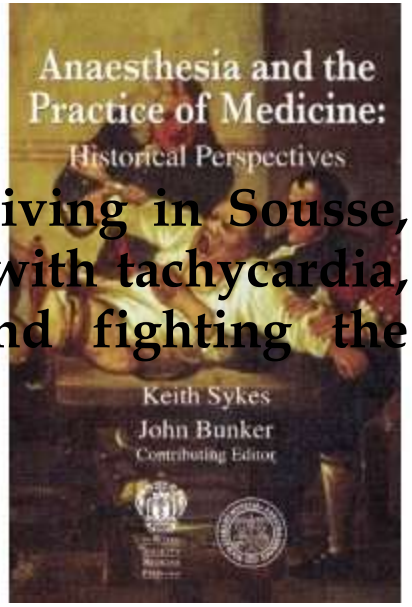
# L'analgo-sédation en réanimation : *Peu c'est trop!*


**M Boussarsar**

*Réanimation Médicale - Sousse*


**"… But what I see these days are paralyzed, sedated patients, lying without motion, appearing to be dead, except for the monitors that tell me otherwise."**

*Thomas L. Petty, 2012*




**"... But what I saw several years ago when arriving in Sousse, were agitated patients, bathing in their sweats, with tachycardia, and attached by four plus a chest strap and fighting the ventilator! "**

*Mohamed Boussarsar, 2004*

# **Ere 1:** *Modern intensive care therapy*

## Section of Epidemiology

President—A. BRADFOR

[*October*

**The Epidemic of Poliomye**

By H. C.

*Professor of Epidemiology,*
*Chief Physician Blegdam Hos*

*Proceedings of the Royal Society of*

Fig. 1 A young patient with poliomyelitis being manually ventilated by a medical student during the poliomyelitis epidemic in Copenhagen, 1953 [Source: Medical History Museum in Copenhagen]

# **Ere 2:** *From anesthesia to ICU care*

L'Engström 150 (1954), (l'équipe du Dr.Carl Gunnar Engström) ventilateur à fréquence fixe, a été en Europe l'appareil qui contribua le plus au développement de la ventilation mécanique et à l'essor de la réanimation.

# **Ere 3:** *Ligne rouge!*

Chest. 1998 Aug;114(2):541-8.

## **The use of continuous i.v. sedation is associated with prolongation of mechanical ventilation.**

Kollef MH, Levy NT, Ahrens TS, Schaiff R, Prentice D, Sherman G.

Department of Medicine, Washington University School of Medicine, St. Louis, MO 63110, USA.

# Ere 3: *Ligne rouge!*

Crit Care Med. 1999 Dec;27(12):2609-15.

## Effect of a nursing-implemented sedation protocol on the duration of mechanical ventilation.

Brook AD, Ahrens TS, Schaiff R, Prentice D, Sherman G, Shannon W, Kollef MH.

Division of Pulmonary and Critical Care Medicine, Washington University School of Medicine, St. Louis, MO, USA

# Ere 4: *Protocolisation!*

Lancet. 2008 Jan 12;371(9607):126-34.

## 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.

Girard TD, Kress JP, Fuchs BD, Thomason JW, Schweickert WD, Pun BT, Taichman DB, Dunn JG, Pohlman AS, Kinniry PA, Jackson JC, Canonico AE, Light RW, Shintani AK, Thompson JL, Gordon SM, Hall JB, Dittus RS, Bernard GR, Ely EW.

Department of Medicine, Division of Allergy, Pulmonary, and Critical Care Medicine, Vanderbilt University School of Medicine, Nashville, TN 37232-8300, USA. timothy.girard@vanderbilt.edu

# **Ere 5:** *No sedation!*

Minerva Anestesiol. 2011 Jan;77(1):59-63. Epub 2010 Nov 24.

## Time to wake up the patients in the ICU: a crazy idea or common sense?

Strøm T, Toft P.

Department of Anesthesia and Intensive Care Medicine, Odense University Hospital, University of Southern Denmark, Odense C, Denmark. t.s@dadlnet.dk

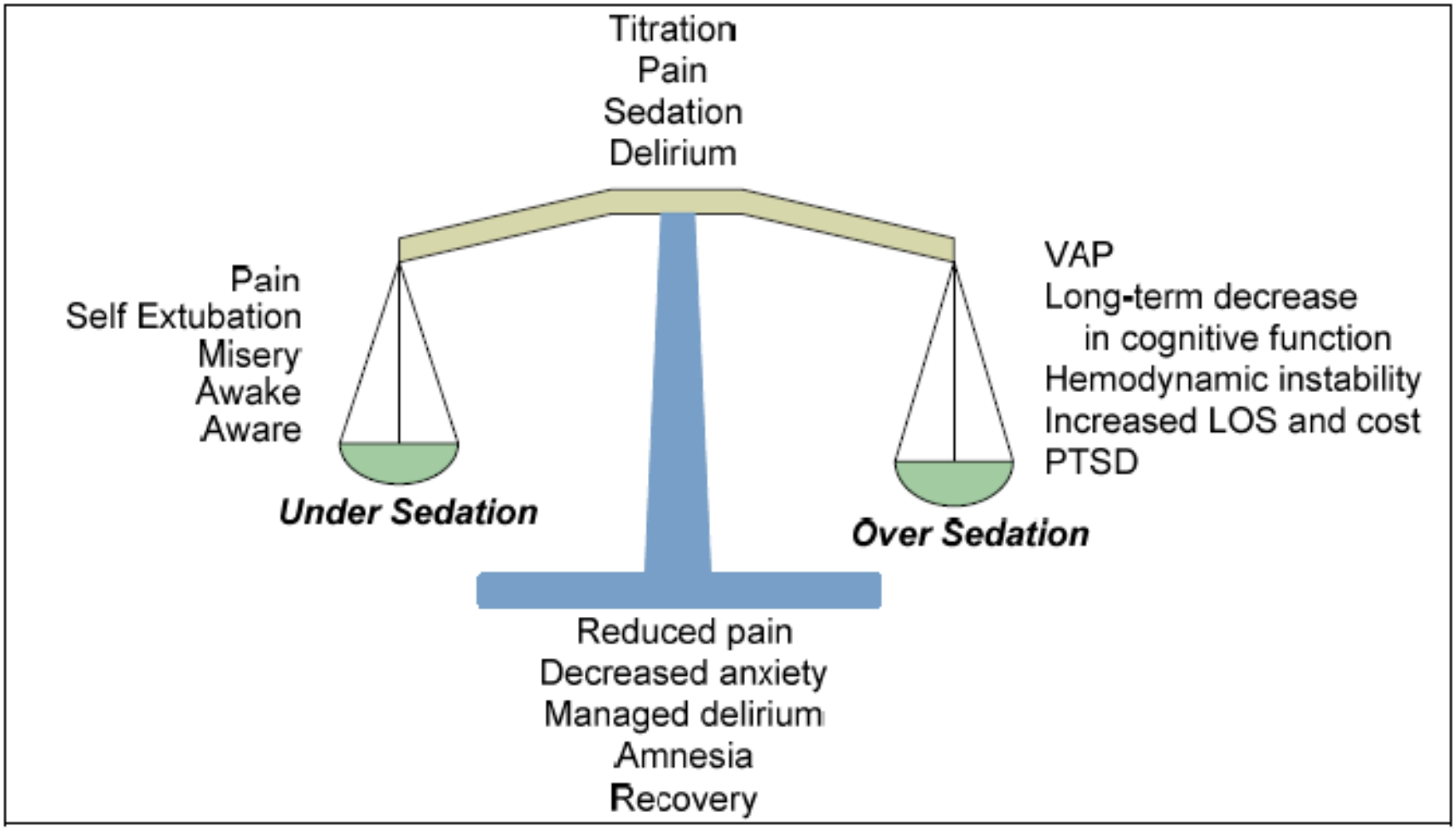
- **Analgo-sédation :** *késako?*
- **Analgo-sédation :** *recommandations?*
- **Analgo-sédation :** *écarts?*

