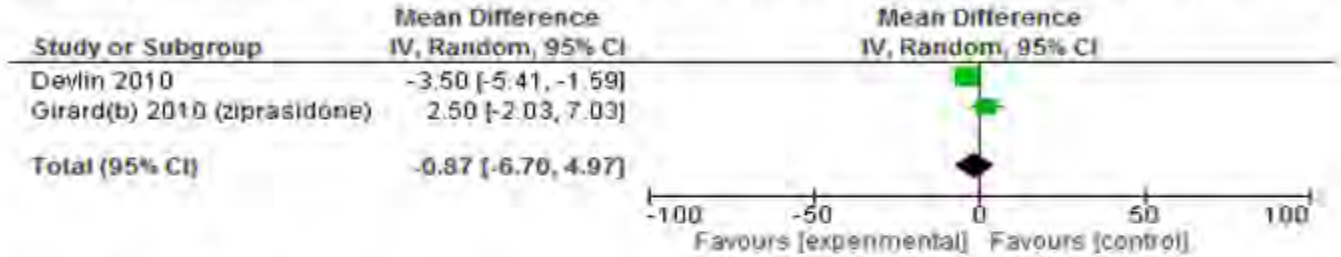
«THINK» acronym for underlying medical conditions associated with delirium

T	**T**oxic situations	Shock, CHF, MI, cardiac arrythmias, new organ failure, severe trauma, temperature dysregulation, post-operative states, neoplasms, history of hypertension
	Toxic medications	Deliriogenic medications (benzodiazepines, hypnotics, opioids, anxiolytics)
H	«**H**ypo» and «**H**yper» states	Hypoxemia, hypocarbia, hypercabia, hypoglycemia, hypoalbuminemia, hypothiaminemia
I	**I**nfection	Infections (e.g. respiratory, urinary tract, septicaemia)
	Immobilization	Bed rest, physical and chemical restraints
N	**N**on-pharmacological reasons	Sensory deprivation (visual and hearing impairment), sensory overload (noise, lighting), social isolation, inability to communicate needs, sleep deprivation
	Neurologic reasons	Pre-existing dementia, head trauma, ictal and post-ictal states, vascular diseases (stroke, hypertensive encephalopathy), Pick's disease, brain tumour, focal lesions, history of aclohol abuse
K	**K^+** (potassium)	Potassium and other fluid/electrolyte problems including dehydration, anemia, endocrinopathy and acid/base disturbances

Adapté de : Oxford Textbook of Critical Care 2nd Ed-2016

Atypical Antipsychotic Versus None (Treatment)

- **Duration of delirium** (2 RCTs, 102 patients)
  - **Not significant**, reduced by 0.87 days (95% CI, –6.70 to 4.97)



- **Duration of mechanical ventilation** (2 RCTs, 95 patients)
  - **Not significant**, reduced by 0.34 days (95% CI, –6.54 to 5.86)
- **Length of ICU stay** (2 RCTs, 102 patients)
  - **Not significant**, increased by 1.93 days (95% CI, –1.17 to 5.68)
- **ICU mortality** (2 RCTs, 102 patients)
  - **Not significant**, RR 0.75 (95% CI, 0.29 to 1.96)

Recommendation:

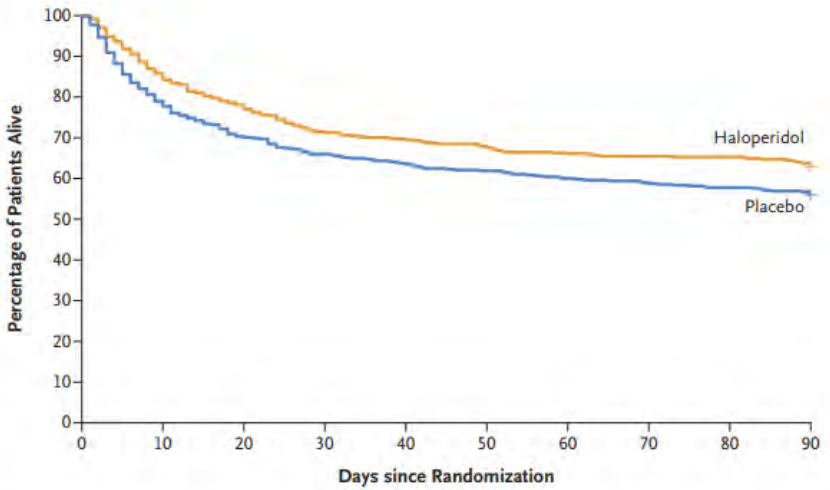
We suggest **not** routinely using haloperidol and atypical antipsychotics to treat delirium (conditional recommendation, low quality of evidence).

