UNIVERSITY HOSPITAL BRNO
FACULTY OF MEDICINE
MASARYK UNIVERSITY

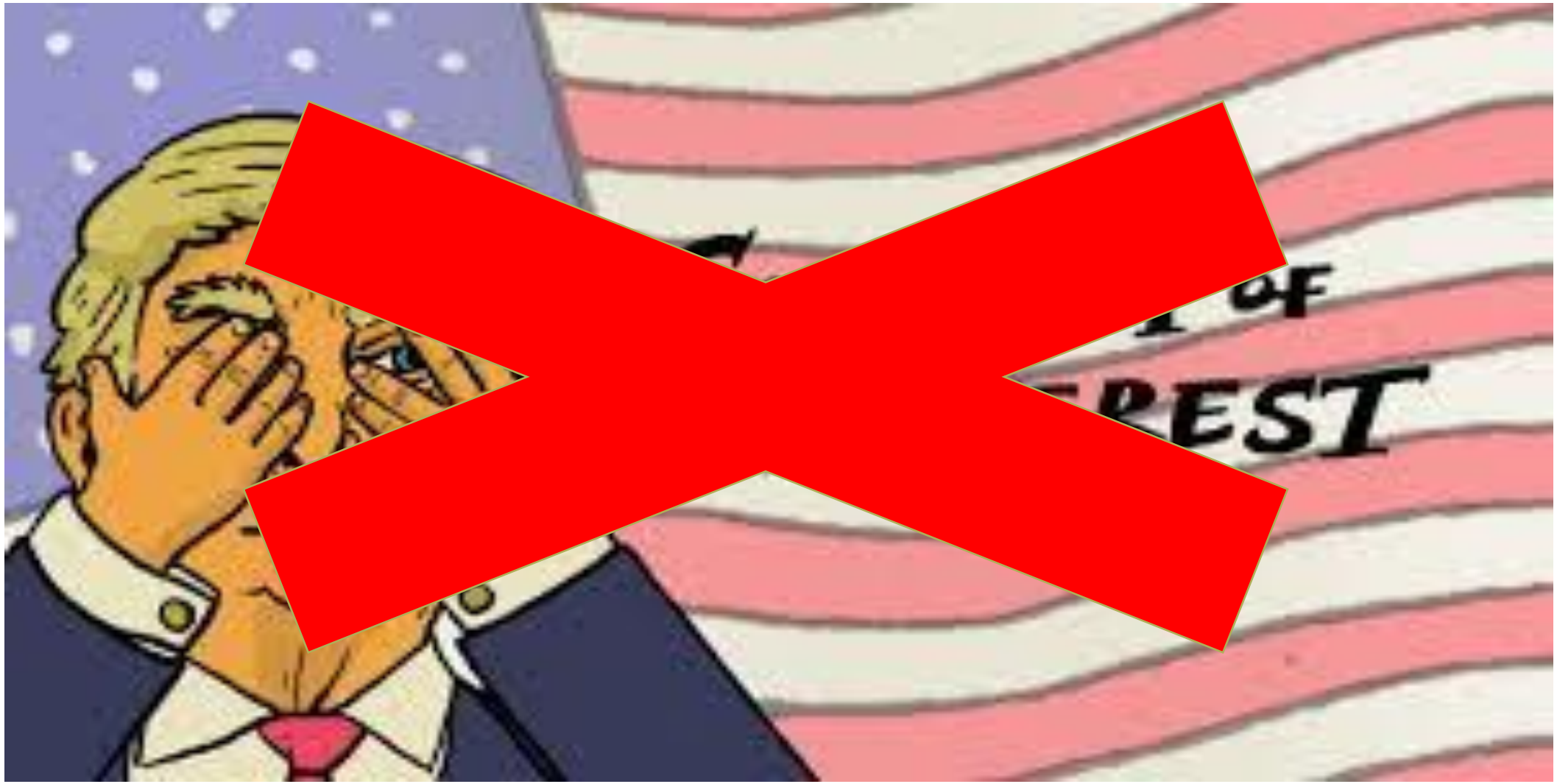
DEPARTMENT OF PAEDIATRIC
ANAESTHESIOLOGY
AND INTENSIVE CARE MEDICINE

POUŽITÍ DEXMEDETOMIDINU V INTENZIVNÍ PÉČI V PEDIATRII

Věra Nečasová Zuzana Foralová

MUNI MED

FAKULTNÍ NEMOCNICE BRNO


OF
REST

SEDACE

- Jedna z nejčastějších intervencí v pediatrii
- Terapeutické výkony
- Diagnostické výkony
- Anestezie
- Intenzivní péče

VYUŽITÍ SEDACE

- Stres
- Agitace
- Hypertenze
- Tachykardie
- Ohrožení vstupů
- Asynchronie s UPV
- Akcidentální extubace

CÍL SEDACE

- Klidný spolupracující dětský pacient
- Pacient bez dyskomfortu s dostatečnou analgezii
- Umožnit spontánní ventilaci

Richmond Agitation-Sedation Scale (RASS)

Score	Term	Description	
+4	Combative	Overtly combative, violent, immediate danger to staff	
+3	Very agitated	Pulls or removes tube(s) or catheter(s), aggressive	
+2	Agitated	Frequent nonpurposeful movement, fights ventilator	
+1	Restless	Anxious but movements not aggressively vigorous	
0	Alert and calm		
-1	Drowsy	Not fully alert but has sustained awakening (eye opening/eye contact) to *voice* (≥10 seconds)	Verbal Stimulation
-2	Light sedation	Briefly awakens to *voice* with eye contact (<10 seconds)	Verbal Stimulation
-3	Moderate sedation	Movement or eye opening to *voice* (but no eye contact)	Verbal Stimulation
-4	Deep sedation	No response to voice but movement or eye opening to *physical* stimulation	Physical Stimulation
-5	Unarousable	No response to *voice* or *physical* stimulation	Physical Stimulation

Richmond škála agitace a sedace validovaná pro pediatrické pacienty v roce 2019 !!!!

Evidence dospělá populace

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]

c. Choice of sedative

i. We suggest that sedation strategies using nonbenzodiazepine sedatives (either propofol or dexmedetomidine) may be preferred over sedation with benzodiazepines (either midazolam or lorazepam) to improve clinical outcomes in mechanically ventilated adult ICU patients (+2B).

Crit Care Med 2013; 41:263–306

Online Special Article

(*Crit Care Med* 2018; 46:e825–e873)

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

Recommendation: We suggest using light sedation (vs deep sedation) in critically ill, mechanically ventilated adults (conditional recommendation, low quality of evidence).

Recom ol or dex-medetom critically ill, mechanically ventilated adults (conditional recommendation, low quality of evidence).

Non-pain-related distress

Distress is an organism's response to aversive internal and external stimuli and may include discomfort, anxiety and fear [25]

Optimal sedation A state in which the patient is somnolent, responsive to the environment but untroubled by it, and with no excessive movements [13]