- **Analgo-sédation :** *késako?*
- **Analgo-sédation :** *recommandations?*
- **Analgo-sédation :** *écarts?*

# **Analgo-sedation:** *objectifs*

- Diminution douleur, anxiété
- Adaptation patient-machine
- Diminution du travail respiratoire
- Diminution de la réponse neuroendocrine au stress (↓VO2)
- Prévenir les extubations accidentelles
- Réduire l'apparition de délirium
- Réduire l'incidence du PTSD

# Analgo-sedation: *balance*



# **Analgo-sedation:** *Souvenirs!*

- 66% des patients se souviennent de leur séjour
- le séjour est très inconfortable :
  - ne pas pouvoir communiquer (65%)
  - avoir soif (62%)
  - se sentir tendu (46%)
  - perdre la maîtrise de soi (46%)
  - avoir des difficultés à déglutir (44%)
- l'IT est très inconfortable :
  - ne pas pouvoir parler (68%)
  - douloureuse (56%), avec VAS 4-8 mm
  - angoissante (59%)
- l'IT est associée à :
  - troubles du sommeil (insomnie, réveil brusque, cauchemars)
  - périodes de terreur, panique
  - peur de la solitude

Rotondi, *Crit Care Med,* 2002

# Analgo-sedation: *Moyens*

Moyens non pharmacologiques:

- La communication (information du patient, visites) et le maintien du rythme nycthéméral et de l'orientation temporo-spatiale des patients (présence de fenêtres, horloges).
- Les techniques d'approche psychologique (approche cognitive, hypnose, musique) ou la stimulation électrique ne sont au mieux que des adjuvants de la sédation.
- Chez l'enfant, la participation des parents est mieux intégrée dans les soins que la présence de la famille chez l'adulte.

# Analgo-sedation: *Moyens*

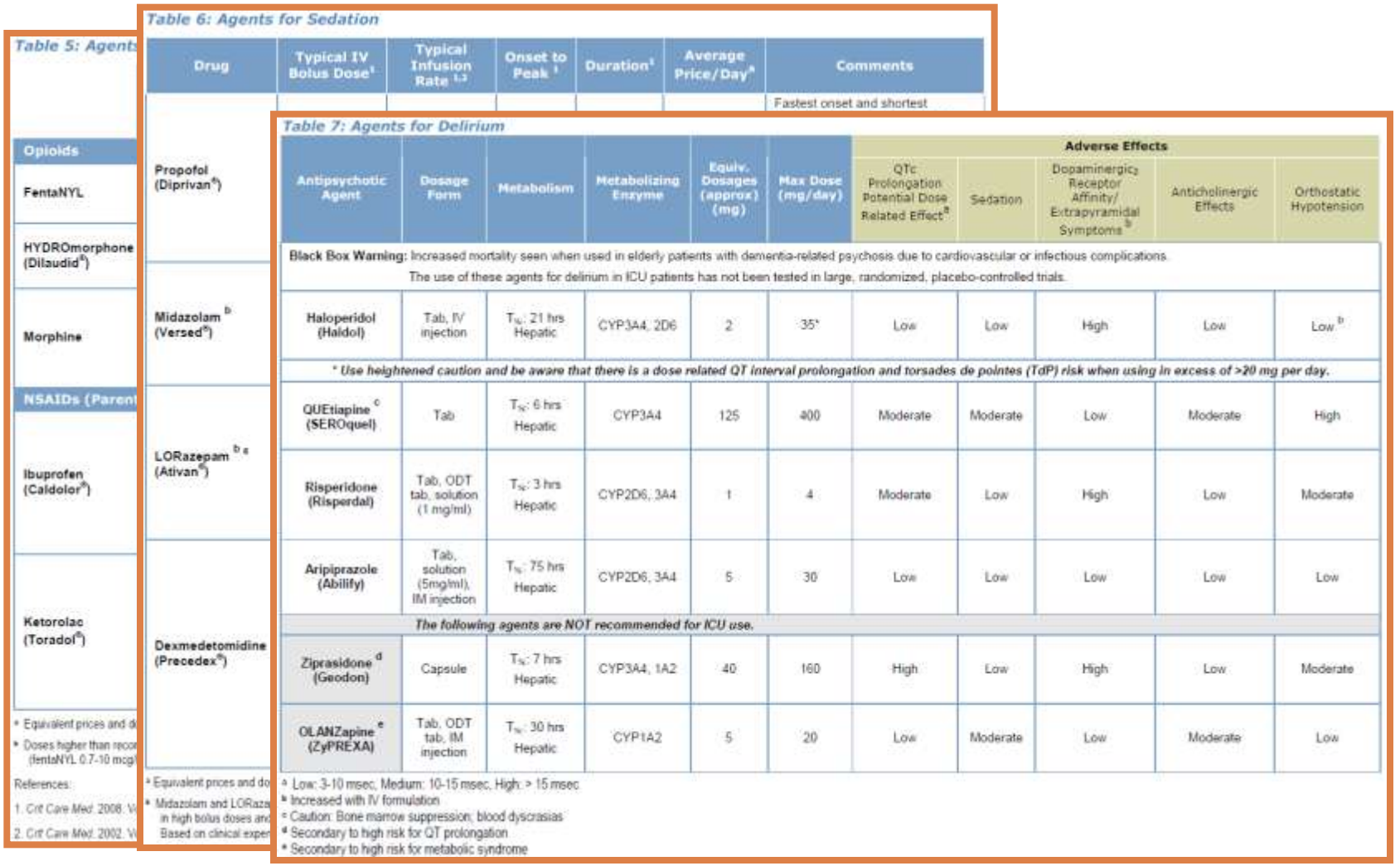


Table 5: Agents

| Opioids |
| --- |
| FentaNYL |
| HYDROmorphone (Dilaudid®) |
| Morphine |
| **NSAIDs (Paren** |
| Ibuprofen (Caldolor®) |
| Ketorolac (Toradol®) |

* Equivalent prices and d
* Doses higher than recor (fentaNYL 0.7-10 mcg/

References:
1. Crit Care Med. 2008; V
2. Crit Care Med. 2002; V

Table 6: Agents for Sedation

| Drug | Typical IV Bolus Dose[1] | Typical Infusion Rate [1,3] | Onset to Peak [1] | Duration[1] | Average Price/Day[a] | Comments |
| --- | --- | --- | --- | --- | --- | --- |
| Propofol (Diprivan®) | | | | | | Fastest onset and shortest |
| Midazolam [b] (Versed®) | | | | | | |
| LORazepam [b,c] (Ativan®) | | | | | | |
| Dexmedetomidine (Precedex®) | | | | | | |