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Haloperidol for the Treatment of Delirium in ICU Patients

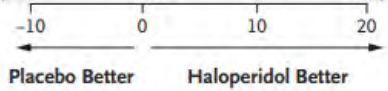
A Overall Survival



No. at Risk										
Haloperidol	501	430	391	358	349	340	332	328	327	319
Placebo	485	383	341	320	309	300	291	286	280	275

B Main and Subgroup Analyses of the Primary Outcome

Subgroup	No. of Patients		Mean No. of Days Alive and Out of Hospital (95% CI)		Adjusted Mean Difference (95% or 99% CI)
	Haloperidol	Placebo	Haloperidol	Placebo	
All patients	501	486	35.8 (32.9 to 38.7)	32.9 (29.9 to 35.8)	2.9 (−1.2 to 7.0)
Motor subtype of delirium					
Hyperactive	217	216	39.3 (34.9 to 43.7)	34.9 (30.4 to 39.3)	4.4 (−4.0 to 12.7)
Hypoactive	274	256	33.0 (29.3 to 36.8)	31.2 (27.3 to 35.1)	1.6 (−5.5 to 8.7)
Age					
<69 yr	221	189	39.3 (35.2 to 43.4)	39.1 (34.5 to 43.8)	0.4 (−7.9 to 8.8)
≥69 yr	270	283	32.9 (29.0 to 36.9)	28.7 (24.9 to 32.4)	3.8 (−3.4 to 11.0)
Sex					
Male	319	314	35.6 (32.1 to 39.1)	32.4 (28.8 to 36.0)	3.4 (−3.3 to 10.0)
Female	172	158	36.2 (31.2 to 41.2)	33.8 (28.6 to 39.1)	2.0 (−7.3 to 11.2)
Admission type					
Surgical	178	149	36.9 (32.4 to 41.5)	36.9 (31.9 to 42.0)	−1.1 (−10.0 to 7.8)
Medical	313	323	35.2 (31.5 to 38.8)	31.0 (27.4 to 34.6)	4.5 (−2.3 to 11.3)
Risk factors for delirium					
Yes	308	279	37.5 (33.9 to 41.1)	33.0 (29.2 to 36.8)	4.5 (−2.2 to 11.3)
No	183	193	32.9 (28.2 to 37.6)	32.7 (27.9 to 37.4)	0.9 (−8.0 to 9.9)
SMS-ICU					
<25	383	361	38.5 (35.3 to 41.7)	35.3 (32.0 to 38.6)	2.9 (−3.2 to 9.1)
≥25	108	111	26.3 (20.3 to 32.3)	25.1 (19.0 to 31.1)	1.2 (−10.0 to 12.5)



