Sedace na ICU

- věc jednoduchá?

OA Dr. Stibor B.

ICU, Landesklinikum Baden bei Wien, Austria

no conflict of interest

OA Dr. Stibor B.

ICU, Landesklinikum Baden bei Wien, Austria

přehled

1. guidelines
2. *light or no sedation*
3. propofol
4. benzodiazepiny
5. agonisté
6. ostatní
7. nefarmakologické postupy

current guidelines

2018 PADIS *guidelines*

Online Special Article

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]; Arjen J. C. Slooter, MD, PhD[7]; Pratik P. Pandharipande, MD, MSCI, FCCM[8]; Paula L. Watson, MD[9]; Gerald L. Weinhouse, MD[10]; Mark E. Nunnally, MD, FCCM[11,12,13,14]; Bram Rochwerg, MD, MSc[15,16]; Michele C. Balas, RN, PhD, FCCM, FAAN[17,18]; Mark van den Boogaard, RN, PhD[19]; Karen J. Bosma, MD[20,21]; Nathaniel E. Brummel, MD, MSCI[22,23]; Gerald Chanques, MD, PhD[24,25]; Linda Denehy, PT, PhD[26]; Xavier Drouot, MD, PhD[27,28]; Gilles L. Fraser, PharmD, MCCM[29]; Jocelyn E. Harris, OT, PhD[30];

Crit Care Med. 2018;*46:825-873*.

2013 PAD *guidelines*	**2018 PADIS** *guidelines*
nonbenzodiazepine sedatives (either *propofol* or *dexmedetomidine*) are **preferable** to **benzodiazepine** sedatives (either *midazolam* or *lorazepam*) in critically ill patients	
improved **short-term** outcomes	improved both **short-term** and **long-term** outcomes
- ICU LOS - duration of mechanical ventilation - delirium	- time to extubation, time to light sedation, delirium - 90-day mortality, cognitive and physical functioning, institutionalization, and psychologic dysfunction

SPECIAL ARTICLE

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

Lewis, Kimberley MD, MSc, FRCPC (Methodology Chair)[1,2,3]; Balas, Michele C. RN, PhD, CCRN, FCCM, FAAN (Chair)[4]; Stollings, Joanna L. PharmD, FCCM (Vice-Chair)[5,6]; McNett, Molly RN, PhD, CNRN, FNCS, FAAN (Vice-Chair)[7]; Girard, Timothy D. MD, MSCI, ATSF[8]; Chanques, Gerald MD, PhD[9]; Kho, Michelle E. PT, PhD[3,10,11]; Pandharipande, Pratik P. MD, FCCM[6,12]; Weinhouse, Gerald L. MD[13]; Brummel, Nathan E. MD, MSCI, ATSF, FCCM[14]; Chlan, Linda L. RN, PhD, ATSF, FAAN[15]; Cordoza, Makayla RN, PhD, CCRN[6,16,17]; Duby, Jeremiah J. PharmD, BCPS, BCCCP, FCCM[18]; Gélinas, Céline RN, PhD, FCAN[19,20]; Hall-Melnychuk, Erin L. PsyD, MSCP[21,22]; Krupp, Anna RN, PhD, CCNS, CCRN-K, MSHP[23]; Louzon, Patricia R. PharmD, BCPS, BCCCP, FFSHP, FCCM[24]; Tate, Judith A. RN, PhD, ATS-F, FAAN[7]; Young, Bethany RN, PhD, CCRN, AGCNS-BC[25]; Jennings, Ron; Hines, Anitra; Ross, Chris; Carayannopoulos, Kallirroi Laiya MD, MSc(c), FRCPC[1,2,3]; Aldrich, J. Matthew MD, FCCM (Chair)[26]

Society of Critical Care Medicine
The Intensive Care Professionals

POPULATION: **Adult Critically Ill Patients**
(Specific recommendations for pediatric patients are not made.)

P **Prevention and Management of Pain**	(No updates made to previous guidelines recommendations for pain.)	
A **Anxiety, Agitation/Sedation**	Insufficient Evidence For explanation, see Full Focused Update Guidelines.	1. There is insufficient evidence to make a recommendation on the use of benzodiazepines to treat anxiety in adult patients admitted to the ICU.
	Conditional Recommendation For  Moderate Certainty of Evidence 	2. **We suggest** using dexmedetomidine over propofol for sedation in mechanically ventilated adult patients admitted to the ICU where light sedation and/or a reduction in delirium are of highest priorities.
D **Delirium**	Conditional Recommendation For Intervention or Comparison  Low Certainty of Evidence 	3. We are unable to issue a recommendation for or against the use of antipsychotics over usual care for the treatment of delirium in adult patients admitted to the ICU.
I **Immobility**	Conditional Recommendation For  Moderate Certainty of Evidence 	4. **We suggest** providing enhanced mobilization/ rehabilitation over usual care mobilization/rehabilitation to adult patients admitted to the ICU.
S **Sleep Disruption**	Conditional Recommendation For  Low Certainty of Evidence 	5. **We suggest** administering melatonin over no melatonin in adult patients admitted to the ICU.

goal

critically ill patients should be awake, attentive, painless, fearless and without delirium
in order to be able to actively participate
in one's own treatment and recovery

