FAKULTNÍ NEMOCNICE OLOMOUC

BOLEST, AGITACE A DELIRIUM NA ICU

Tomáš Gabrhelík

KARIM FN a LF UP v Olomouci

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]; Aaron M. Joffe, DO[10]; Douglas B. Coursin, MD[11]; Daniel L. Herr, MD, MS, FCCM[12]; Avery Tung, MD[13]; Bryce R. H. Robinson, MD, FACS[14]; Dorrie K. Fontaine, PhD, RN, FAAN[15]; Michael A. Ramsay, MD[16]; Richard R. Riker, MD, FCCM[17]; Curtis N. Sessler, MD, FCCP, FCCM[18]; Brenda Pun, MSN, RN, ACNP[19]; Yoanna Skrobik, MD, FRCP[20]; Roman Jaeschke, MD[21]

Crit Care Med 2013; 41:263-306.
Am J Health Syst Pharm 2013; 70:53-8.

BOLEST NA ICU

Analgezie by měla být vždy součástí péče na ICU (na rozdíl od sedace)

ICU pacienti mají procedurální i klidovou bolest[1]

je doporučeno bolest rutinně monitorovat (+1B)[1,2]

spolupracující pacient - VAS nebo NRS (Numeric Rate Scale)

Behavioral Pain Scale a Critical-Care Pain Observation Tool (B)[2]

vitální funkce nejsou vhodné pro monitoraci bolesti (-2C)[2]

1 Payen JF et al. Anesthesiology 2009; 111:1308-16.
2 Barr J et al. Crit Care Med 2013; 41:263-306.

Anesthesiology 2009; 111:1308–16

Pain Assessment Is Associated with Decreased Duration of Mechanical Ventilation in the Intensive Care Unit

A Post Hoc Analysis of the DOLOREA Study

Jean-Francois Payen, M.D., Ph.D., Jean-Luc Bosson, M.D., Ph.D.,† Gérald Chanques, M.D.,‡ Jean Mantz, M.D., Ph.D.,§ José Labarere, M.D., Ph.D.,‖ for the DOLOREA Investigators#*

Table 4. Patient Outcomes and Pain Assessment on Day 2 of the ICU Stay

Outcome Measure	Pain Assessment		Unadjusted Odds Ratio (95% CI)*†	*P* Value	Adjusted Odds Ratio (95% CI)†‡	*P* Value
	No (n = 631)	Yes (n = 513)				
ICU mortality, n (%)	136 (22)	95 (19)	0.91 (0.58–1.43)	0.69	1.06 (0.76–1.49)	0.71
ICU duration of stay, median (IQR), days	18 (10–30)	13 (7–25)	1.70 (1.29–2.25)	<0.01	1.43 (1.02–2.00)	0.04
Duration of MV, median (IQR), days	11 (6–30)	8 (4–17)	1.87 (1.41–2.48)	<0.01	1.40 (1.00–1.98)	0.05
Ventilator-acquired pneumonia, n (%)	117 (24)	66 (16)	0.61 (0.43–0.85)	<0.01	0.75 (0.48–1.17)	0.21
Thromboembolic events, n (%)	13 (3)	10 (2)	0.91 (0.39–2.09)	0.82	0.68 (0.21–2.24)	0.53
Gastroduodenal hemorrhage, n (%)	8 (2)	4 (1)	0.59 (0.18–1.97)	0.39	—	—
Central venous catheter colonization, n (%)	28 (6)	19 (5)	0.79 (0.44–1.44)	0.45	0.77 (0.34–1.76)	0.54

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HODNOCENÍ BOLESTI

Table 1. The Behavioral Pain Scale[13]

Item	Description	Score
Facial expression	Relaxed	1
	Partially tightened	2
	Fully tightened	3
	Grimacing	4
Upper limbs	No movement	1
	Partially bent	2
	Fully bent with finger flexion	3
	Permanently retracted	4
Compliance with ventilation	Tolerating movement	1
	Coughing but tolerating ventilation for most of the time	2
	Fighting ventilator	3
	Unable to control ventilation	4