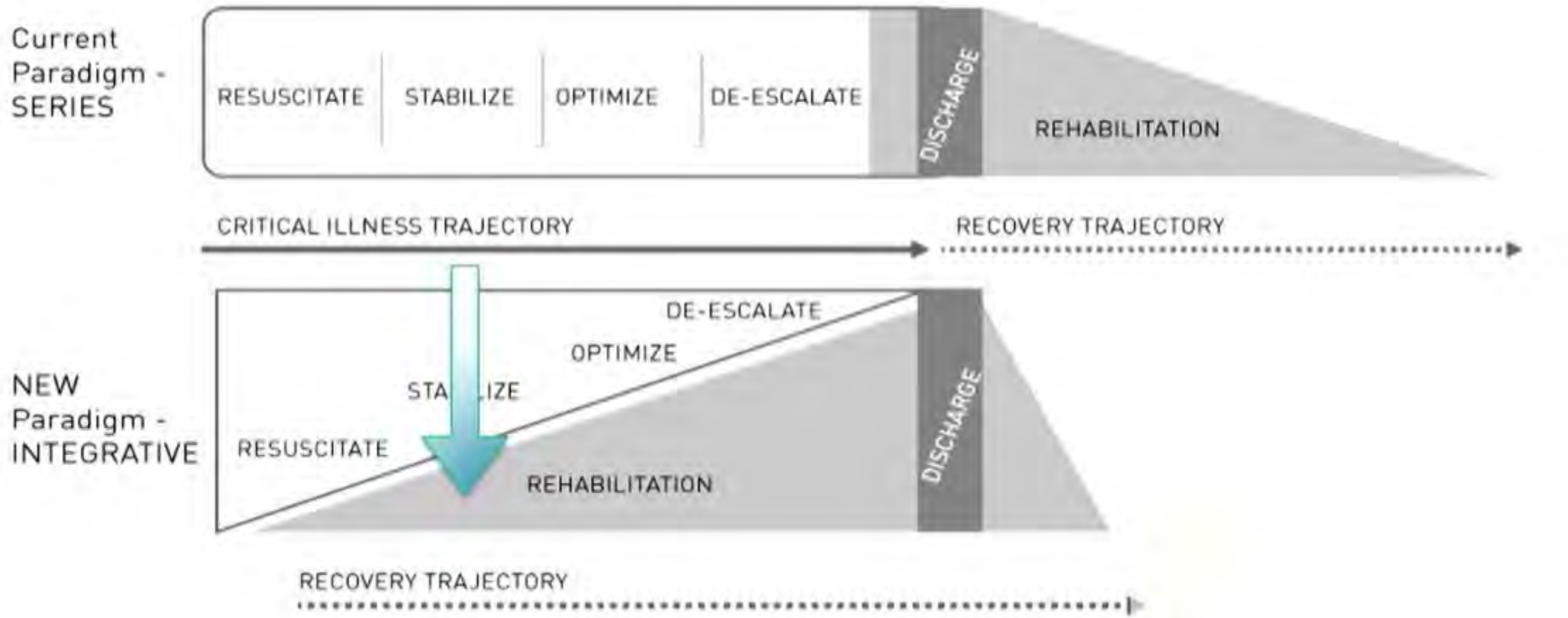
Andersen-Ranberg et al. NEJM 2022

Immobilité (I)

Pourquoi avoir ajouté «I» au PAD ?

- Chez le sujet sain, la force musculaire diminue de 1 à 1.5% par jour d'alitement strict
- Aux SI, perte de force ↑↑↑ (3 à 11%)
- La perte de force totale peut aller jusqu'à 40% après une semaine d'immobilisation

- **ICU-acquired weakness (ICU-AW)**
  - Faiblesse symétrique, diffuse, détectée cliniquement impliquant tous les membres et les muscles respiratoires survenant après l'apparition de la maladie grave
  - 25-50% des malades critiques
  - ↑ durée de ventilation, ↑ échecs de sevrage, ↑ LOS, ↑ mortalité intra-hosp
  - Association avec :
    - Survie à long terme
    - Capacités physiques
    - QOL