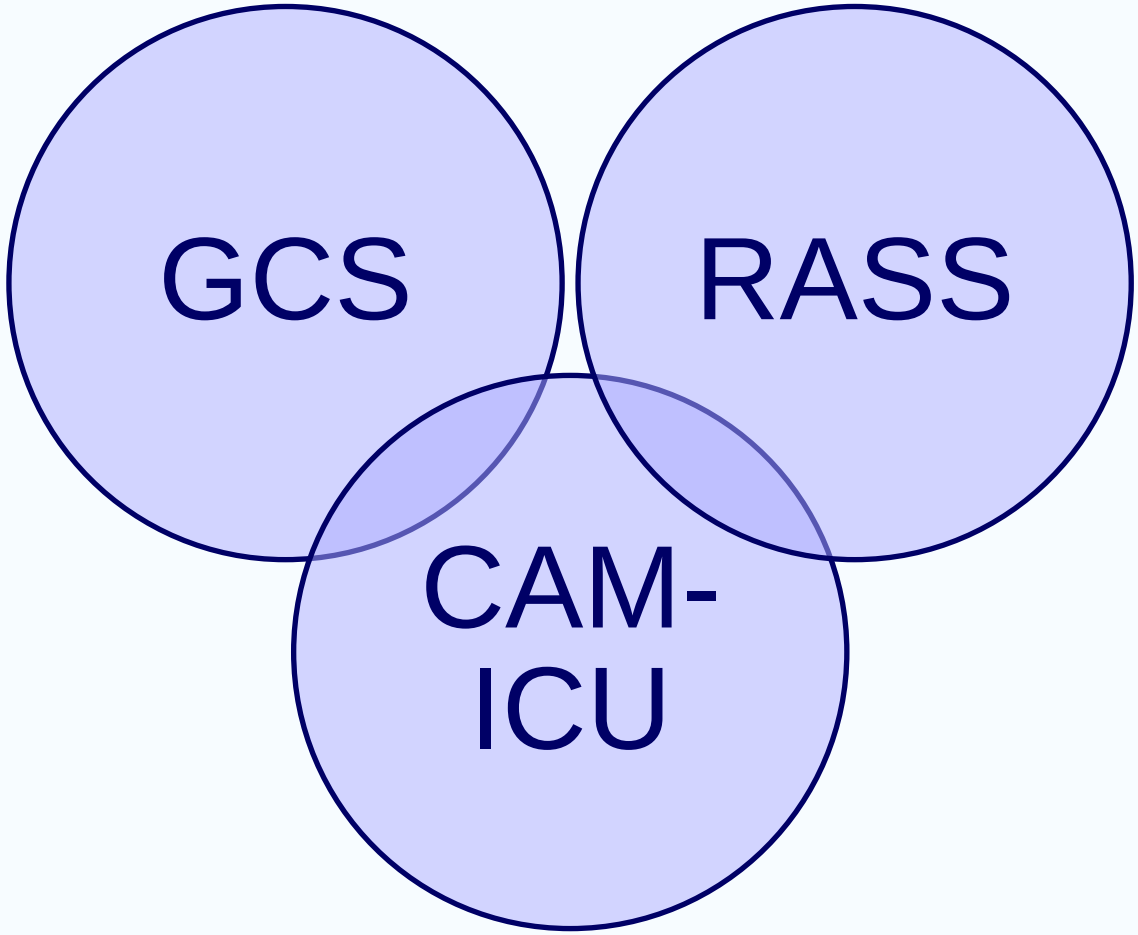




monitorace

analgosedace

monitorace analgosedace

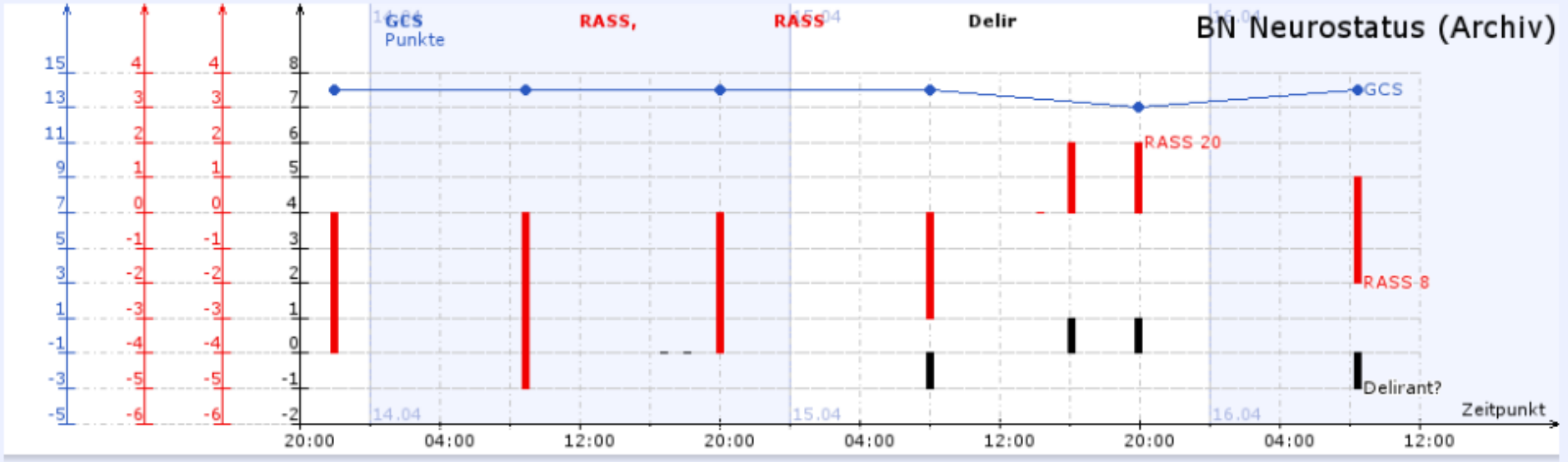


Tabulka 1. Richmond Agitation and Sedation Scale (RASS)

Skóre	Stav	Popis
+4	Bojovný	Očividně bojovný, násilný, bezprostředně ohrožuje personál
+3	Výrazně agitovaný	Tahá či vytahuje kanylu či katetry, agresivní
+2	Agitovaný	Časté bezcílné pohyby, zápasí s ventilátorem
+1	Neklidný	Úzkostný, ale pohyby bez známek živé agrese
0	Bdělý ale klidný	
-1	Somnolence	Není plně bdělý, ale reaguje při oslovení (otevření oči/oční kontakt >10 s)
-2	Lehká sedace	Krátké probuzení a oční kontakt na oslovení (<10 s)
-3	Střední sedace	Pohyb či otevření očí na oslovení (bez očního kontaktu)
-4	Hluboká sedace	Žádná odpověď na oslovení, pouze pohyb či otevření očí na fyzický podnět
-5	Neprobuditelný	Žádná odpověď na oslovení ani fyzický podnět

Neurostatus ges.

13.04.2014 20:00 - 16.04.2014 12:00



Analgosedierung

14.04.2014 - 16.04.2014	11	13	15	17	19	21	23	01	03	05	07	09	11	13	15	17	19	21	23	01	03	05	07	09	Gesamt
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Regelmässig																									
Startonyl 1000 mg .. 10 mg/ml															1000 mg									1000 mg	2000 mg
Medikamenteninfusionen																									
Ziel																									
Dexdor 400µg-Bypass 8 µg/ml	4 ml/h	3 ml/h !	2.9 ml/h							5 ml/h !	5 ml/h !				6 ml/h !	3.5 ml/h !			8 ml/h !	8 ml/h !				8 ml/h !		2131 µg
Propofol 2% 50ml-.. 20 mg/ml	4 ml/h !			2 ml/h !	2 ml/h !			4 ml/h !	4 ml/h !				4 ml/h !	4 ml/h !	2 ml/h !	1 ml/h !	0 ml/h !								1709 mg
Ultiva 2mg / 50 .. 0.04 mg/ml	3 ml/h !		1 ml/h !	1 ml/h !			2 ml/h !							1.5 ml/h !											2.15 mg

no sedation

or

light sedation

light, no sedation

- the **2018 guidelines** suggest that **light sedation** and not deep sedation should be **used** in critically ill mechanically **ventilated adults**
- mechanically ventilated patients should not be deeply sedated without a **specific indication** and without daily attempts to lighten sedation
- light sedation is between **-2 to +1**
- **shorter** duration of invasive mechanical ventilation and reduced **tracheotomy** rates

Society of Critical Care Medicine, American Association of Critical Care Nurses, Chest Association of Physicians, American Thoracic Society

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Nonsedation or Light Sedation in Critically Ill, Mechanically Ventilated Patients

Hanne T. Olsen, M.D., Helene K. Nedergaard, M.D., Ph.D., Thomas Strøm, M.D., Ph.D., Jakob Oxlund, M.D., Karl-Andre Wian, M.D., Lars M. Ytrebø, M.D., Ph.D., Bjørn A. Kroken, M.D., Michelle Chew, M.D., Ph.D., Serkan Korkmaz, Jørgen T. Lauridsen, M.Sc., and Palle Toft, M.D., D.M.Sc.