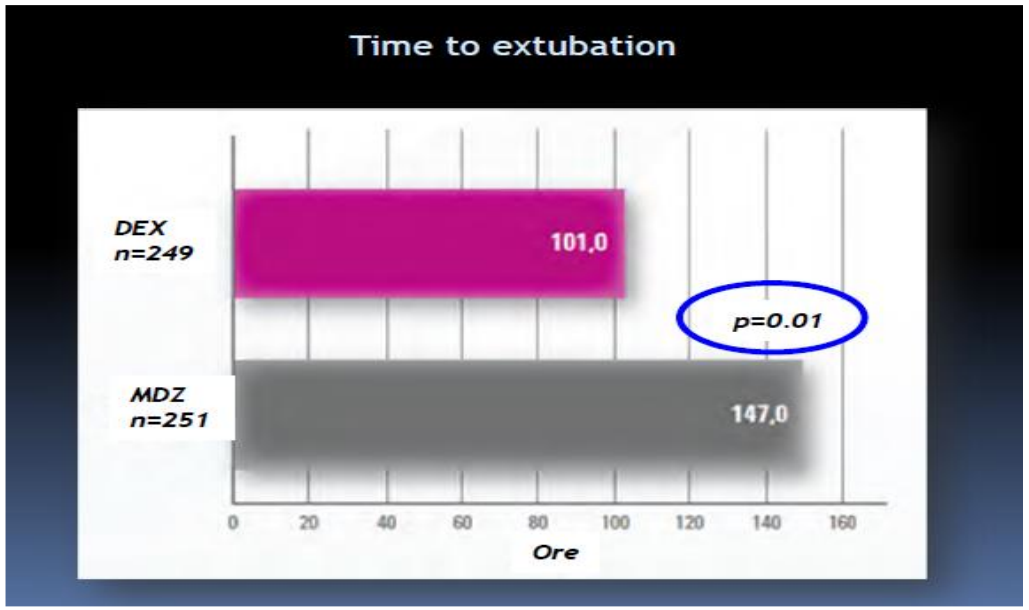
Table 3 Recommended analgesic and sedative agents

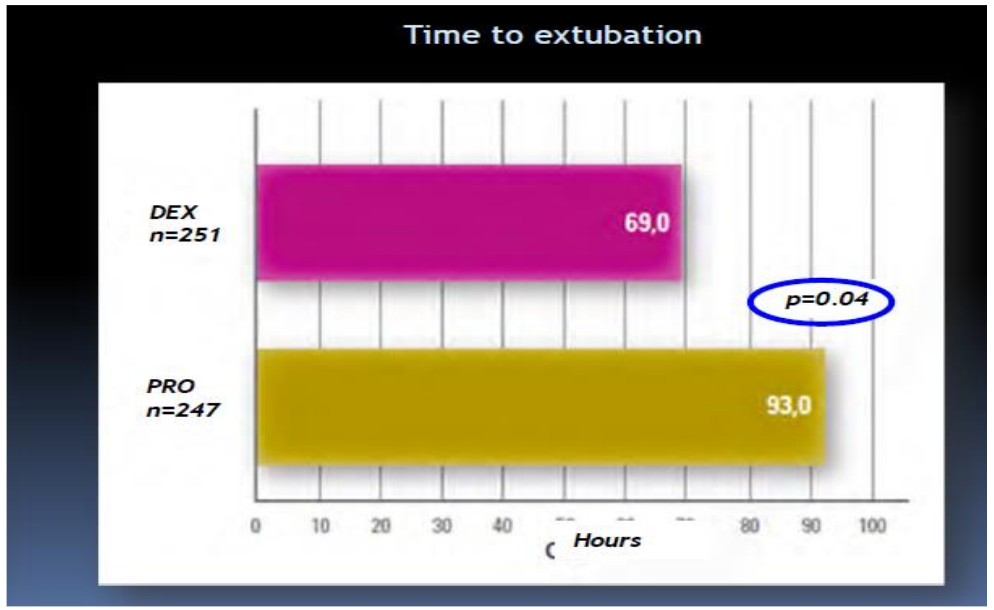
Drug	Dosing information	Notes
Morphine	Intravenous bolus: < 60 kg; 100–200 µg/kg/dose > 60 kg; 5–10 mg/dose Intravenous infusion: < 60 kg; 10–60 µg/kg/h > 60 kg; 0.8–3mg/h	Consider reduced dose in renal and hepatic impairment Use with caution in asthmatic patients due to potential histamine release
Fentanyl	Intravenous bolus: < 60 kg; 1–2 µg/kg/dose > 60 kg; 50–100 µg/dose Intravenous infusion: < 60 kg; 4–10 µg/kg/h > 60 kg; 25–100 µg/h	Rapid onset Relatively long elimination half-life
Paracetamol	< 60 kg; 10–15 mg/kg/dose, 4 hourly > 60 kg; 650–1000 mg/dose, 4 hourly Max. daily dose: <3 months; 60 mg/kg/day 3 months–12 years; 90 mg/kg/day > 12 years; 4 g/day	Reduce maximum daily doses in neonates Rectal administration produces variable uptake
Ibuprofen	< 60 kg; 6–10 mg/kg/dose, 6 hourly > 60 kg; 400–600 mg/dose, 6 hourly Max. daily dose: < 60 kg; 40 mg/kg/day > 60 kg; 2.4 g/day	Use with caution in renal disease Potential for gastrointestinal and post-tonsillectomy bleeding with platelet inhibition
Midazolam	Intravenous bolus: < 60 kg; 0.1–0.2mg/kg/dose > 60 kg; 5 mg/dose Intravenous infusion: < 60 kg; 2–10 µg/kg/min > 60 kg; 5–15 mg/h	Problems with tolerance and withdrawal syndrome Prolonged sedation on discontinuation Hypotension with bolus dosing Consider reduced dose in renal and hepatic impairment Reduced efficacy in infants
Clonidine	Intravenous infusion: 0.1–2 µg/kg/h NG: 1–5 µg/kg/dose 8 hourly	Avoid sudden discontinuation
Chloral hydrate	NG: 25–50 mg/kg/dose 4–6 hourly	Triclofos causes less gastric irritation
Triclofos	Maximum 2 g per dose Max. daily dose: 200 mg/kg/day	Avoid in severe renal and hepatic failure Paradoxical excitement may occur
Promethazine	NG: 1–2 mg/kg/dose 6 hourly Maximum 50 mg per dose	Use with caution in neonates
Alimemazine (trimeprazine)	NG: 2–4 mg/kg/dose 6 hourly Maximum 90 mg per dose	Avoid in renal and hepatic failure