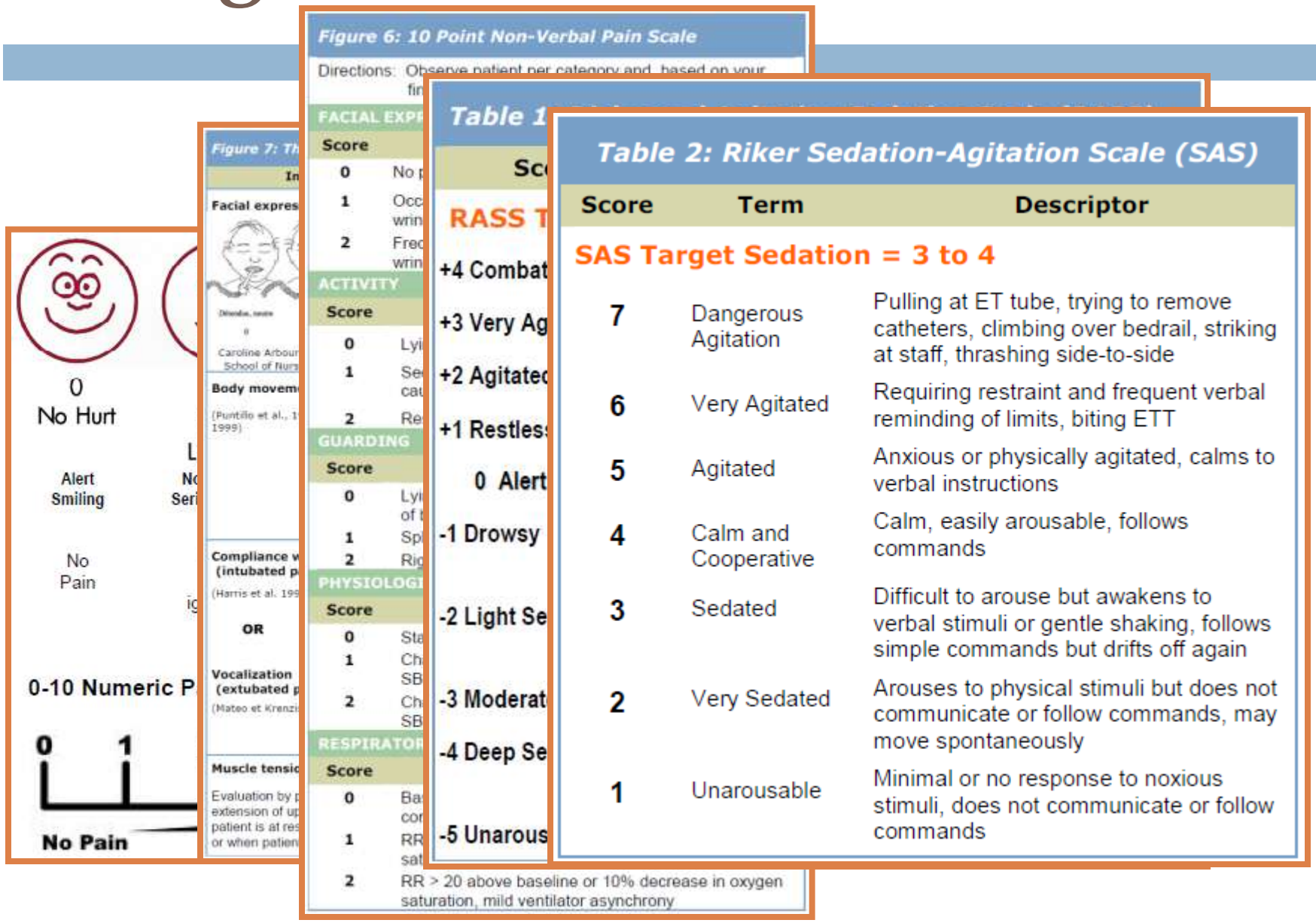
[a] Equivalent prices and do
* Midazolam and LORaza in high bolus doses and Based on clinical exper

Table 7: Agents for Delirium

| Antipsychotic Agent | Dosage Form | Metabolism | Metabolizing Enzyme | Equiv. Dosages (approx) (mg) | Max Dose (mg/day) | Adverse Effects: QTc Prolongation Potential Dose Related Effect[a] | Adverse Effects: Sedation | Adverse Effects: Dopaminergic$_2$ Receptor Affinity/ Extrapyramidal Symptoms[b] | Adverse Effects: Anticholinergic Effects | Adverse Effects: Orthostatic Hypotension |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Black Box Warning:** Increased mortality seen when used in elderly patients with dementia-related psychosis due to cardiovascular or infectious complications. The use of these agents for delirium in ICU patients has not been tested in large, randomized, placebo-controlled trials. | | | | | | | | | | |
| Haloperidol (Haldol) | Tab, IV injection | $T_{1/2}$: 21 hrs Hepatic | CYP3A4, 2D6 | 2 | 35* | Low | Low | High | Low | Low [b] |
| ** Use heightened caution and be aware that there is a dose related QT interval prolongation and torsades de pointes (TdP) risk when using in excess of >20 mg per day.* | | | | | | | | | | |
| QUEtiapine [c] (SEROquel) | Tab | $T_{1/2}$: 6 hrs Hepatic | CYP3A4 | 125 | 400 | Moderate | Moderate | Low | Moderate | High |
| Risperidone (Risperdal) | Tab, ODT tab, solution (1 mg/ml) | $T_{1/2}$: 3 hrs Hepatic | CYP2D6, 3A4 | 1 | 4 | Moderate | Low | High | Low | Moderate |
| Aripiprazole (Abilify) | Tab, solution (5mg/ml), IM injection | $T_{1/2}$: 75 hrs Hepatic | CYP2D6, 3A4 | 5 | 30 | Low | Low | Low | Low | Low |
| *The following agents are NOT recommended for ICU use.* | | | | | | | | | | |
| Ziprasidone [d] (Geodon) | Capsule | $T_{1/2}$: 7 hrs Hepatic | CYP3A4, 1A2 | 40 | 160 | High | Low | High | Low | Moderate |
| OLANZapine [e] (ZyPREXA) | Tab, ODT tab, IM injection | $T_{1/2}$: 30 hrs Hepatic | CYP1A2 | 5 | 20 | Low | Moderate | Low | Moderate | Low |

[a] Low: 3-10 msec, Medium: 10-15 msec, High: > 15 msec
[b] Increased with IV formulation
[c] Caution: Bone marrow suppression; blood dyscrasias
[d] Secondary to high risk for QT prolongation
[e] Secondary to high risk for metabolic syndrome