ABSTRACT

BACKGROUND

In critically ill, mechanically ventilated patients, daily interruption of sedation has been shown to reduce the time on ventilation and the length of stay in the intensive care unit (ICU). Data on whether a plan of no sedation, as compared with a plan of light sedation, has an effect on mortality are lacking.

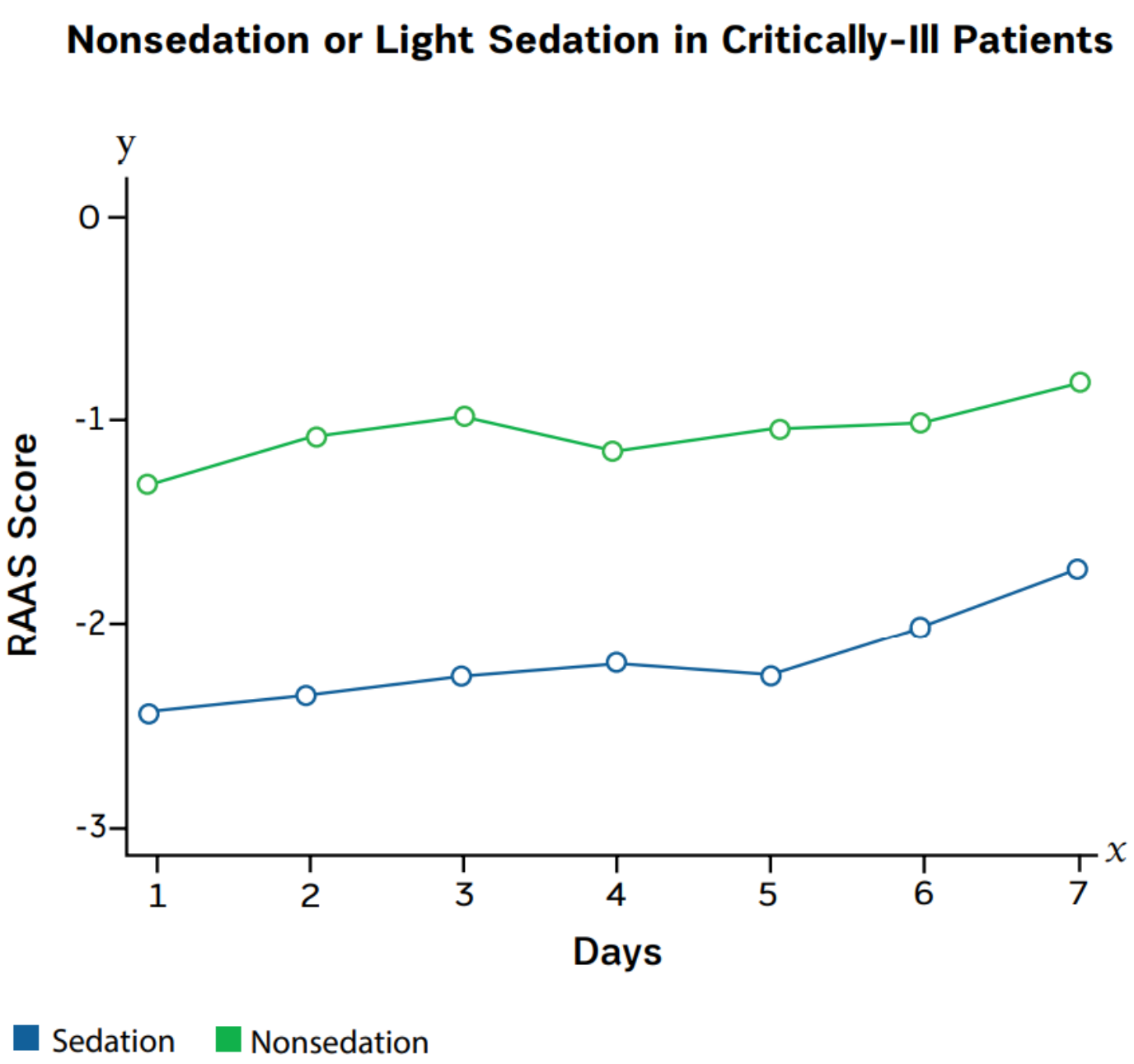
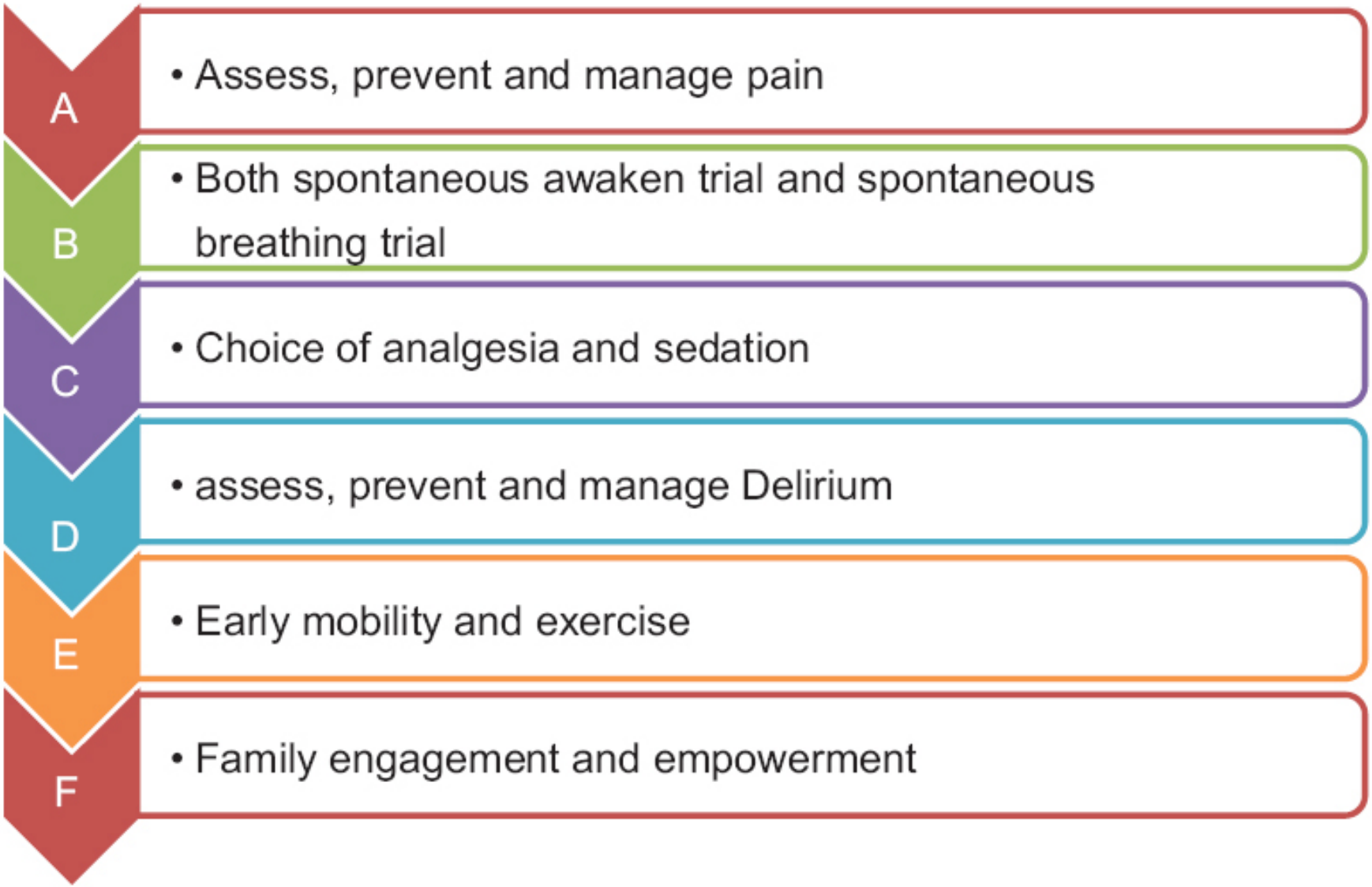
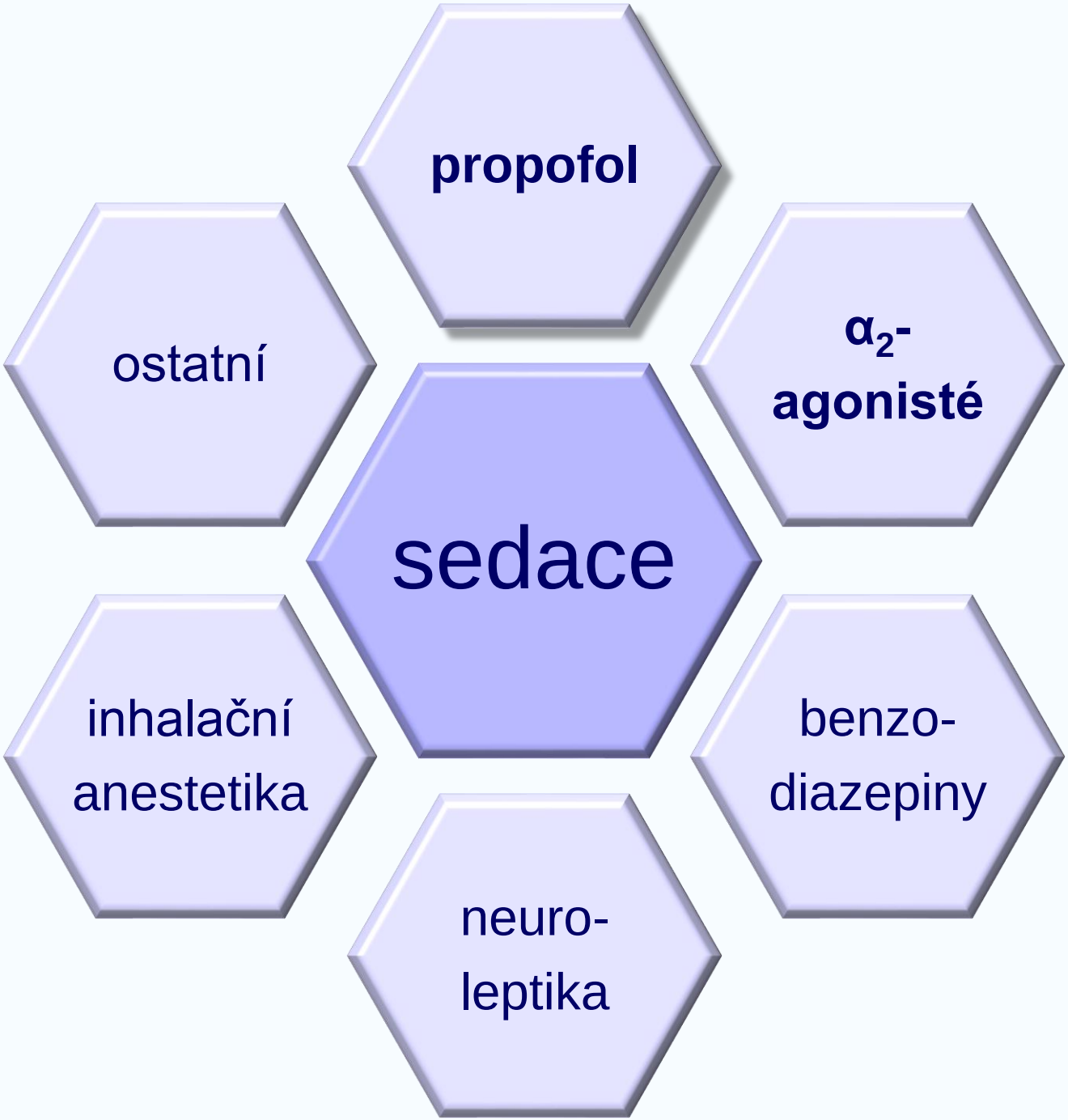