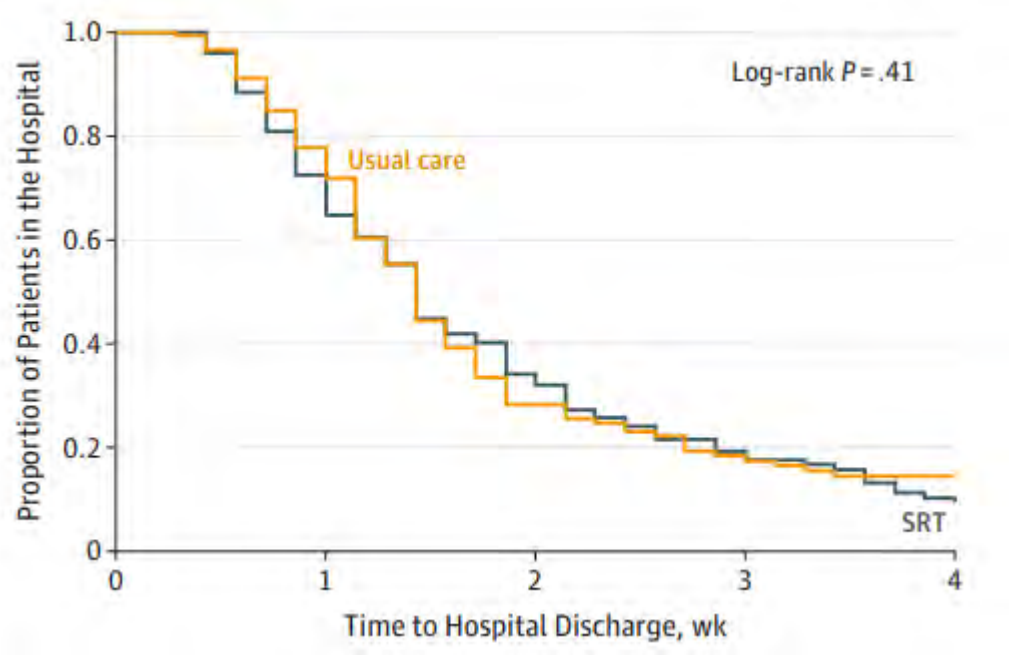


Choong K. ICU Manag and Pract 2019;19(2):85-87

Mobilisation précoce : Utile ?

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

JAMA. 2016;315(24):2694-2702



- Nombreuses études
- Bcp sont négatives
- Biais méthodologiques +++
- Grande étude en cours (Early Mob)

Formal Recommendation:

We **suggest** performing rehabilitation or mobilization in critically ill adults (conditional recommendation, low quality evidence).

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Early Active Mobilization during Mechanical Ventilation in the ICU