Jak se to dá dosáhnout?

Dexmedetomidine vs Midazolam or Propofol for Sedation During Prolonged Mechanical Ventilation

Two Randomized Controlled Trials *JAMA. 2012;307(11):1151-1160*





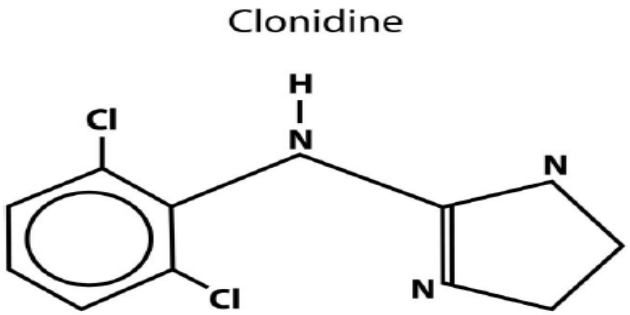
ÚČINKY DEXMEDETOMIDINU

- **Selektivní agonista alfa – 2 receptorů se širokou škálou farmakologických vlastností**
- **Sedativní a hypnotické účinky**
- **Sympatolytický**
- **Analgetické účinky**
- **Kardiovaskulární účinky** – bradykardie, hypotenze
- **Min. ovlivnění ventilace**

α2 agonisté

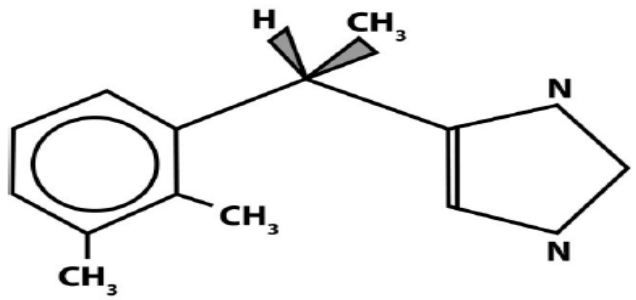
Klonidin

- α2: α1 – 200:1
- poločas 12-24 hodin
- SPC pediatrická populace ANO
- Speciální dovoz = hlášení SÚKL



Dexmedetomidin

- α2: α1 – 1600:1
- poločas 2-3 hodiny
- SPC pediatrická populace nejsou data = off-label
- Dostupný v ČR