Figure 1. Nonsedation or Light sedation in critically-ill, mechanically ventilated patients. Adapted from Olsen et al. 2020



Respir Crit Care Med.*37(1):119-125*.


propofol
ostatní
α_2-agonisté
sedace
inhalační anestetika
benzo-diazepiny
neuro-leptika

propofol

propofol

- **nejčastěji** používané sedativum
- Německo: povoleno použití od **17. roku** věku, max. po dobu **7 dnů** a v dávce **≤ 4 mg/kg/h**
- být si vědom **nežádoucích** účinků!
- *propofol-related infusion syndrom*
- **sterilita**!
- **energetický** příjem (tuková emulze)

benzodiazepiny

benzodiazepiny

- **nejsou** doporučeny jako *first-line* sedativa
- použití je rizikovým faktorem vzniku **deliria**
- léky 1. volby u **syndromu z odnětí** (alkohol, léky) a součást léčby **epileptických** stavů
- midazolam, lorazepam, lormetazepam, flunitrazepam ..
- **lormetazepam**
  - orální forma dostupná více jak 30 let
  - intravenózní forma dostupná od r. 2011

S3-Leitlinie

Analgesie, Sedierung und Delirmanagement in der Intensivmedizin (DAS-Leitlinie 2020)

AWMF-Registernummer: 001/012

Für Patient:innen mit Alkoholkrankheit und einem Delir (20-50% der ICU-Patient:innen) sind Benzodiazepine in Bezug auf Sicherheit und Effektivität vorteilhaft[386].