The TEAM Study Investigators and the ANZICS Clinical Trials Group*

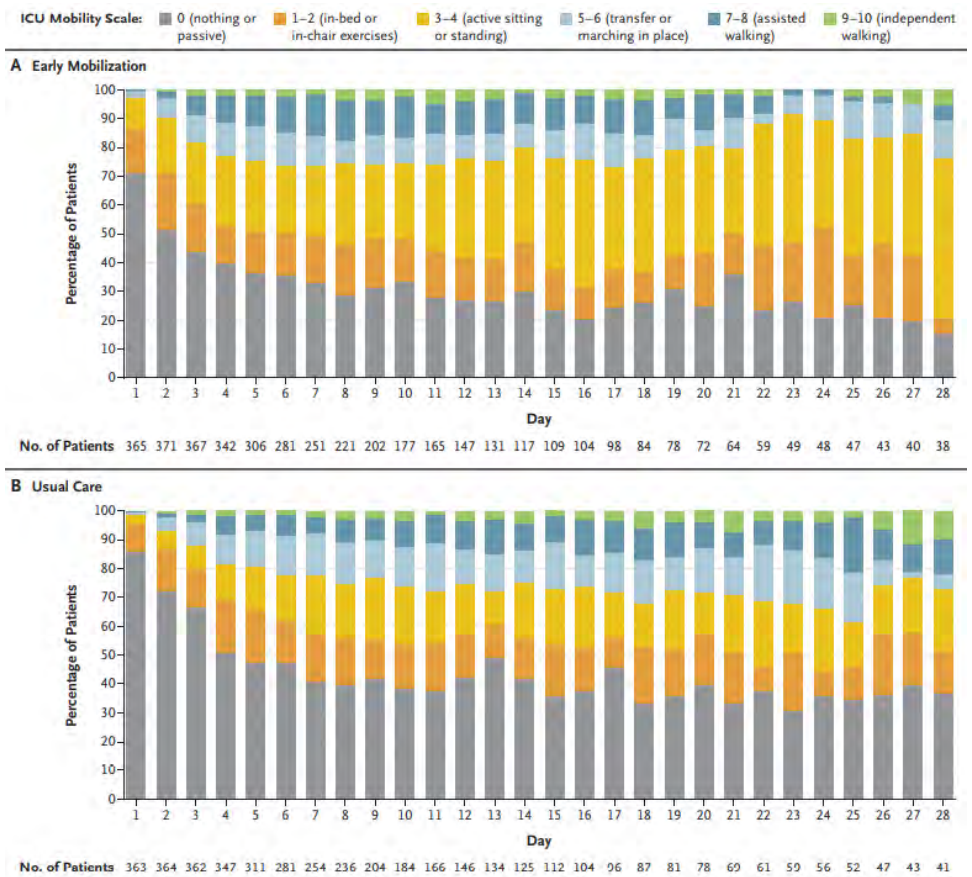


Table 3. Primary Outcome, Key Secondary Outcomes, and Adverse Events.*

Outcome	Early Mobilization (N=371)	Usual Care (N=370)	Difference or Odds Ratio (95% CI)†	P Value
Primary outcome				
Days alive and out of hospital at day 180‡				
Median no. (IQR)	143 (21 to 161)	145 (51 to 164)	−2.0 (−10 to 6)	0.62
Key secondary outcomes				
Death at day 180				
Patients — no. (%)	83/369 (22.5)	71/364 (19.5)	1.15 (0.81–1.65)§	
Median no. of days since randomization (IQR)	17 (9 to 41)	19 (12 to 50)	−2.0 (−12.0 to 8.0)	
Median no. of ventilator-free days at day 28 (IQR)	21 (8 to 25)	21 (11 to 25)	0.0 (−1.4 to 1.4)	
Median no. of ICU-free days at day 28 (IQR)	16 (0 to 21)	17 (3 to 22)	−1.0 (−3.1 to 1.1)	
Functional outcomes in survivors at day 180¶				
Score on EQ-5D-5L utility score‖	0.7±0.3	0.7±0.3	0.0 (−0.0 to 0.1)	
Score on EQ Visual Analogue Scale**	70.2±19.7	69.0±20.1	2.0 (−5.7 to 9.7)	
Median score on Barthel Index of ADL (IQR)††	100 (100 to 100)	100 (95 to 100)	0	
Median score on IADL (IQR)‡‡	8.0 (7.0 to 8.0)	8.0 (6.0 to 8.0)	0.2 (−0.9 to 1.3)	
Median score on WHODAS 2.0 (IQR)§§	12.5 (2.1 to 33.3)	14.6 (4.2 to 38.9)	−1.8 (−6.9 to 3.4)	
Adverse events — no. (%) ¶¶				
Patients with ≥1 adverse event potentially due to mobilization — no. (%)	34 (9.2)	15 (4.1)	2.55 (1.33–4.89)§	0.005

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Sommeil (S)

Recommendation:
We suggest using assist control ventilation at night (vs. pressure support ventilation) to improve sleep in critically ill adults (conditional recommendation, low quality of evidence)

Recommendation:
We make no recommendation regarding the use of an adaptive mode of ventilation at night (vs. pressure support ventilation) to improve sleep in critically ill adults (no recommendation, very low quality of evidence)

Recommendation:
We suggest using either an NIV-dedicated ventilator or a standard ICU ventilator for critically ill adults requiring NIV to improve sleep (no recommendation, very low quality of evidence)

Recommendation:
We suggest not using aromatherapy, acupressure, or music at night to improve sleep in critically ill adults (conditional recommendation, low quality of evidence (aromatherapy and acupressure; very low quality of evidence (music).