# Analgo-sedation: *Outils*



# Analgo-sedation: *évaluations*

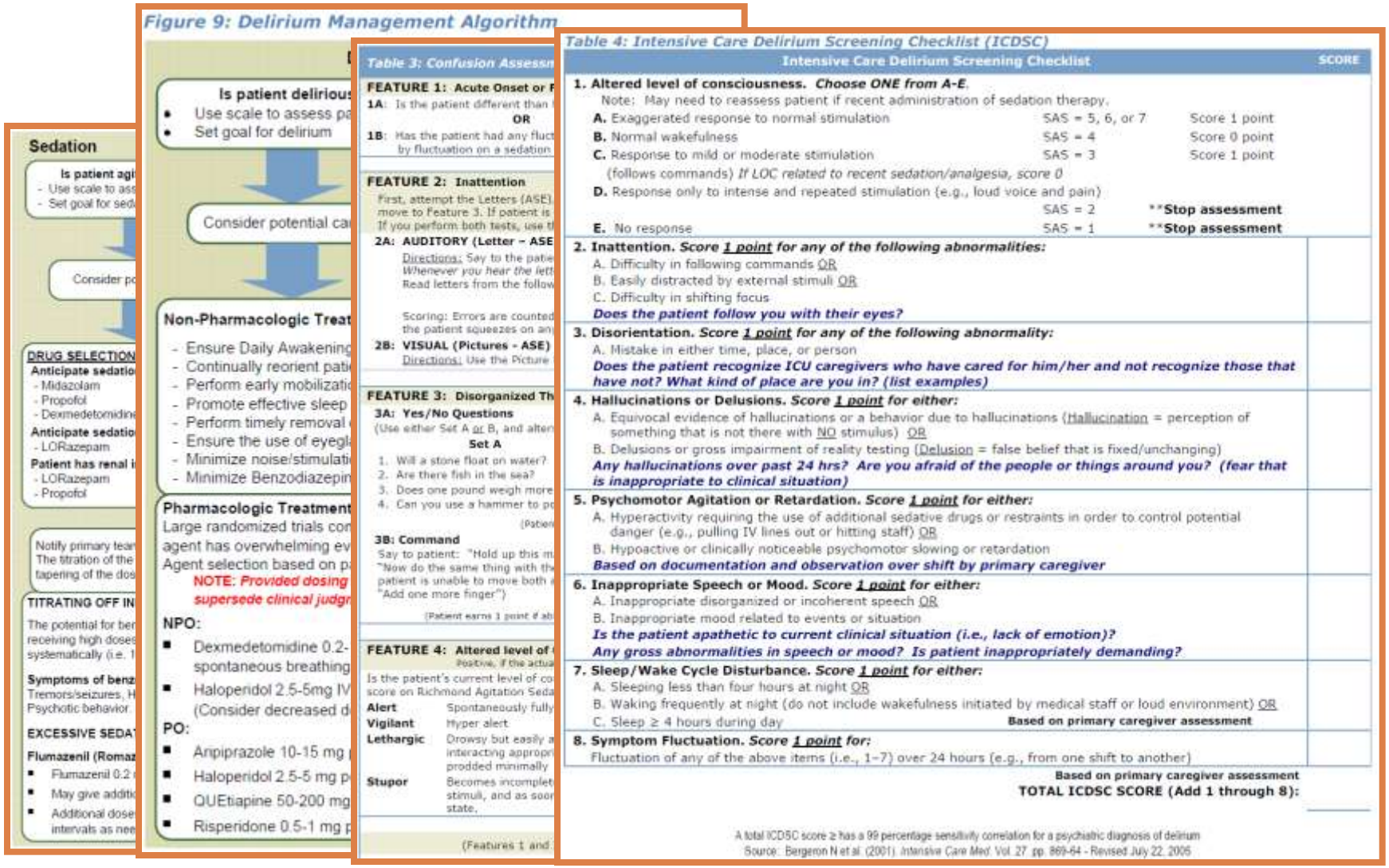


Figure 9: Delirium Management Algorithm

Sedation

Is patient delirious
- Use scale to assess pa
- Set goal for delirium

Consider potential ca

Non-Pharmacologic Treat
- Ensure Daily Awakening
- Continually reorient pati
- Perform early mobilizati
- Promote effective sleep
- Perform timely removal
- Ensure the use of eyegl
- Minimize noise/stimulati
- Minimize Benzodiazepin

Pharmacologic Treatment
Large randomized trials con
agent has overwhelming ev
Agent selection based on pa
NOTE: Provided dosing
supersede clinical judgr

NPO:
- Dexmedetomidine 0.2-
spontaneous breathing
- Haloperidol 2.5-5mg IV
(Consider decreased d

PO:
- Aripiprazole 10-15 mg
- Haloperidol 2.5-5 mg p
- QUEtiapine 50-200 mg
- Risperidone 0.5-1 mg p

DRUG SELECTION
Anticipate sedatio
- Midazolam
- Propofol
- Dexmedetomidine
Anticipate sedatio
- LORazepam
Patient has renal i
- LORazepam
- Propofol

Notify primary tear
The titration of the
tapering of the dos

TITRATING OFF IN
The potential for ber
receiving high doses
systematically (i.e. 1

Symptoms of benz
Tremors/seizures, H
Psychotic behavior

EXCESSIVE SEDA

Flumazenil (Romaz
- Flumazenil 0.2
- May give additi
- Additional dose
intervals as nee

Table 3: Confusion Assessm

FEATURE 1: Acute Onset or F
1A: Is the patient different than
OR
1B: Has the patient had any fluct
by fluctuation on a sedation

FEATURE 2: Inattention
First, attempt the Letters (ASE)
move to Feature 3. If patient is
If you perform both tests, use t
2A: AUDITORY (Letter – ASE
Directions: Say to the patie
Whenever you hear the lett
Read letters from the follow
Scoring: Errors are counted
the patient squeezes on any
2B: VISUAL (Pictures – ASE)
Directions: Use the Picture

FEATURE 3: Disorganized Th
3A: Yes/No Questions
(Use either Set A or B, and alter
Set A
1. Will a stone float on water?
2. Are there fish in the sea?
3. Does one pound weigh more
4. Can you use a hammer to pc
(Patien
3B: Command
Say to patient: "Hold up this m
"Now do the same thing with th
patient is unable to move both
"Add one more finger")
(Patient earns 1 point if ab

FEATURE 4: Altered level of
Positive, if the actua
Is the patient's current level of co
score on Richmond Agitation Seda
Alert — Spontaneously fully
Vigilant — Hyper alert
Lethargic — Drowsy but easily a
interacting appropri
prodded minimally
Stupor — Becomes incomplet
stimuli, and as soor
state.
(Features 1 and

Table 4: Intensive Care Delirium Screening Checklist (ICDSC)

| Intensive Care Delirium Screening Checklist | | | SCORE |
|---|---|---|---|
| **1. Altered level of consciousness.** ***Choose ONE from A-E.*** Note: May need to reassess patient if recent administration of sedation therapy. | | | |
| **A.** Exaggerated response to normal stimulation | SAS = 5, 6, or 7 | Score 1 point | |
| **B.** Normal wakefulness | SAS = 4 | Score 0 point | |
| **C.** Response to mild or moderate stimulation (follows commands) *If LOC related to recent sedation/analgesia, score 0* | SAS = 3 | Score 1 point | |
| **D.** Response only to intense and repeated stimulation (e.g., loud voice and pain) | SAS = 2 | **Stop assessment | |
| **E.** No response | SAS = 1 | **Stop assessment | |
| **2. Inattention.** ***Score 1 point for any of the following abnormalities:*** A. Difficulty in following commands OR B. Easily distracted by external stimuli OR C. Difficulty in shifting focus ***Does the patient follow you with their eyes?*** | | | |
| **3. Disorientation.** ***Score 1 point for any of the following abnormality:*** A. Mistake in either time, place, or person ***Does the patient recognize ICU caregivers who have cared for him/her and not recognize those that have not? What kind of place are you in? (list examples)*** | | | |
| **4. Hallucinations or Delusions.** ***Score 1 point for either:*** A. Equivocal evidence of hallucinations or a behavior due to hallucinations (Hallucination = perception of something that is not there with NO stimulus) OR B. Delusions or gross impairment of reality testing (Delusion = false belief that is fixed/unchanging) ***Any hallucinations over past 24 hrs? Are you afraid of the people or things around you? (fear that is inappropriate to clinical situation)*** | | | |
| **5. Psychomotor Agitation or Retardation.** ***Score 1 point for either:*** A. Hyperactivity requiring the use of additional sedative drugs or restraints in order to control potential danger (e.g., pulling IV lines out or hitting staff) OR B. Hypoactive or clinically noticeable psychomotor slowing or retardation ***Based on documentation and observation over shift by primary caregiver*** | | | |
| **6. Inappropriate Speech or Mood.** ***Score 1 point for either:*** A. Inappropriate disorganized or incoherent speech OR B. Inappropriate mood related to events or situation ***Is the patient apathetic to current clinical situation (i.e., lack of emotion)?*** ***Any gross abnormalities in speech or mood? Is patient inappropriately demanding?*** | | | |
| **7. Sleep/Wake Cycle Disturbance.** ***Score 1 point for either:*** A. Sleeping less than four hours at night OR B. Waking frequently at night (do not include wakefulness initiated by medical staff or loud environment) OR C. Sleep ≥ 4 hours during day | | **Based on primary caregiver assessment** | |
| **8. Symptom Fluctuation.** ***Score 1 point for:*** Fluctuation of any of the above items (i.e., 1–7) over 24 hours (e.g., from one shift to another) | | | |
| | | **Based on primary caregiver assessment** **TOTAL ICDSC SCORE (Add 1 through 8):** | |

A total ICDSC score ≥ has a 99 percentage sensitivity correlation for a psychiatric diagnosis of delirium
Source: Bergeron N et al. (2001). Intensive Care Med. Vol. 27. pp. 859-64 - Revised July 22, 2005

# Analgo-sedation: *charte*

**Problem Statement:**

For patients in adult ICUs, there are:

- Inconsistent interpretation of provider orders
- Inconsistent practice in the use of sedation and analgesia
- Lack of an executable pla
  assessment tools and pro

e shortcomi
sequences:

r sedation
ween caregivers
ind

**Customer(s) and Requirements:**

Critical care health care professionals need a straightforward protocol that can be consistently executed.

**Deliverables:**

Tool kit for the assessment and management of intubated ICU adult patients who need sedation to include:

1. Guidelines/Protocols and Algorithm
2. Assessment Tools (pain, sedation, and delirium scales)
3. Evidenced-based Order Set

**Project Scope:**

This project includes intubated patients in adult ICU require more than 24 hours of ventilatory support.