Ultrakurzwirksame Benzodiazepine (z.B. Remimazolam)[387] und Benzodiazepine mit alternativem Metabolisierungsweg und veränderter Pharmakodynamik (insbesondere einer stärkeren anxiolytischen Komponente (z.B. Lormetazepam[388]), können in Zukunft alternative Optionen darstellen und werden bereits erfolgreich eingesetzt.

α_2- agonisté

clonidin

- **paucity of evidence** to support the use of clonidine (a lack of **controlled trials** in critically ill adults)
- common use in the **UK**
- clonidine **reduces** the total dose of **opioids**
- associated with **increased incidence** of clinically significant **hypotension**

Received: 13 November 2019 | Revised: 13 February 2020 | Accepted: 26 February 2020

DOI: 10.1111/bcp.14273

ORIGINAL ARTICLE

Optimising the dose of clonidine to achieve sedation in intensive care unit patients with population pharmacokinetics

Michael E. Cloesmeijer[1] | Huub L.A. van den Oever[2] | Ron A.A. Mathôt[1] | Marieke Zeeman[3] | Arriette Kruisdijk-Gerritsen[2] | Carmen M.A. Bles[2] | Polina Nassikovker[2] | Arthur R. de Meijer[2] | Fred L. van Steveninck[2] | Maurits E.L. Arbouw[4]

[1]Department of Hospital Pharmacy - Clinical Pharmacology, Amsterdam University Medical Centres, The Netherlands

[2]Intensive Care Unit, Deventer Hospital, The Netherlands

[3]Department of Clinical Geriatrics, Deventer Hospital, The Netherlands

[4]Department of Clinical Pharmacy, Deventer Hospital, The Netherlands

Correspondence
Michael E. Cloesmeijer, Department of Hospital Pharmacy - Clinical Pharmacology, Amsterdam University Medical Centres, The Netherlands.
Email: m.e.cloesmeijer@amsterdamumc.nl

Funding information

Aims: The aim of this study was to investigate the population pharmacokinetics (PK) of clonidine in intensive care unit (ICU) patients in order to develop a dosing regimen for sedation.

Methods: We included 24 adult mechanically ventilated, sedated patients from a mixed medical and surgical ICU. Intravenous clonidine was added to standard sedation in doses of 600, 1200 or 1800 μg/d. Within each treatment group, 4 patients received a loading dose of half the daily dose administered in 4 hours. Patients gave an average of 12 samples per individual. In total, 286 samples were available for analysis. Model development was conducted with NONMEM and various covariates were tested. After modelling, doses to achieve a target steady-state plasma concentration of >1.5 μg/L were explored using stochastic Monte Carlo simulations for 1000 virtual patients.

- the **first** population **pharmacokinetic model** for **clonidine** dosing in an adult **ICU**

- they defined an **optimal plasma concentration** for ICU sedation as ranging from 1.5 to 4.0µg/L.

- they determined **1200µg** per **day** which provided a target sedation concentration of more than 1.5 µg/L.

- a **doubling** of the infusion rate for the **first 6 h** (reducing time to achieve steady-state to 5 h without peaks in plasma concentration; no loading)

„**Excellent pharmacokinetic** study in a drug commonly used with considerable variation in dosing. Very useful **recommendation** regarding **doubling** infusion for **six hours** rather than using a bolus loading does.“

Br J Clin Pharmacol.2020;86:1620–1631.

Intensive Care Med. 2022 Jun 1. doi: 10.1007/s00134-022-06712-2. Online ahead of print.

Dexmedetomidine vs other sedatives in critically ill mechanically ventilated adults: a systematic review and meta-analysis of randomized trials

Kimberley Lewis [1 2], Fayez Alshamsi [# 3], Kallirroi Laiya Carayannopoulos [# 4], Anders Granholm [# 5], Joshua Piticaru [# 4], Zainab Al Duhailib [6], Dipayan Chaudhuri [4 7], Laura Spatafora [4], Yuhong Yuan [8], John Centofanti [4 9], Jessica Spence [4 7 9 10], Bram Rochwerg [4 7], Dan Perri [4 11], Dale M Needham [12 13 14 15], Anne Holbrook [7 11], John W Devlin [16], Osamu Nishida [17], Kimia Honarmand [18], Begüm Ergan [19], Eugenia Khorochkov [20], Pratik Pandharipande [21], Mohammed Alshahrani [22], Tim Karachi [4], Mark Soth [4], Yahya Shehabi [23], Morten Hylander Møller [5], Waleed Alhazzani [4 7], GUIDE group

Affiliations + expand

PMID: 35648198 DOI: 10.1007/s00134-022-06712-2

dexmedetomidin

- systematic review summarizing evidence to **X/2021**
- MEDLINE, EMBASE, CENTRAL, ClinicalTrials.gov, …
- dexmedetomidine compared to **conventional** sedatives
- ↓ the risk of **delirium** (RR 0.67, 95% CI 0.55 to 0.81)
- ↓ the duration of **mechanical ventilation**
  (MD - 1.8 h, 95% CI - 2.89 to - 0.71)
- ↓ICU **length of stay** (MD - 0.32 days, 95% CI - 0.42 to - 0.22)
- ↑increased the risk of **bradycardia**
  (RR 2.39, 95% CI 1.82 to 3.13)
- ↑increased the risk of **hypotension**
  (RR 1.32, 95% CI 1.07 to 1.63)

CHEST® JOURNAL

CRITICAL CARE: ORIGINAL RESEARCH | VOLUME 159, ISSUE 6, P2274-2288, JUNE 01, 2021

Safety and Efficacy of Dexmedetomidine in Acutely Ill Adults Requiring Noninvasive Ventilation

A Systematic Review and Meta-analysis of Randomized Trials

Kimberley Lewis, MD • Joshua Piticaru, MD • Dipayan Chaudhuri, MD • ... Morten Hylander Møller, MD • John W. Devlin, PharmD • Waleed Alhazzani, MD • Show all authors

CHEST® JOURNAL

CRITICAL CARE: ORIGINAL RESEARCH | VOLUME 159, ISSUE 6, P2274-2288, JUNE 01, 2021

Safety and Efficacy of Dexmedetomidine in Acutely Ill Adults Requiring Noninvasive Ventilation

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Conclusion: Compared with any sedation strategy or placebo, dexmedetomidine reduced the risk of delirium and the need for mechanical ventilation while increasing the risk of bradycardia and hypotension. The results are limited by imprecision, and further large RCTs are needed.

dexmedetomidin

- 12 RCTs (738 pts), till July 31, 2020
- MEDLINE, EMBASE, Cochrane Library, …
- dexmedetomidine vs other sedatives and placebo
- ↓ the risk of **intubation** (RR 0.54, 95% CI 0.41 to 0.71)
- ↓ the duration of **delirium** (RR 0.34, 95% CI 0.22 to 0.54)
- ↓ICU **length of stay** (MD - 2.40 days, 95% CI – 3.51 to - 1.29)
- ↑increased the risk of **bradycardia** (RR 2.80, 95% CI 1.92 to 4.07)
- ↑increased the risk of **hypotension** (RR 1.98, 95% CI 1.32 to 2.98)