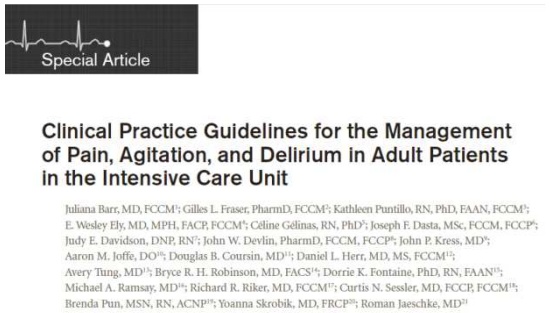
Critical-Care Pain Observation Tool

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

BPS >5 predikuje bolest

CPOT >2 predikuje bolest s 86% sensitivitou

LÉČBA BOLESTI NA ICU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nociceptivní bolest - lékem volby IV opioidy (+1C)

efekt IV opioidů je srovnatelný (C), kombinace s non-opioidy (+2C)

neuropatická bolest - gabapentin a karbamazepin (+1A)

TEA - fraktury žeber a bolest po AAA (+1B)

regionální/neuraxiální analgezie vs. IV opioidy - bez doporučení (0)

preemptivní analgezie a nefarmakologické intervence
před extubací (+1C)
ostatní procedury (+2C)

Barr J et al. Crit Care Med 2013; 41:263-306.

LÉČBA BOLESTI NA ICU

Ann Pharmacother. 2012 Apr;46(4):530-40. doi: 10.1345/aph.1Q525. Epub 2012 Apr 10.

Analgosedation: a paradigm shift in intensive care unit sedation practice

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

intensive care unit (ICU) length of stay. Studies have demonstrated that analgosedation, a strategy that manages patient pain and discomfort first, before providing sedative therapy, results in improved patient outcomes compared to standard sedative-hypnotic regimens. Nine randomized controlled trials comparing remifentanil-based analgosedation to other commonly used agents (fentanyl, midazolam, morphine, and propofol) for ICU sedation and 1 trial comparing morphine to daily sedation interruption with propofol or midazolam were reviewed. Remifentanil is an ideal agent for analgosedation due to its easy titratability and organ-independent metabolism. When compared to sedative-hypnotic regimens, remifentanil-based regimens were associated with shorter duration of mechanical ventilation, more rapid weaning from the ventilator, and shorter ICU length of stay. Compared to fentanyl-based regimens, remifentanil had similar efficacy with the exception of increased pain requirements upon remifentanil discontinuation. Analgosedation was well tolerated, with no significant differences in hemodynamic stability compared to sedative-hypnotic regimens.

všechny opioidy mají stejná rizika[1]

všechny indukují vznik tolerance a hyperalgezie - NMDA antagonisté[1]

remifentanil - řiditelnost, neaktivní metabolity, context-sensitive half-time[1]

1 Patel SB and Kress JP. Am J Respir Crit Care Med 2012; 185:486-497.

SEDACE NA ICU

„Paradigm Shift“

Rudis, 1997 „..spontaneous breathing…“ [1]

Kress, 2000 „..daily holiday from sedatives...“ (+1B) [2]

Strom, 2010 „..no sedation…“ [3]

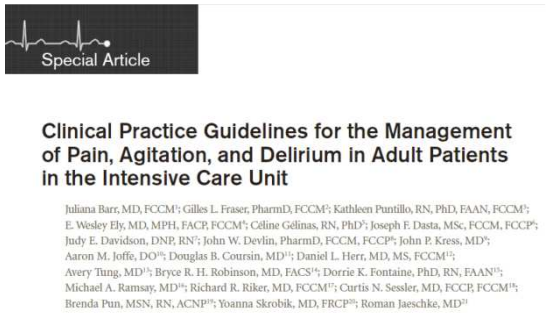
nižší sedace je spojena s nižší mortalitou a výskytem komplikací (VAP, CINM, ileus, imunosuprese, cholestáza, sinusitida aj.) (+1B)[5]

zkrácení délky UPV o 30 %, zkrácení ICU hospitalizace o 49 % (B)[4,5]

relaxace – výjimečně, intermitentně, cis-atrakurium, TOF monitorace[1]

1 Rudis et al: CCM 1997; 25:575-583.
2 Kress JP et al. N Engl J Med, 2000; 342:1471-77.
3 Strom et al. Lancet 2010; 375:475-480.
4 Kollef MH et al: Chest, 1998; 114:541-548.
5 Barr J et al. Crit Care Med 2013; 41:263-306.