This project *excludes* the following types of patients:

- Extubated patients in adult ICUs
- Pediatrics
- Head trauma and burn injuries
- End of Life care
- Non-Intensive care
- Chemically paralyzed
- Chronic substance abuse

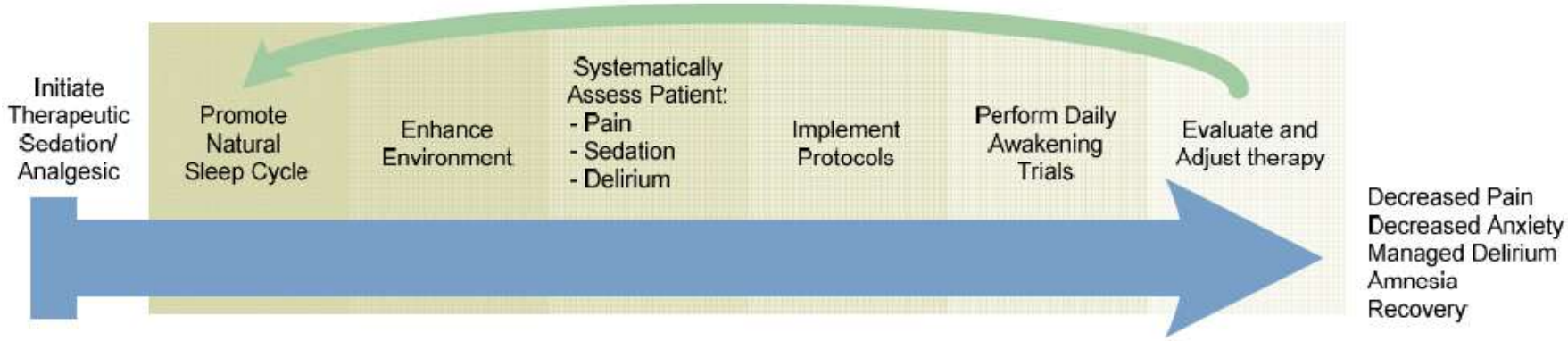
**Goal and Other Potential Benefits of Appropriate Sedation Protocol:**

To develop an evidenced-based tool kit that supports the achievement of the following metrics of appropriate sedation:

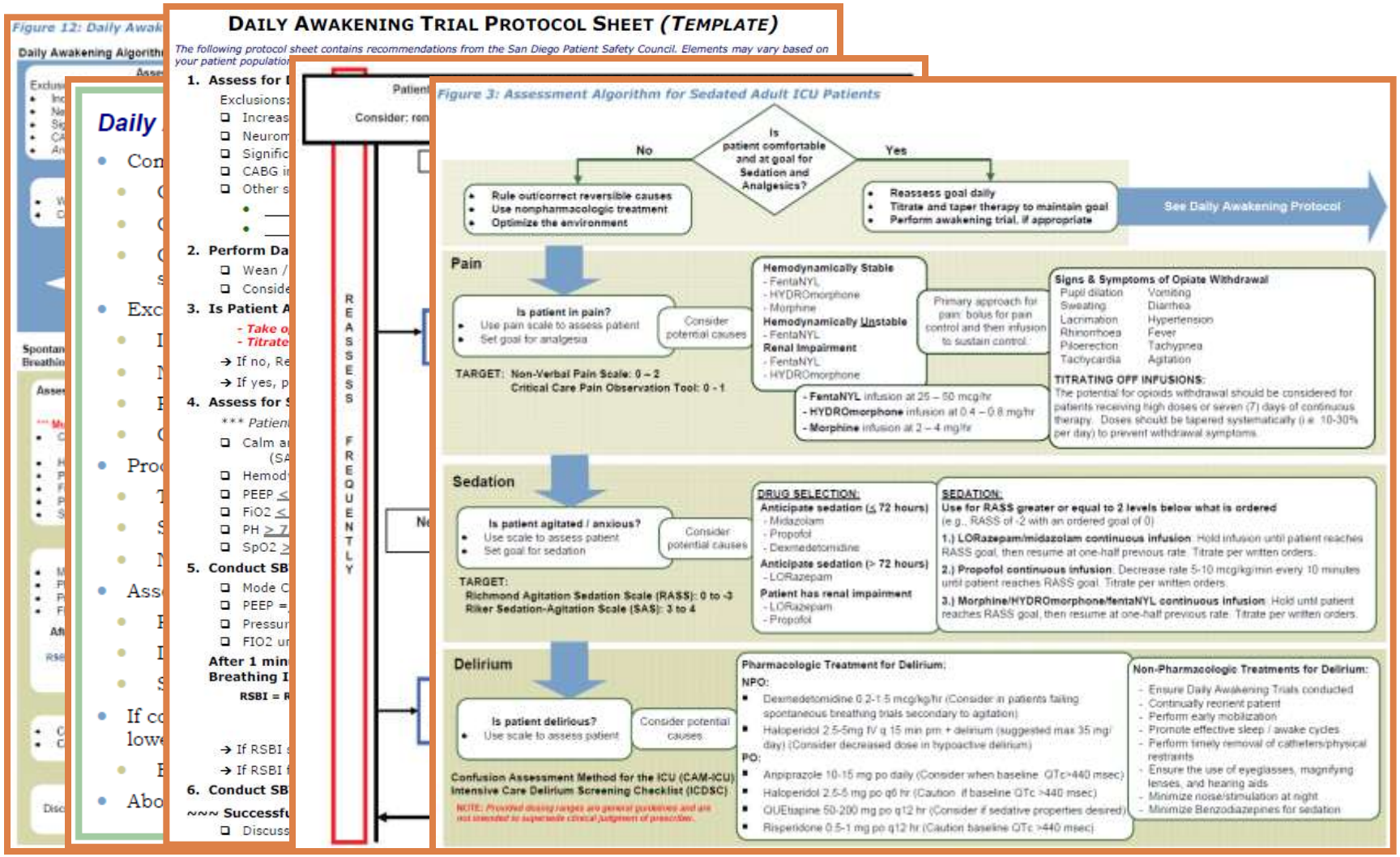
- Decrease pain
- Decrease anxiety
- Decrease patient's ventilator days
- Decrease patient's ICU length of stay
- Reduce long term cognitive decline
- Avoid heart, lung, liver, and kidney complications
- Reduce the incidence of PTSD
- Reduce occurrences of spontaneous extubation
- Reduce the occurrence of delirium and/or improve the management of delirium

- **Analgo-sédation :** *késako?*
- **Analgo-sédation : *recommandations?***
- **Analgo-sédation :** *écarts?*

# Analgo-sédation : *recommandations?*



# Analgo-sedation: *protocoles*



# Analgo-sedation: *protocoles*

*Scheduled opioid doses or a continuous infusion is preferred over an "as needed" regimen to ensure consistent analgesia. A PCA device may be utilized to deliver opioids if the patien*
*operate the device. (Grade*

*Fentanyl is preferred for*
*in acutely distressed pati*
*dation = C)*

*Fentanyl or hydromorphon*
*with hemodynamic instab*
*(Grade of recommendation*

*Morphine and hydromo*
*intermittent therapy becau*
*effect. (Grade of recomme*

*Recommendation: Sedatio*
*patients should be starte*
*equate analgesia and treat*
*causes. (Grade of recomm*

*Recommendations: A sedati*
*be established and regularl*
*Regular assessment and response to therapy should be systematically documented. (Grade of recommendation = C)*

*Recommendations: Mid*
*diazepam should be used for rapid*
*sedation of acutely agit*
*(Grade of recommendatio*

*Propofol is the prefer*
*when rapid awakening (*
*rologic assessment or extubation) is important. (Grade of recommendation = B)*

*Midazolam is recommended for short-term use only, as it produces unpredictable awakening and time to extubation when infusions continue longer than 48–72 hours. (Grade of recommendation = A)*

*The titration of the sedative dose to a defined endpoint is recommended with systematic tapering of the dose or daily interruption with retitration to minimize prolonged sedative effects. (Grade of recommendation = A)*