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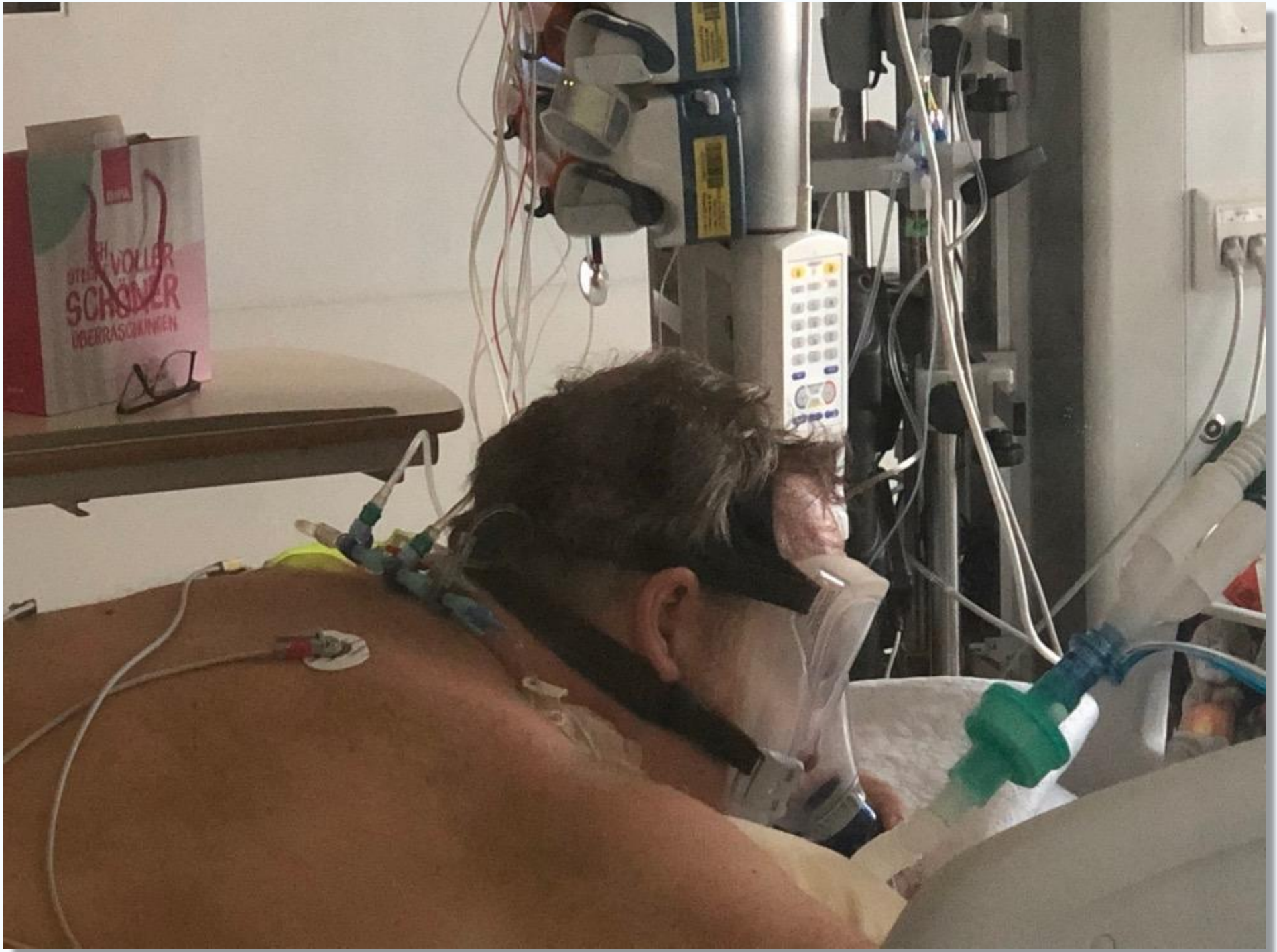
VOLLER
SCHÖNER
ÜBERRASCHUNGEN

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Early Sedation with Dexmedetomidine in Critically Ill Patients

Y. Shehabi, B.D. Howe, R. Bellomo, Y.M. Arabi, M. Bailey, F.E. Bass, S. Bin Kadiman, C.J. McArthur, L. Murray, M.C. Reade, I.M. Seppelt, J. Takala, M.P. Wise, and S.A. Webb, for the ANZICS Clinical Trials Group and the SPICE III Investigators*

BACKGROUND

Dexmedetomidine produces sedation while maintaining a degree of arousability and may reduce the duration of mechanical ventilation and delirium among patients in the intensive care unit (ICU). The use of dexmedetomidine as the sole or primary sedative agent in patients undergoing mechanical ventilation has not been extensively studied.

N Engl J Med. 2019;380(26):2506-2517.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

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CONCLUSIONS

Among patients undergoing mechanical ventilation in the ICU, those who received early dexmedetomidine for sedation had a rate of death at 90 days similar to that in the usual-care group and required supplemental sedatives to achieve the prescribed level of sedation. More adverse events were reported in the dexmedetomidine group than in the usual-care group. (Funded by the National Health and Medical Research Council of Australia and others; SPICE III ClinicalTrials.gov number, NCT01728558.)

N Engl J Med. 2019;380(26):2506-2517.

SPICE III study

- 74 ICUs, **4000** patients, in 2013 - 2018
- **dexmedetomidine** as the **sole** or **primary** sedative agent in patients undergoing mechanical ventilation
- **dexmedetomidine** vs **propofol/midazolam**
- primary end point: **90 day** mortality
- mortality **29,1%** vs **29,1%** (RR 0,0%, 95% CI -2.9 to 2.8)

but (!):

- **80%** pts in both groups recived **propofol** on day 1
  10% pts in both groups recived **midazolam** on day 1

EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH

First published: 16/06/2022
Dissemination date: 16/06/2022

Dexmedetomidine: Increased risk of mortality in intensive care unit (ICU) patients ≤65 years

Summary

- **The SPICE III study was a randomised clinical trial comparing the effect of sedation with dexmedetomidine on all-cause mortality with the effect of "usual standard of care" in 3904 ventilated critically ill adult intensive care unit (ICU) patients.**
- **Dexmedetomidine was associated with an increased risk of mortality in the age group ≤65 years compared with alternative sedatives (odds ratio 1.26; 95% credibility interval 1.02 to 1.56).**
- **This heterogeneity of effect on mortality from age was most prominent in patients admitted for reasons other than post-operative care, and increased with increasing APACHE II scores and with decreasing age. The mechanism is not known.**
- **These findings should be weighed against the expected clinical benefit of dexmedetomidine compared to alternative sedatives in younger patients.**
- **The product information of dexmedetomidine containing products is being updated with a warning statement describing the evidence, and risk factors, for increased risk of mortality in ICU patients ≤65 years of age.**