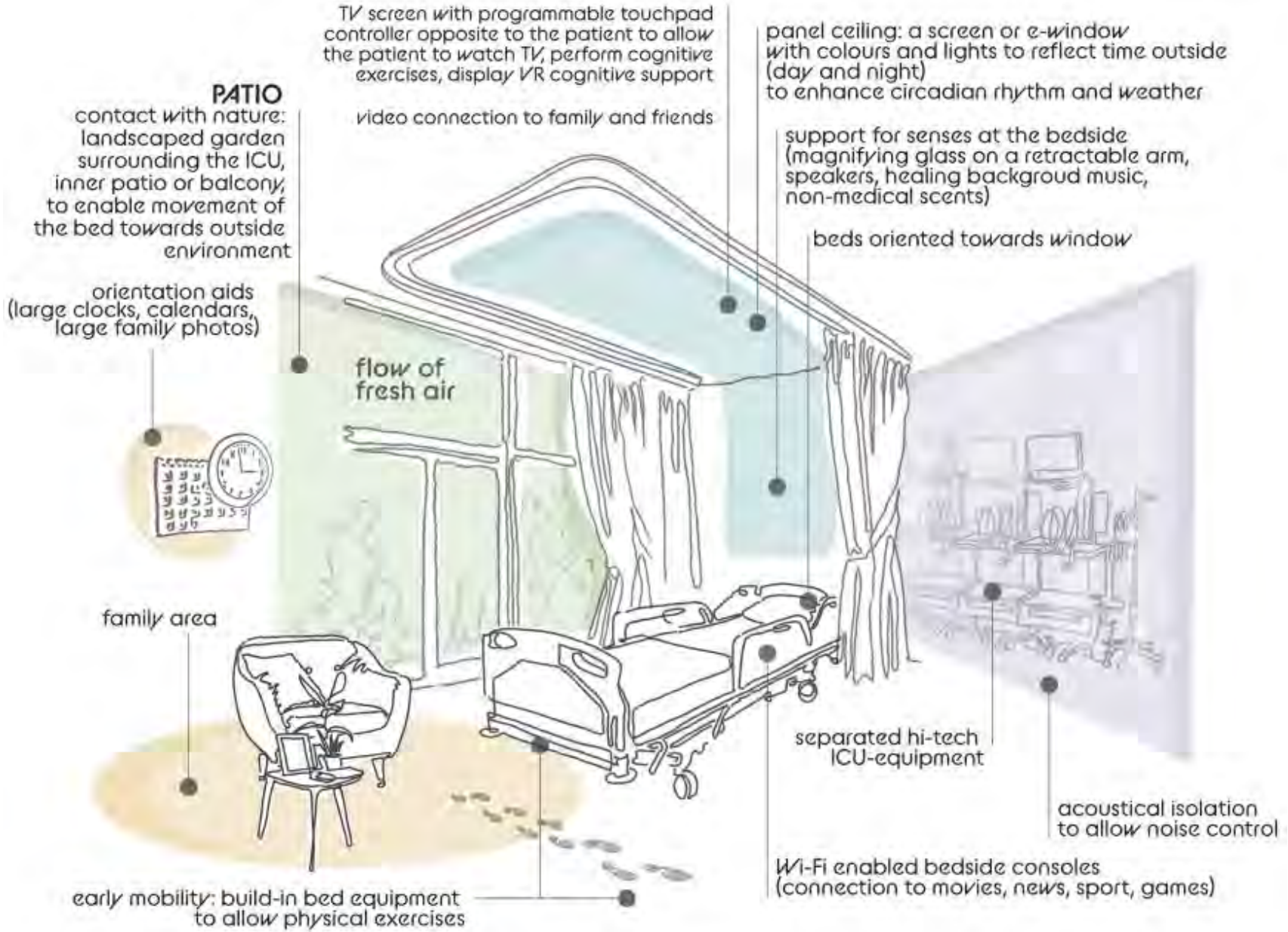
Recommendation:
We suggest using noise and light reduction strategies to improve sleep in critically ill adults (conditional recommendation, low quality of evidence).

Recommendation:
We suggest using a sleep-promoting, multicomponent protocol in critically ill adults (conditional recommendation, low quality evidence).

Recommendation:
We make no recommendation regarding the use of melatonin to improve sleep in critically ill adults (no recommendation, very low quality of evidence).

Recommendation:
We make no recommendation regarding the use of dexmedetomidine to improve sleep in critically ill adults (no recommendation, very low quality of evidence).

Le Futur



b. Future of delirium-free ICU-design – the importance of healing environment

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