Dexmedetomidin PICU

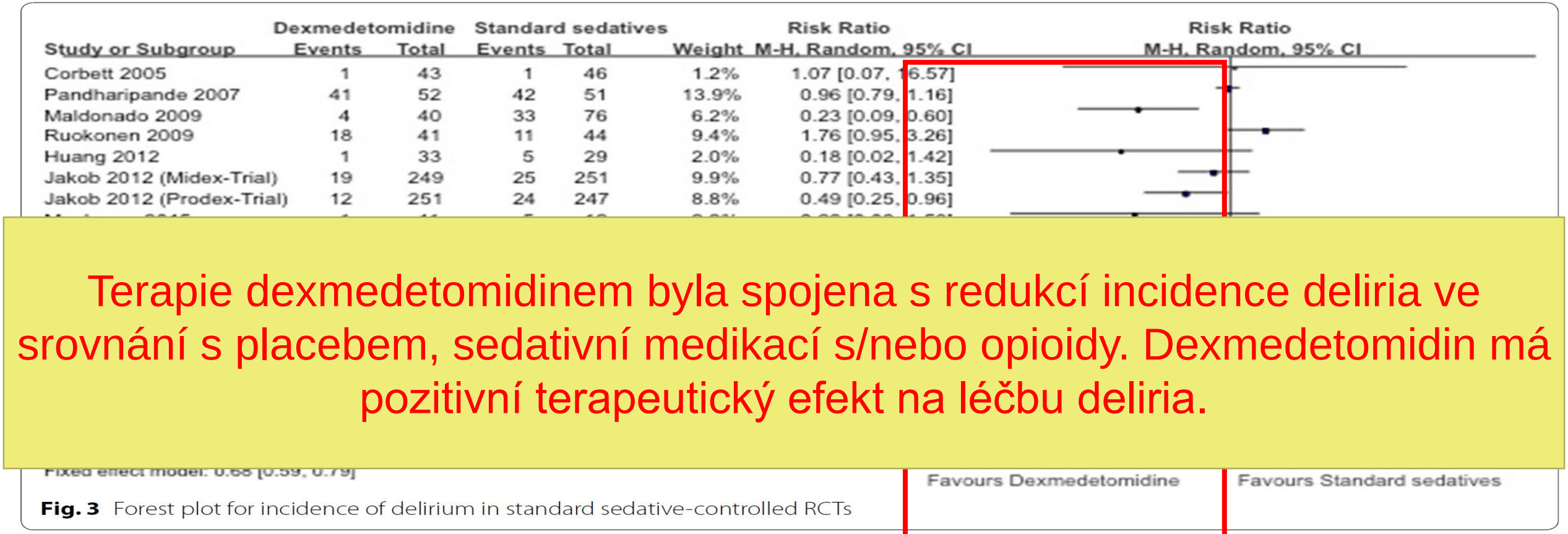
Dexmedetomidine Use in Critically Ill Children With Acute Respiratory Failure*

Mary Jo C. Grant, APRN, PhD[1]; James B. Schneider, MD[2]; Lisa A. Asaro, MS[3]; Brenda L. Dodson, PharmD[4]; Brent A. Hall, PharmD[5]; Shari L. Simone, APRN, DNP[6]; Allison S. Cowl, MD[7]; Michele M. Munkwitz, MD[8]; David Wypij, PhD[3,9,10]; Martha A. Q. Curley, RN, PhD[11,12]; for the Randomized Evaluation of Sedation Titration for Respiratory Failure (*RESTORE*) Study Investigators

Conclusions: Our data support the use of dexmedetomidine as a primary agent in low criticality patients offering the benefit of rapid achievement of targeted sedation levels. Dexmedetomidine as a

Dex a ketamin jsou jediné sedativa, které netlumí dechové centrum u pacientů s respiračním selháním!!!

data support a broader armamentarium of pediatric critical care sedation. (*Pediatr Crit Care Med* 2016; 17:1131–1141)



Terapie dexmedetomidinem byla spojena s redukcí incidence deliria ve srovnání s placebem, sedativní medikací s/nebo opioidy. Dexmedetomidin má pozitivní terapeutický efekt na léčbu deliria.