Table 1: 90-days mortality

	Dexmedetomidine n/total (%)	Usual care n/total (%)
Total	566/1948 (29.1)	569/1956 (29.1)
Subgroup per age		
≤ median age 63.7 years	219/976 (22.4)	176/975 (18.1)
> median age 63.7 years	347/972 (35.7)	393/981 (40.1)

ostatní

gabapentin

ments. Only two of the recommendations were strong, (i) using a neuropathic pain medication (e.g. gabapentin, carbamazepine, and pregabalin) with opioids for neuropathic pain

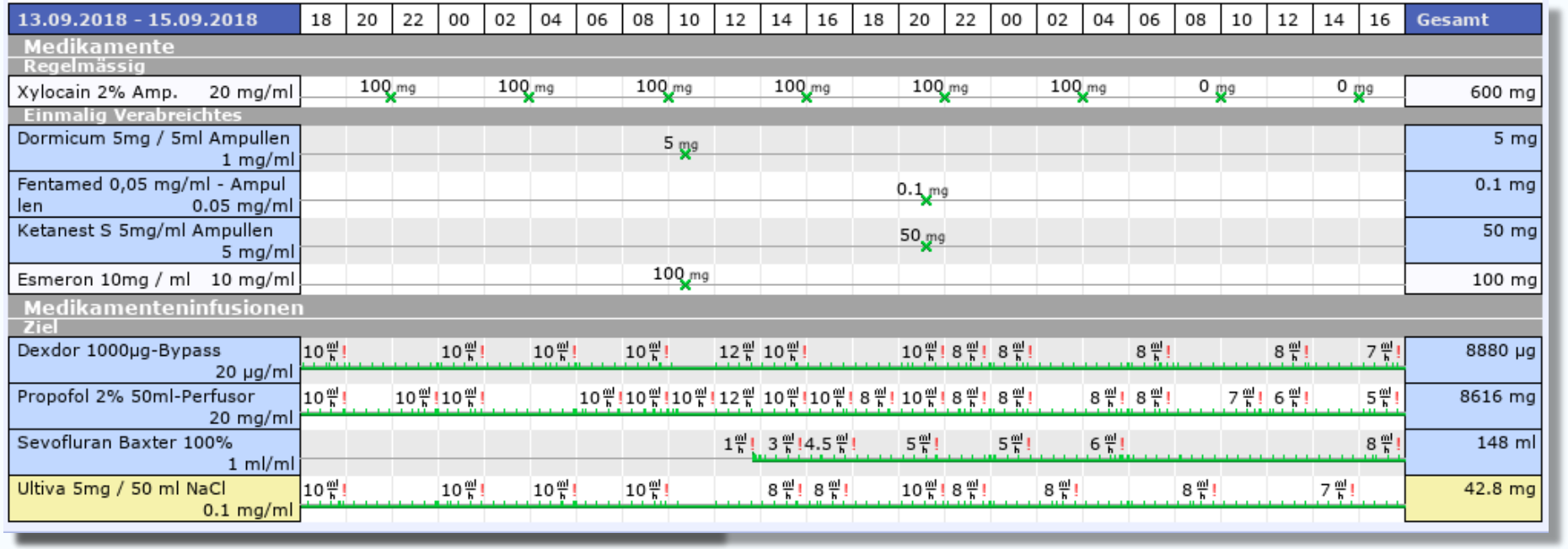
- ICU indikace: hyperalgézie a alodynie
- doplňující analgetikum zvl. u myalgií a „celotělových“ bolestí
- snižuje spotřebu opioidních analgetik, 300-1800 mg/d

neuroleptika - quetiapin, …

antidepresiva - 3. generace, …

inhalační anestetika

- Anaconda®, Mirus®, Sedaconda®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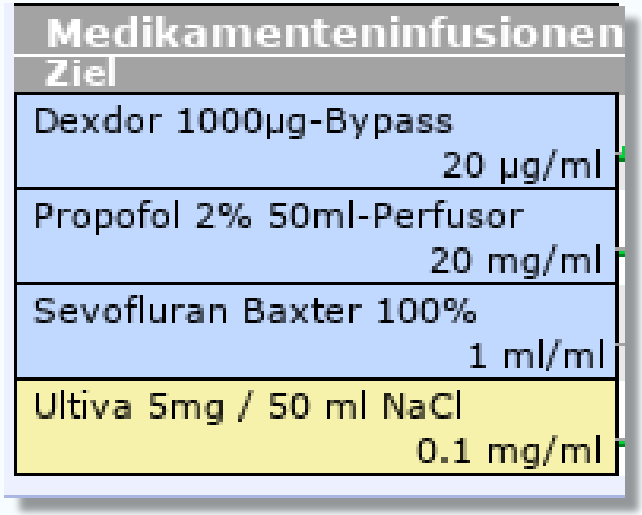
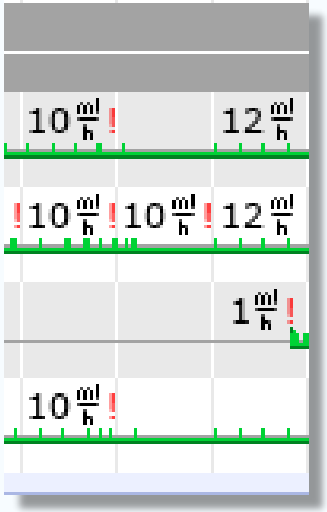
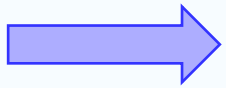
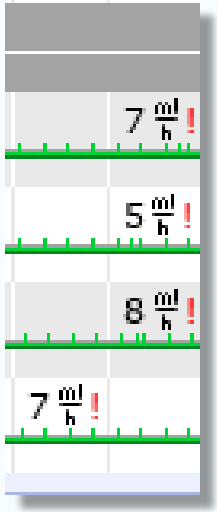
18 20 22 00 02 04 06 08 10 12 14 16 18 20 22 00 02 04 06 08 10 12 14 16
Gesamt
Medikamente
Regelmässig
Xylocain 2% Amp. 20 mg/ml
100 mg 100 mg 100 mg 100 mg 100 mg 100 mg 0 mg 0 mg
600 mg
Einmalig Verabreichtes
Dormicum 5mg / 5ml Ampullen 1 mg/ml
5 mg
5 mg
Fentamed 0,05 mg/ml - Ampullen 0.05 mg/ml
0.1 mg
0.1 mg
Ketanest S 5mg/ml Ampullen 5 mg/ml
50 mg
50 mg
Esmeron 10mg / ml 10 mg/ml
100 mg
100 mg
Medikamenteninfusionen
Ziel
Dexdor 1000µg-Bypass 20 µg/ml
8880 µg
Propofol 2% 50ml-Perfusor 20 mg/ml
8616 mg
Sevofluran Baxter 100% 1 ml/ml
148 ml
Ultiva 5mg / 50 ml NaCl 0.1 mg/ml
42.8 mg


Medikamenteninfusionen
Ziel
Dexdor 1000µg-Bypass 20 µg/ml
Propofol 2% 50ml-Perfusor 20 mg/ml
Sevofluran Baxter 100% 1 ml/ml
Ultiva 5mg / 50 ml NaCl 0.1 mg/ml