MONITORACE SEDACE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A. Nekomatózní ICU pacient

Richmond Agitation-Sedation Scale (RASS) (B)

Sedation-Agitation Scale (SAS) (B)

Ramsay Sedation Scale (RSS)

B. Objektivní měření mozkových funkcí – koma, NMBA

AEP, BIS, Patient State Index-PSI, state entropy (+2B)

EEG – léčba křečové aktivity, u pacientů s vyšším ICP (+1A)

Barr J et al. Crit Care Med 2013; 41:263-306.

RICHMOND AGITATION-SEDATION SCALE

Skóre	Stav	Popis
+4	Bojovný	Očividně bojovný, násilný, bezprostředně ohrožuje personál
+3	Výrazně agitovaný	Tahá za či vytahuje invaze, 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	Mírná sedace	Krátké probuzení a oční kontakt na oslovení (<10)
-3	Střední stupeň sedace	Pohyb či otevření očí na oslovení (bez očního kontaktu)
-4	Hluboká sedace	Žádná odpověď na oslovení, pouze pohyb či otevření očí na fyzikální podnět
-5	Neprobuditelný	Žádná odpověď na oslovení ani fyzikální podnět

SEDATION-AGITATION SCALE

Score	Term	Descriptor
7	Dangerous Agitation	Pulling at ET tube, trying to remove catheters, climbing over bedrail, striking at staff, thrashing side-to-side
6	Very Agitated	Requiring restraint and frequent verbal reminding of limits, biting ETT
5	Agitated	Anxious or physically agitated, calms to verbal instructions
4	Calm and Cooperative	Calm, easily arousable, follows commands
3	Sedated	Difficult to arouse but awakens to verbal stimuli or gentle shaking, follows simple commands but drifts off again
2	Very Sedated	Arouses to physical stimuli but does not communicate or follow commands, may move spontaneously
1	Unarousable	Minimal or no response to noxious stimuli, does not communicate or follow commands

SEDACE NA ICU

A. Nefarmakologické intervence

polohování, verbální kontakt, světelný komfort, hluk, noční klid (+1C)[1,2]

B. Farmakologické intervence

diazepiny – lipofilní, respir. deprese, delirium *(lorazepam > midazolam)*[1]

propofol – řiditelnost, lipidová emulze, Propofol Infusion Syndrome[1]

fospropofol – prodrug, rozpustný ve vodě

DEX – analgosedace, není respir.deprese, krátkodobá infuze (FDA)[1]

Propofol nebo DEX jsou preferovány před diazepiny. (+2B)[2]

inhalační anestetika – AnaConDa system *(Hudson RCI,Uplands Vasby, Sweden)*

1 Patel SB and Kress JP. Am J Respir Crit Care Med 2012; 185:486-497.
2 Barr J et al. Crit Care Med 2013; 41:263-306.

DELIRIUM NA ICU

Náhlý nástup cerebrální dysfunkce
(vědomí, spánek, psychomotorická aktivita, kognice, emotivita…)

11 - 87 % pacientů na ICU[1,2]

rizikové faktory - demence, hypertenze, alkoholismus, stav při přijetí (B)[2]

koma je nezávislý rizikový faktor (B)[2]

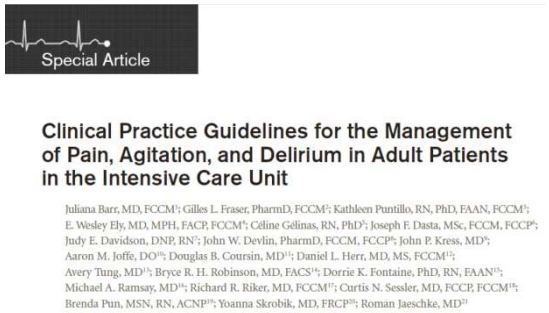
diazepiny a opioidy mohou být rizikovým faktorem (B)[2]

diazepiny mohou být častěji příčinou deliria než DEX (B)[2,3]

propofol a delirium - insuficientní data (C)

1 Van Rompaey B et al. Intensive Crit Care Nurs 2008; 13:98-107.
2 Barr J et al. Crit Care Med 2013; 41:263-306.
3 Roberts DJ et al. Drugs 2012; 72:1881-916.