Fig. 3 Forest plot for incidence of delirium in standard sedative-controlled RCTs

Naše zkušenosti na dětském ARO

- Pacient na PICU ke krátkodobé sedaci bez zajištění DC

  SFNT k analgezii + Dexmedetomidin

- Pacient na PICU k dlouhodobé sedaci (těžká oběhová nestabilita, těžké oxygenační selhání)

  SFNT k analgezii + Midazolam

- Pacient na PICU weaning

  Dexmedetomidin +/- SFNT

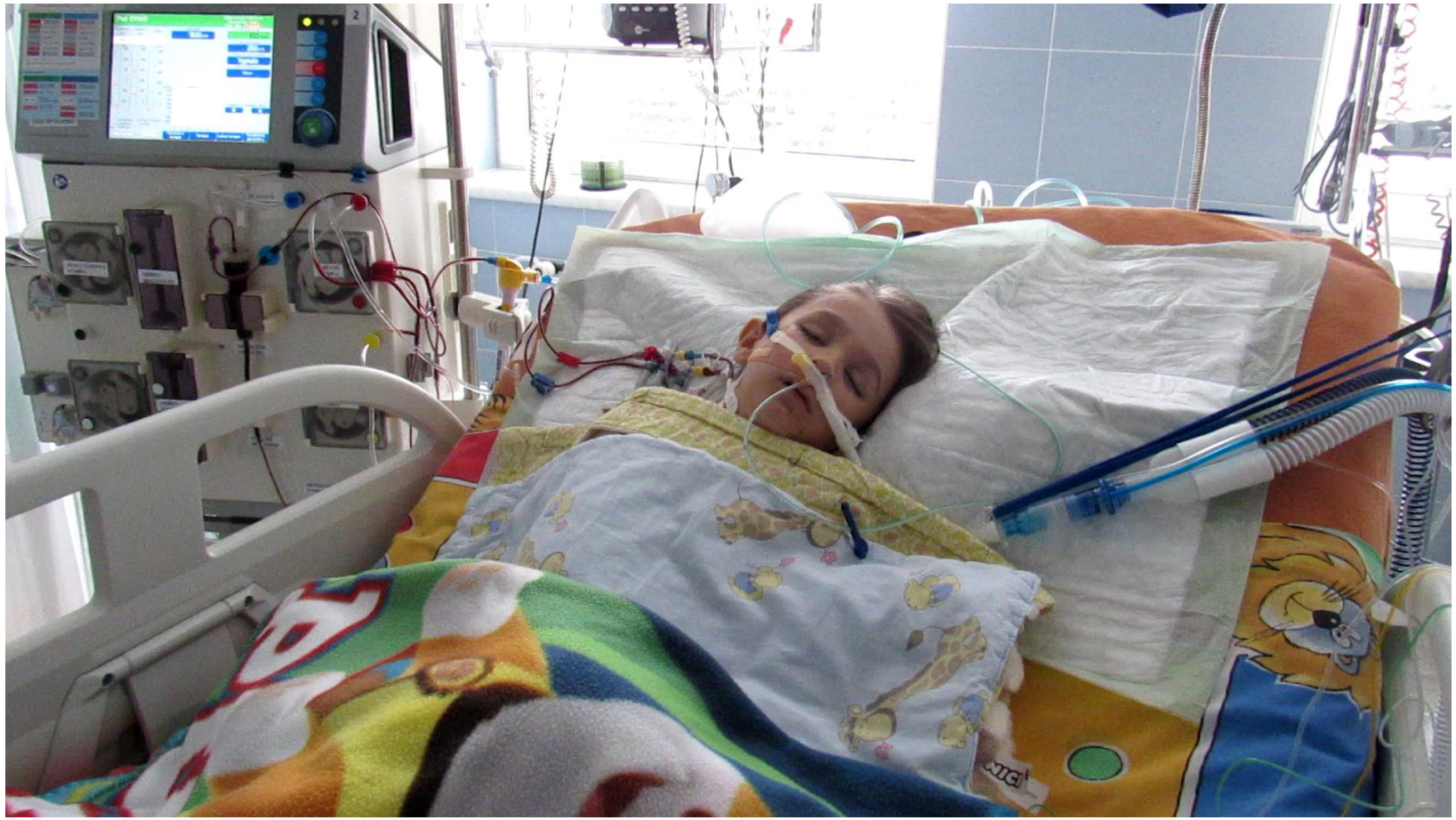
Kazuistika pacienta na Dexmedetomidinu

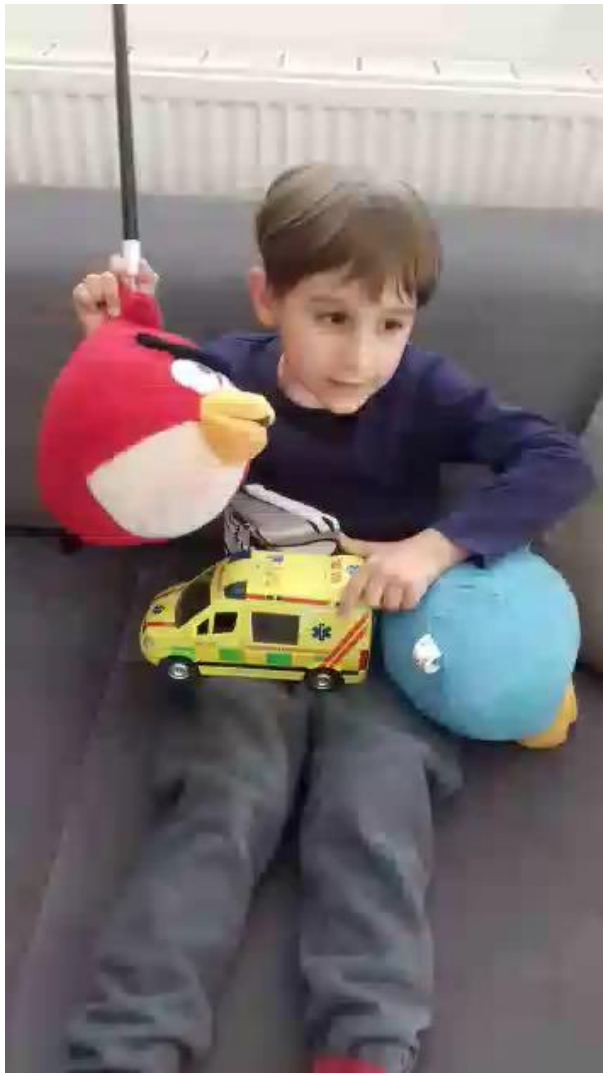
TOBÍK 4,5 roku

- 25.6. hospitalizace na KDIN – průjem, zvracení, dehydratace
- 28.6. kontrolní odběry – trombocytopenie, anémie, pozitivní schistocyty, elevace D-dimerů, elevace urea a kre, nízké zánětlivé parametry.
- UZ ledvin zvýšená echogenita obou ledvin – diagnostikován HUS
- Překlad na PEK – HD – 1x denně – 2 hodiny
- Pro progresi klinického stavu – anurie, tachykardie, dyspnoe, hypertenze – hospitalizace na KDAR

KDAR
5. - 31.7.

- Akutní intubace, CVK, NSG, výměna dial.katetru
- Napojený na CVVHD (5.-22.7)
- UPV (5.-22.7.) – nutnost reintubace (posintubační stridor) , TSK
- Průběh komplikovaný – těžké delirium u kriticky nemocného dítěte – Thiapridal + DEX
- Postupná regrese deliria – vysazeny opioidy a postupně i DEX
- 23.8. – dekanylace
- 28.8. – propuštění domů





DĚKUJEME ZA POZORNOST

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