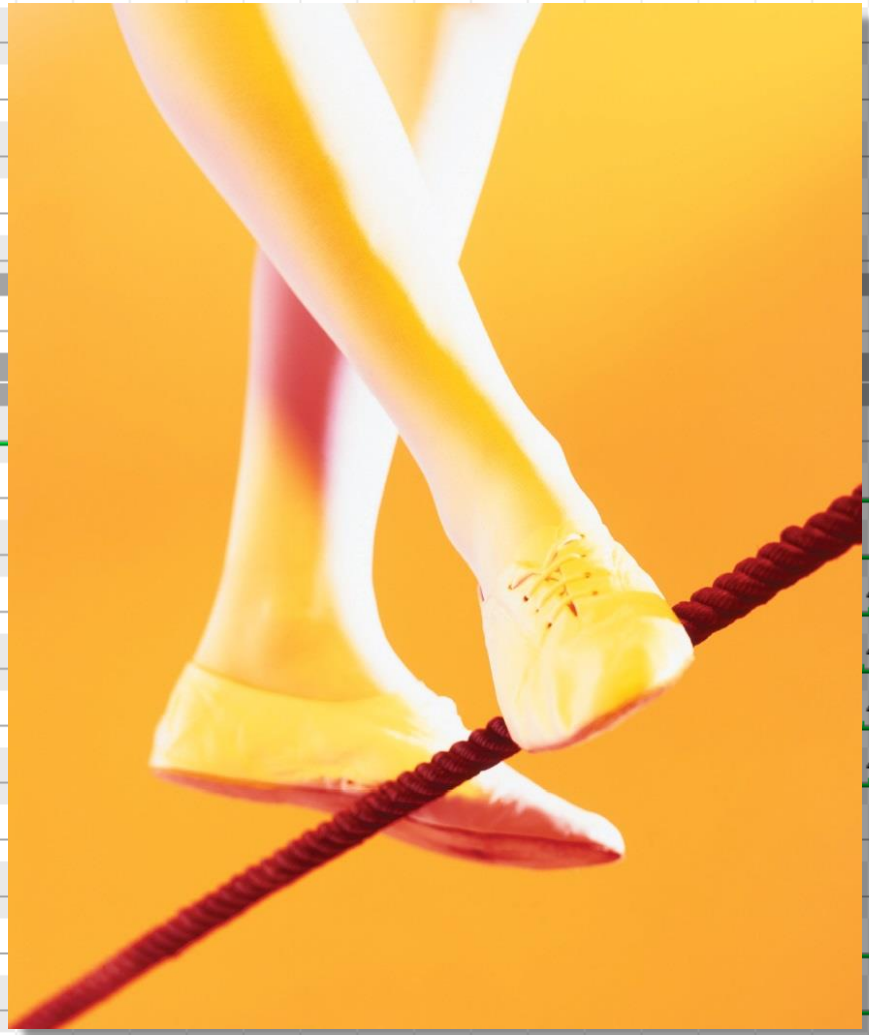







Edwards Lifesciences

16.11.2021 - 18.11.2021	23	01	03	05	07	09	11	13	15	17	19	21	23	01	03	05	07	09	11	13	15	17	19	21	Gesamt
Medikamente																									
Regelmässig																									
Ketanest S 5mg/ml Ampullen 5 mg/ml						250 mg																			250 mg
Praxiten 15 mg Tbl. 15 mg/Tabl																								15 mg	15 mg
Praxiten 15 mg Tbl. 15 mg/Tabl	15 mg																								30 mg
Seropram 20 mg Filmtbl. 20 mg/Tabl																									40 mg
Seroquel 200mg FTBL 200 mg/Tabl																				200 mg				400 mg	600 mg
Esmeron 10mg / ml 10 mg/ml																									200 mg
Einmalig Verabreichtes																									
Novalgin Amp. 2,5g / 5ml 0.5 g/ml																									2.5 g
Medikamenteninfusionen																									
Ziel																									
Dexdor 1000µg-Bypass 20 µg/ml	5 ml/h	5 ml/h !																							2058 µg
Dexdor 1000µg-Bypass 20 µg/ml																									2924 µg
Ketanest 1250mg Perfusor 25 mg/ml																									2808 mg
Propofol 2% 50ml-Perfusor 20 mg/ml																			4.5 ml/h !		4.5 ml/h !				2576 mg
Propofol 2% 50ml-Perfusor 20 mg/ml																			4.5 ml/h !					8 ml/h !	5333 mg
Propofol 2% 50ml-Perfusor 20 mg/ml																			4.5 ml/h !						5278 mg
Propofol 2% 50ml-Perfusor 20 mg/ml																			4.5 ml/h !		4.5 ml/h !				2576 mg
Sufenta 2mg / 50 NaCl 0.04 mg/ml																			3 ml/h						1.07 mg
Sufenta 2mg / 50 NaCl 0.04 mg/ml																			3 ml/h !					5 ml/h !	1.4 mg
Ultiva 5mg / 50 ml NaCl 0.1 mg/ml																			6 ml/h					1 ml/h	0.01 mg
Ultiva 5mg / 50 ml NaCl 0.1 mg/ml																			6 ml/h					1 ml/h	0.01 mg
Ultiva 5mg / 50 ml NaCl 0.1 mg/ml						3.5 ml/h	6.7 ml/h												6 ml/h					1 ml/h	15.3 mg
Bei Bedarf																									
Novalgin 1g / 2ml 9.8 mg/ml NaCl 0.9 % 0.98 ml/ml									100 ml/h																1000 mg 100 ml



nefarmakologické postupy

Intensive Care Med (2021) 47:943–960
https://doi.org/10.1007/s00134-021-06490-3

SYSTEMATIC REVIEW

Pharmacological and non-pharmacological interventions to prevent delirium in critically ill patients: a systematic review and network meta-analysis

Lisa D. Burry[1,2,3*], Wei Cheng[4], David R. Williamson[5,6], Neill K. Adhikari[7,8], Ingrid Egerod[9], Salmaan Kanji[10,11], Claudio M. Martin[12,13], Brian Hutton[10,14] and Louise Rose[15]

non-pharmacologic strategies

- **physical** therapy, early **mobilisation**
- **earplugs**
- **noise** and **light** reduction
- **cognitive** stimulation (radio, TV)
- repeated **reorientation**
- avoid physical **restraints**
- promote normal **sleep–wake** cycles
- engage ICU patients and **families**

Intensive Care Med 2021.47:943-960.

non-pharmacologic strategies

- ↓ amount of **sedatives**
- ↓ hospital **costs**
- ↓ length of mechanical **ventilation**
- ↑ improve patient **outcomes**

Intensive Care Med 2021.47:943-960.

sedace

- **individualizovaný** přístup
- používat **širokou paletu** léků
- upřednostnit **kombinaci** léků před monoterapií
- **monitorace (!)**
- ***ABCDEF*** *bundle*
- **nefarmakologické** postupy
- časná **mobilizace**
- zahrnout **příbuzné**

…děkuji Vám za pozornost