*Recommendation: The potential for opioid, benzodiazepine, and propofol withdrawal should be considered after high doses or more than approximately*
*seven days of contin*
*pered systematically*
*(Grade of recomme*

*Recommendations: Haloperidol is the preferred agent for the treatment of delirium in critically ill patients. (Grade of recommendation = C)*

*Patients should be monitored for electrocardiographic changes (QT interval prolongation and arrhythmias) when receiving haloperidol. (Grade of recommendation = B)*

*Recommendation: Sleep promotion should include optimization of the environment and nonpharmacologic methods to promote relaxation with adjunctive use of hypnotics. (Grade of recommendation = B)*

# **Analgo-sedation:** *protocoles*

- **Analgo-sédation** *Propofol midazolam / Sufentanil remifentanil*
- **Echelles** *EVA / BPS*
- **Evaluations régulières** *Ramsay / ATICE*
- **Protocoles** *Arrêt quotidien / titration*

- **Analgo-sédation :** *késako?*
- **Analgo-sédation :** *recommandations?*
- **Analgo-sédation :** *écarts?*

## Clinical Practice Guidelines for the Sustained Use of Sedatives and Analgesics in the Critically Ill Adult

Crit Care Med 2002

Anesthesiology 2007; 106:687–95



## *Current Practices in Sedation and Analgesia for Mechanically Ventilated Critically Ill P*

*A Prospective Multicenter Patient-based Study*

*Jean-Francois Payen, M.D., Ph.D.,* Gérald Chanques, M.D.,† Jean Mantz, M.D*
*Igor Auriant, M.D.,‖ Jean-Luc Leguillou, M.D.,# Michèle Binhas, M.D.,** Céline*
*Jean-Luc Bosson, M.D., Ph.D.§§ for the DOLOREA Investigators‖‖‖*

**Perceived versus Actual Sedation Practices in Adult Intensive Care Unit Patie**

Kimberly Varney Gill PharmD BCPS, Stacy A Voils PharmD BCPS, Gregory A Chenault PharmD, Gretchen M Brophy Pha
The Annals of Pharmacotherapy. 2012;46(10):1331-1339.

## Current Sedation Practices: Lessons Learned from International Surveys

Sangeeta Mehta, MD, FRCPC[a,d,*], Iain McCullagh, MBChB, FRCA[b],
Lisa Burry, PharmD, FCCP[c,d]

Crit Care Clin 25 (2009) 471–488

Ann Pharmacother. 2012 Apr;46(4):530-40. doi: 10.1345/aph.1Q525.

## Analgosedation: a paradigm shift in intensive care unit sedation practice.

Devabhakthuni S, Armahizer MJ, Dasta JF, Kane-Gill SL.

Research

Open Access

## Sedation practice in the intensive care unit: a UK national survey

Henrik Reschreiter[1], Matt Maiden[1] and Atul Kapila[2]

*Critical Care* 2008, **12**:R152 (doi:10.1186/cc7141)

Anesthesiology 2007; 106:687–95



# *Current Practices in Sedation an*
# *Mechanically Ventilated Critically*

## *A Prospective Multicenter Patient-based Stu*

**Table 2. Incidence (%) of Patients Being Assessed and Those Receiving Sedatives and Analgesics during the ICU Stay**

| | D2 (1,360 Patients) | D4 (1,256 Patients) | D6 (1,099 Patients) |
|---|---|---|---|
| Patients on MV | 94 | 82 | 76 |
| Sedation | | | |
| | | 36 | 31 |
| | | 56* | 49* |
| | | 39 | 37 |
| | | 80* | 74* |
| | | 35 | 35 |
| | | 21* | 22* |
| | | 36 | 35 |

ive care unit (ICU) stay.
(chi-square test).

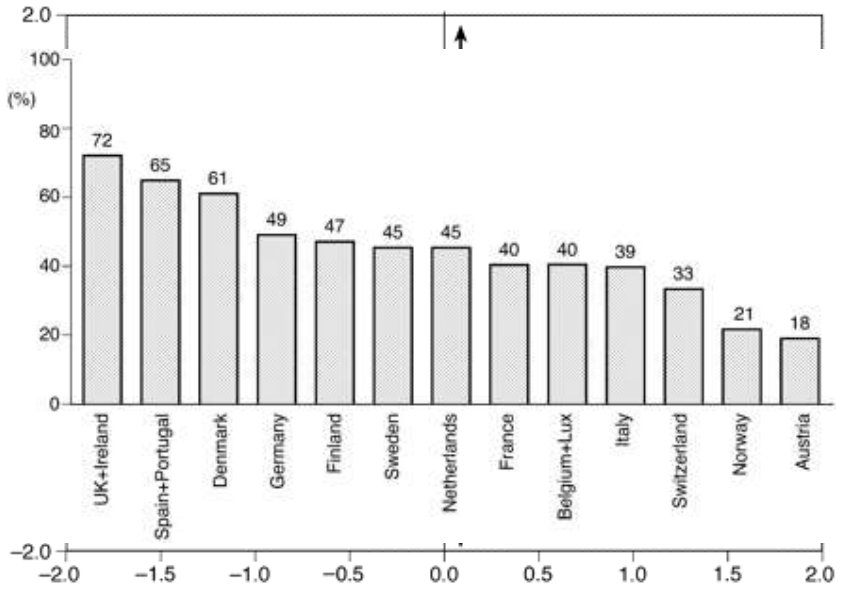
**Table 5. Impact of the Use of Protocol for Sedation and Analgesia Management among the 44 Participating Sites**

| | Use of Protocol (n = 16 Sites) | No Use of Protocol (n = 28 Sites) |
|---|---|---|
| University hospital, n (%) | 12 (75) | 22 (79) |
| ICU beds per site, median (range) | 13 (8–31) | 12 (8–24) |
| Caregivers per bed, median (range) | 4.1 (2.7–5.6) | 4.1 (2.0–7.5) |
| Low-recruiter sites, n (%) | 5 (31) | 14 (50) |
| Dedicated education, n (%) | 12 (75) | 11 (39)* |
| Patients on MV on D2, n (%) | 602 (91) | 672 (96)† |
| SAPS II, median (range) | 41 (8–107) | 44 (6–112)* |
| Sedation on D2, n (%) | | |
| Assessment | 370 (56) | 215 (31)† |
| Treatment | 451 (68) | 530 (76)† |
| Analgesia on D2, n (%) | | |
| Assessment | 398 (60) | 175 (25)† |
| Treatment with opioids | 572 (87) | 647 (92)† |
| Procedural pain on D2, n (%) | | |
| Assessment | 335 (51) | 143 (20)† |
| Treatment | 148 (22) | 158 (23) |
| Nonopioids on D2, n (%) | 217 (33) | 230 (33) |

Low-recruiter sites were defined as less than 20 patients included per site during the study. The number of patients in the intensive care unit (ICU) on day 2 (D2) was 660 in sites using a protocol and 700 in sites using no protocol.

* $P < 0.05$ and † $P < 0.01$ *vs.* "use of protocol."

MV = mechanical ventilation; SAPS = Simplified Acute Physiology Score.




**Utilisation des échelles de sédation dans les réanimations européennes**

**Soliman HM et al. British Journal of Anaesthesia, 2001, 87:186-192**

## Perceived versus Actual Sedation Practices in Adult Intensive Care Unit Patients Receiving Mechanical Ventilation

Kimberly Varney Gill PharmD BCPS, Stacy A Voils PharmD BCPS, Gregory A Chenault PharmD, Gretchen M Brophy PharmD BCPS FCCP FCCM

The Annals of Pharmacotherapy. 2012;46(10):1331-1339.

**Conclusions:** These data suggest differences in perceived and actual sedation practice in the US, as well as underutilization of evidence-based interventions.