DELIRIUM NA ICU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vyšší mortalita (A), delší pobyt na ICU (A), kognitivní deficit (B)

rutinní monitorace na ICU (+1B)

doporučeny CAM-ICU (pozitivní) a ICDSC (>4) (A)

Prevence

časná mobilizace a fyzioterapie (+1B)

farmakologický protokol (0,C), DEX (0,C)

haloperidol a atypická antipsychotika (-2C)

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CAM-ICU

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Confusion Assessment Method for the ICU (CAM-ICU) Flowsheet

1. Acute Change or Fluctuating Course of Mental Status:

- Is there an acute change from mental status baseline? OR
- Has the patient's mental status fluctuated during the past 24 hours?

NO → **CAM-ICU negative NO DELIRIUM**

YES ↓

2. Inattention:

- *"Squeeze my hand when I say the letter 'A'."*
  Read the following sequence of letters: S A V E A H A A R T
  ERRORS: No squeeze with 'A' & Squeeze on letter other than 'A'
- If unable to complete Letters → Pictures

0 - 2 Errors → **CAM-ICU negative NO DELIRIUM**

> 2 Errors ↓

3. Altered Level of Consciousness
Current RASS level

RASS other than zero → **CAM-ICU positive DELIRIUM Present**

RASS = zero ↓

4. Disorganized Thinking:

1. Will a stone float on water?
2. Are there fish in the sea?
3. Does one pound weigh more than two?
4. Can you use a hammer to pound a nail?

Command: "Hold up this many fingers" (Hold up 2 fingers)
"Now do the same thing with the other hand" (Do not demonstrate)
OR "Add one more finger" (If patient unable to move both arms)

> 1 Error → **CAM-ICU positive DELIRIUM Present**

0 - 1 Error → **CAM-ICU negative NO DELIRIUM**

ICDSC

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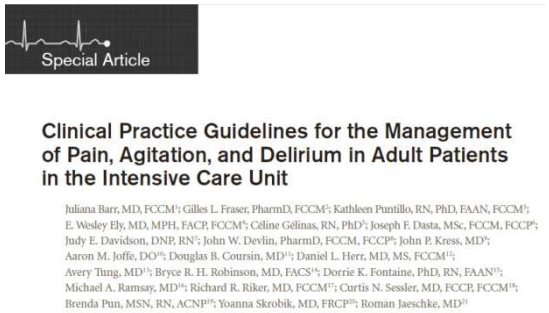
Intensive Care Delirium Screening Checklist

Scoring

The scale is completed based on information collected from each entire 8-h shift or from the previous 24 h. Score of 4 or higher sensitive but not specific indicator of delirium

Level of consciousness.	Specific features of delirium. Patient scores 1 for each category if features are present and 0 if features are absent
A. No response	Inattention Disorientation Hallucination, delusion or psychosis Psychomotor agitation or retardation Inappropriate speech or mood Sleep/wake cycle disturbance Symptom fluctuation from one shift to another
B. Vigorous stimulation required to obtain response. If patient is rated A or B most of the time period no further evaluation is carried out during that time period	
C. Drowsy or requires mild to moderate stimulation to obtain response. Scores 1 point	
D. Awake or easily roused. 0 points	
E. Hypervigilance. 1 point	

LÉČBA DELIRIA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Doporučeno

atypická antipsychotika (C), DEX vs. diazepiny (+2B)

Není evidence

haloperidol (0)

Není doporučeno

rivastigmin (-1B), antipsychotika u rizika torsades de pointes (-2C)
diazepiny u deliria (mimo alkohol nebo vysazení diazepinů) (2B)

Barr J et al. Crit Care Med 2013; 41:263-306.

INFO DOMŮ

- kooperativní pacient při vědomí
- rutinní monitorace bolesti, sedace a přítomnosti deliria (+1B)
- analgesia-first sedation (+2B)
- cirkadiánní přerušování sedace nebo mírná sedace (+1B)
- nefarmakologické intervence během sedace (+1C)
- redukce stresu – bolest, sympatikotonní projevy
- časná spontánní ventilace a mobilizace (+1B)

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