Most notable was the limited use of sedation treatment algorithms, daily interruption of sedation, and monitoring for delirium. Individual sedation and delirium protocols should be evaluated and updated based on evidence-based recommendations

Ann Pharmacother. 2012 Apr;46(4):530-40

**Analgosedation: a paradigm shift in intensive care unit sedation practice.**

Devabhakthuni S, Armahizer MJ, Dasta JF, Kane-Gill SL.

Conclusion : Analgosedation is an efficacious and well-tolerated approach to management of ICU sedation with improved patient outcomes compared to sedative-hypnotic approaches. Additional well-designed trials are warranted to clarify the role of analgosedation in the management ofICU sedation, including trials with nonopioid analgesics.

# Current Sedation Practices: Lessons Learned from International Surveys

Sangeeta Mehta, MD, FRCPC[a,d,*], Iain McCullagh, MBChB, FRCA[b], Lisa Burry, PharmD, FCCP[c,d]

Crit Care Clin 25 (2009) 471–488

- What constitutes the ideal level of sedation in the ICU is still controversial. In the past, the practice of ICU sedation has focused on the extensive use of sedatives to achieve deep sedation or ''detachment'' from the environment.
- Recent evidence suggests that patient outcomes are significantly influenced by the choice of agent, the presence of over- or undersedation, poor pain control, and delirium.
- Thus, there is a trend toward lighter sedation guided by sedation assessment tools.

Research

Open Access

# Sedation practice in the intensive care unit: a UK national survey

Henrik Reschreiter[1], Matt Maiden[1] and Atul Kapila[2]

*Critical Care* 2008, **12**:R152 (doi:10.1186/cc7141)

**Conclusions** Most UK ICUs use a sedation guideline and sedation scoring tool. The concept of sedation holding has been implemented in the majority of units, and most ICUs have a written sedation guideline.

# No sedation : *Is it possible?*

Crit Care Med. 2007 Feb;35(2):635-7.

**Comfort without coma: changing sedation practices.**

Fraser GL, Riker RR.

Crit Care Med. 2009 Sep;37(9):2654-5.

**Living on the lighter side of sedation in the intensive care unit: is there a psychological cost?**

Girard TD.

Lancet 2010;375:475-80.

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

Strom T, Martinussen T, Toft P.

**Design overview**

In the main study the primary end point was to prove the effect of a no sedation strategy compared to a standard strategy with sedation and daily interruption of sedative infusions.

**The primary endpoints were the length of mechanical ventilation, length of ICU stay and total hospital length of stay.**

Secondary endpoints were the number of ventilator associated pneumonias (VAP),

number of CT or MR scans of the cerebrum and number of accidental extubations.

In the renal posthoc study we defined the renal effects in terms of urine output and RIFLE classification as the primary endpoints.

Secondary endpoints were the mean arterial blood pressure, fluid balance and the use of vasoactive drugs between the two groups.

For the psychological follow up study the primary endpoint was the rate of PTSD between the groups. Other measures such as general health, rate of depression and recalls from the ICU were secondary outcomes.

Strom T, Johansen RR, Prahl JO et al.

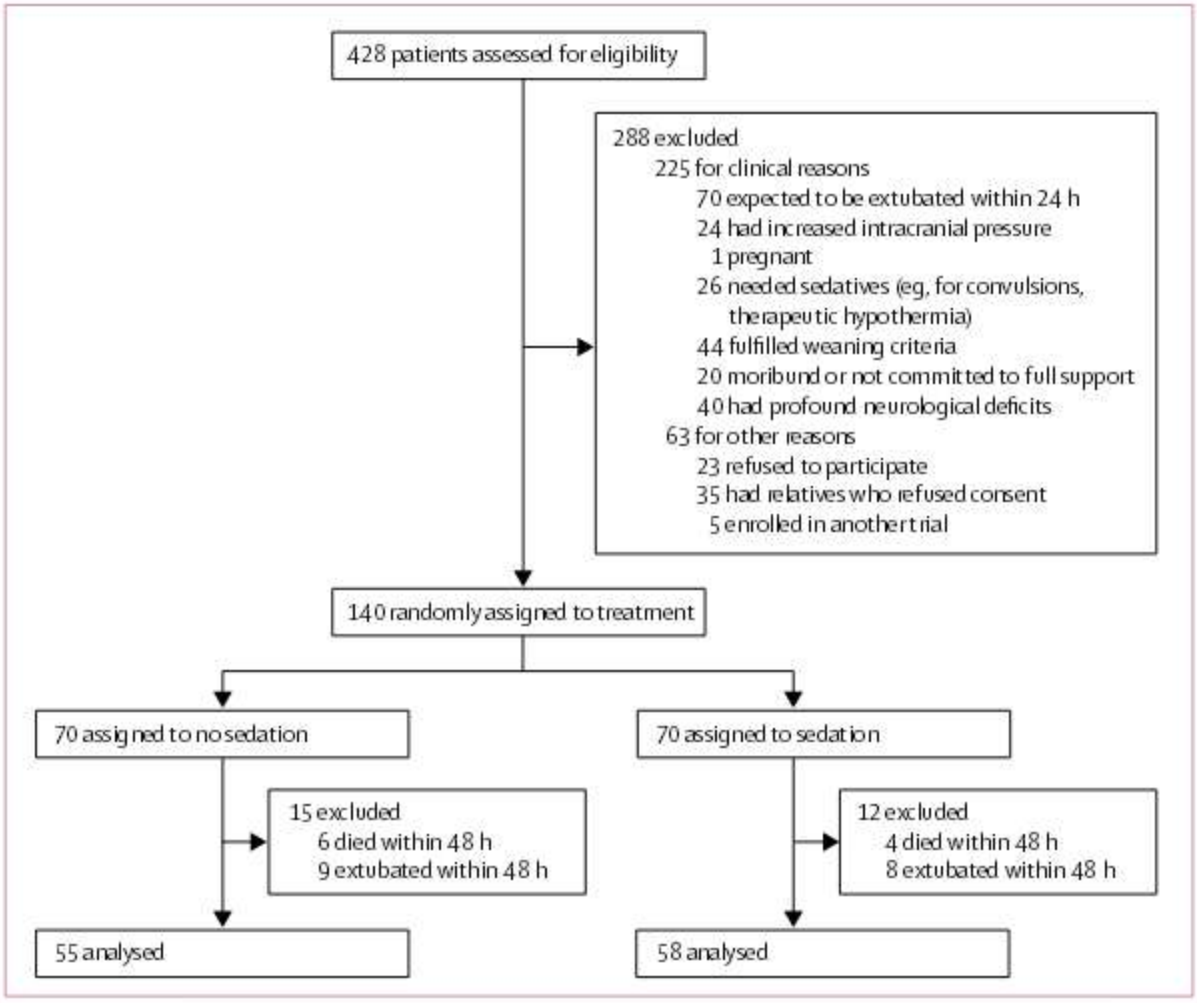
**Sedation and renal impairment in critically ill patients: a post hoc analysis of a randomized trial.**

Crit Care 2011;15:R119.

Strom T, Stylsvig M, Toft P.

**Long-term psychological effects of a no-sedation protocol in critically ill patients.**

Crit Care 2011;15:R293.




patients, the study period s
our intensive care unit; no
duration for which patie
ventilation before they were

The study was approved
committee, and written in
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was given by the patients re
consent was obtained from

**Randomisation and maskin**

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previous dose and titrated to a Ramsay score of 3–4. After 48 h, the sedative was changed to an infusion of midazolam (1 mg/mL) titrated to a Ramsay score of 3–4. Thereafter, daily interruption of sedation, and titration of midazolam to a Ramsay score of 3–4 was continued as for treatment with propofol. Daily interruption of sedation and testing was done by a nurse, and checked by the attending doctor; if the nurse and attending doctor were in doubt of whether the patient could be judged as awake, the investigators assessed the patient.

If possible, both groups of patients were mobilised daily to a chair, despite mechanical ventilation, as per our standard routine; patients from the control group were mainly mobilised during daily interruption of sedation. The standard ventilation method was pressure support. Patients were only put on controlled ventilation in the case of severe prolonged hypoventilation. We decided a priori to stop infusion of sedatives in the control group when ventilator settings reached an $FiO_2$ of 40% and a positive end-expiratory pressure of 5 cm $H_2O$; after this point, patients were not sedated and treatment was identical to that of the intervention group. Sedation was started again if patients in the control group needed increased respiratory support ($FiO_2$ >50% and positive end-expiratory pressure

| | No sedation (n=55) | Sedation (n |
|---|---|---|
| Age (years) | 67 (54–74) | 65 (54–74) |
| Women | 13 (24%) | 24 (41%) |
| Weight (kg) | 80·0 (74·0–92·0) | 78·5 (70·0– |
| APACHE II | 26 (19–30) | 26 (22–31) |
| SAPS II | 46 (36–56) | 50 (43–63) |
| SOFA (at day 1) | 7·5 (5·0–11·0) | 9·0 (5·5–1 |
| Diagnosis at admission to intensive care unit | | |
| Respiratory disorder* | 26 (47%) | 27 (47%) |
| Sepsis | 15 (27%) | 19 (33%) |
| Pancreatitis | 2 (4%) | 3 (5%) |
| Peritonitis | 0 | 1 (2%) |
| Gastro-intestinal bleeding | 5 (9%) | 0 |
| Liver and biliary disease | 2 (4%) | 0 |
| Trauma | 2 (4%) | 3 (5%) |
| Other | 3 (5%) | 5 (9%) |

Data are in number (%) or median (IQR). APACHE II=acute physiology an health evaluation. SAPS II=simplified acute physiology score. SOFA=seq organ-failure assessment. *Pneumonia, chronic obstructive pulmonary and asthma.

***Table 1:*** **Baseline characteristics on admission to the intensive c**

| | No sedation (n=55) | Sedation (n=58) | p value |
|---|---|---|---|
| Days without mechanical ventilation (from intubation to day 28) | 13·8 (11·0); 18·0 (0–24·1) | 9·6 (10·0); 6·9 (0–20·5) | 0·0191*† |
| Length of stay (days) | | | |
| Intensive care unit | 13·1 (5·7–··)‡ | 22·8 (11·7–··)‡ | 0·0316*§ |
| Hospital | 34 (17–65) | 58 (33–85) | 0·0039*§¶ |
| Mortality | | | |
| Intensive care unit | 12 (22%) | 22 (38%) | 0·06 |
| Hospital | 20 (36%) | 27 (47%) | 0·27 |
| Drug doses (mg/kg)‖ | | | |
| Propofol (per h of infusion)** | 0 (0–0·515) | 0·773 (0·154–1·648) | 0·0001 |
| Midazolam (per h of infusion) | 0 (0–0) | 0·0034 (0–0·0240) | <0·0001 |
| Morphine (per h of mechanical ventilation) | 0·0048 (0·0014–0·0111) | 0·0045 (0·0020–0·0064) | 0·39 |
| Haloperidol (per day of mechanical ventilation) | 0 (0–0·0145) | 0 (0–0) | 0·0140 |
| Tracheostomy | 16 (29%) | 17 (29%) | 0·98 |
| Ventilator-associated pneumonia | 6 (11%) | 7 (12%) | 0·85 |

Data are mean (SD), median (IQR), or number (%). ··=data not available because of censoring at day 28. *Corrected for baseline variables: age, sex, weight, acute physiology and chronic health evaluation (APACHE II), simplified acute physiology score (SAPS II), and sequential organ-failure assessment (SOFA) at day 1. †Calculated from multiple linear regression. ‡More than 25% of patients remained in the intensive care unit for more than 28 days (figure 2). §Calculated from Cox regression analysis. ¶Calculated for the first 30 days to agree with the proportional hazards assumption. ||Drug dose (mg) as a proportion of bodyweight (kg). **Maximum dose during 48 h of treatment.

***Table 2:*** **Outcome data**

(HRs), after adjustment for the baseline variables was stopped within 48 h (figure 1). An extra person was

Mean doses of propofol and midazolam are shown in table 2. The protocol was deviated for ten (18%) patients in the intervention group, who received continuous sedation on more than two occasions. In most cases, sedation was needed to permit sufficient oxygenation in severe acute respiratory distress syndrome (eg, prone ventilation), but one patient was sedated after request from relatives. These ten patients account for most of the sedative drugs used in the intervention group, but use of these sedatives was significantly lower in the intervention group than in the control group. Difference in morphine dose between the two groups was not significant.

Delirium was recorded in 11 (20%) patients in the intervention group and 4 (7%) in the control group (p=0·0400). Haloperidol was used more frequently in the intervention group (n=19) than in the control group (n=8; p=0·0100), but the doses were very low for both groups (table 2).

## Discussion

Findings from our study show that in critically ill patients receiving mechanical ventilation, a protocol of no sedation significantly increased the number of days without ventilation in a 28-day period compared with daily interruption of sedation. Use of no sedation was also associated with a significant reduction in the length of stay in the intensive care unit and in hospital. No difference in complications such as accidental removal of the endotracheal tube, ventilator-associated pneumonia, or need for CT and MRI brain scans were recorded. Mortality was increased in the group receiving sedation, but the difference compared with the group receiving no sedation did not reach significance. The occurrence of agitated delirium was increased in the group receiving no sedation.

Our study responded to calls in editorials and review

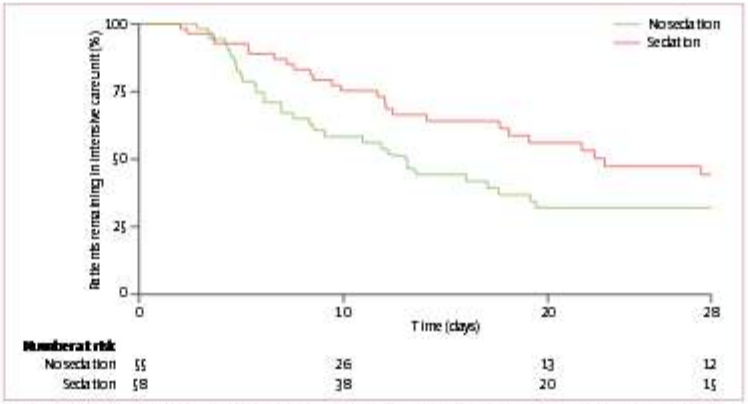


Figure 2: Kaplan-Meier plot of length of stay in the intensive care unit and number at risk from admission to 28 days

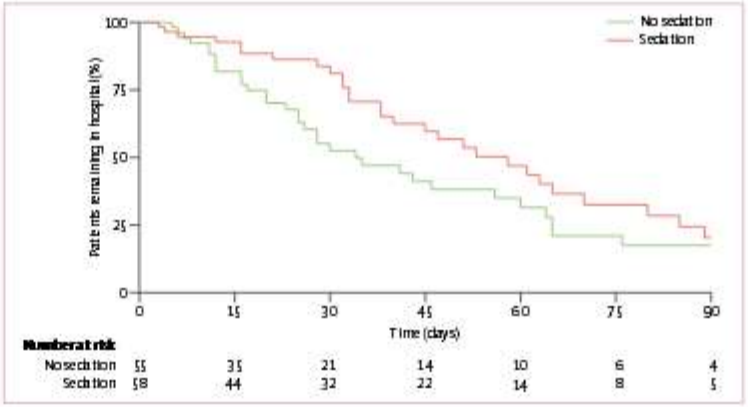


Figure 3: Kaplan-Meier plot of length of stay in hospital and number at risk from admission to 90 days

# No sedation price?

- Autoextubation : idem
- Delirium : 20 vs 14%
- Haloperidol : 35 vs 14%
- Extraperson : 20 vs 5%
- Violation/déviation : 18%

# Back-home message ☺

- Are both sedative and analgesic drugs needed upfront?
- Does the patient have one or several pathological disorders that result in drug accumulation?
- Could a different ventilator setting help adaption and reduce or eliminate the need for drug treatment?
- If treatment with both sedative and analgesic drugs is needed on initial examination, does the patient continue to need both drugs at the same doses?