

Inhalationssedering

SIS 16 nov 2023

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Conflict of interest - jävdeklaration

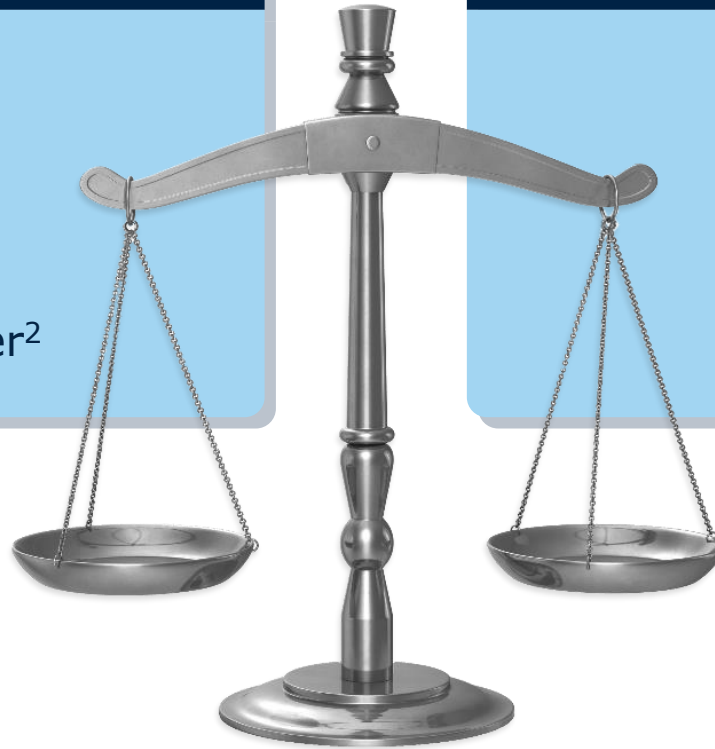


Sedana Medical

Idealt läkemedel?

För lite sedering

- Hypertension, tachycardia¹
- Agitated delirium¹
- Patient safety risks^{1,2}
- Ventilator asynchrony¹
- Post-traumatic stress disorder²



För mycket sedering


- Hypotension¹
- Prolonged ventilator time¹
- Complications to critical care¹
- Delirium³

Sedationsskalor

- Mätning av sederingsdjup anses vara standard¹
 - **Richmond Agitation Sedation Score (RASS)**
 - Ramsay Sedation Scale
 - Sedation-Agitation Scale (SAS).^{2,3}
- EEG-mätare
 - Bispectral Index (BIS)⁴
 - Narcotrend Index (NI)
 - Patient State Index (PSI)

BIS value	Depth of sedation
0	Flat-line EEG
0-40	Deep hypnotic state; memory function lost; increasing burst suppression
40-60	Recommended range for general anaesthesia
60-90	Recommended range for sedation
100	Awake; memory intact

1. Devlin et al., Crit Care Med 2018 (PADIS Clinical Practice Guidelines 2018). 2. Sessler et al., Am J Resp Crit Care Med 2002. 3. Ely et al., JAMA 2003. 4. Sackey et al., Anaesth Intensive Care 2007.



Richmond Agitation Sedation Scale (RASS)

Scale	Label	Description	
+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	VOICE
-1	Drowsy	Not fully alert, but has sustained awakening (eye-opening/eye contact) to voice (>10 seconds)	
-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)	TOUCH
-4	Deep sedation	No response to voice, but movement or eye opening to physical stimulation	
-5	Unarousable	No response to voice or physical stimulation	

Ramsay sedation scale

Awake

- | | |
|--------|--|
| 1 | Anxious and/or agitated |
| 2 | Cooperative, oriented, and tranquil |
| 3 | Responds to commands |
| Asleep | |
| 4 | Quiescent with brisk response to light glabellar tap or loud auditory stimulus |
| 5 | Sluggish response to light glabellar tap or loud auditory stimulus |
| 6 | No response |

Sedationsskalor

RASS (Richmond Agitation-Sedation Scale)

Nivå	Beteckning	Beskrivning
+4	Stridslysten	Uppenbart stridslysten eller våldsam; direkt fara för personal.
+3	Mycket agiterad	Drar i eller drar ut tuben/er eller kateter/rar eller har ett aggressivt beteende mot personal.
+2	Agiterad	Frekventa oavsiktliga rörelser eller dålig följsamhet med ventilator.
+1	Rastlös	Ängslig eller orolig men ej aggressiva eller kraftfulla rörelser.
0	Alert och lugn	
-1	Slö	Ej helt alert men upprätthåller (mer än 10 sekunder) vakenhet med ögonkontakt vid tilltal.
-2	Lätt sederad	Kortvarig (mindre än 10 sekunder) vakenhet med ögonkontakt vid tilltal.
-3	Måttligt sederad	Någon form av rörelse (men ingen ögonkontakt) vid tilltal.
-4	Djupt sederad	Ingen respons vid tilltal men någon form av rörelse vid fysisk stimulering.
-5	Ej väckbar	Ingen respons vid tilltal eller fysisk stimulering.

The ABCDEF Bundle



A Assess & Manage Pain



B Both SATs and SBTs



C Choice of Sedation and Analgesia



D Delirium Assessment & Management



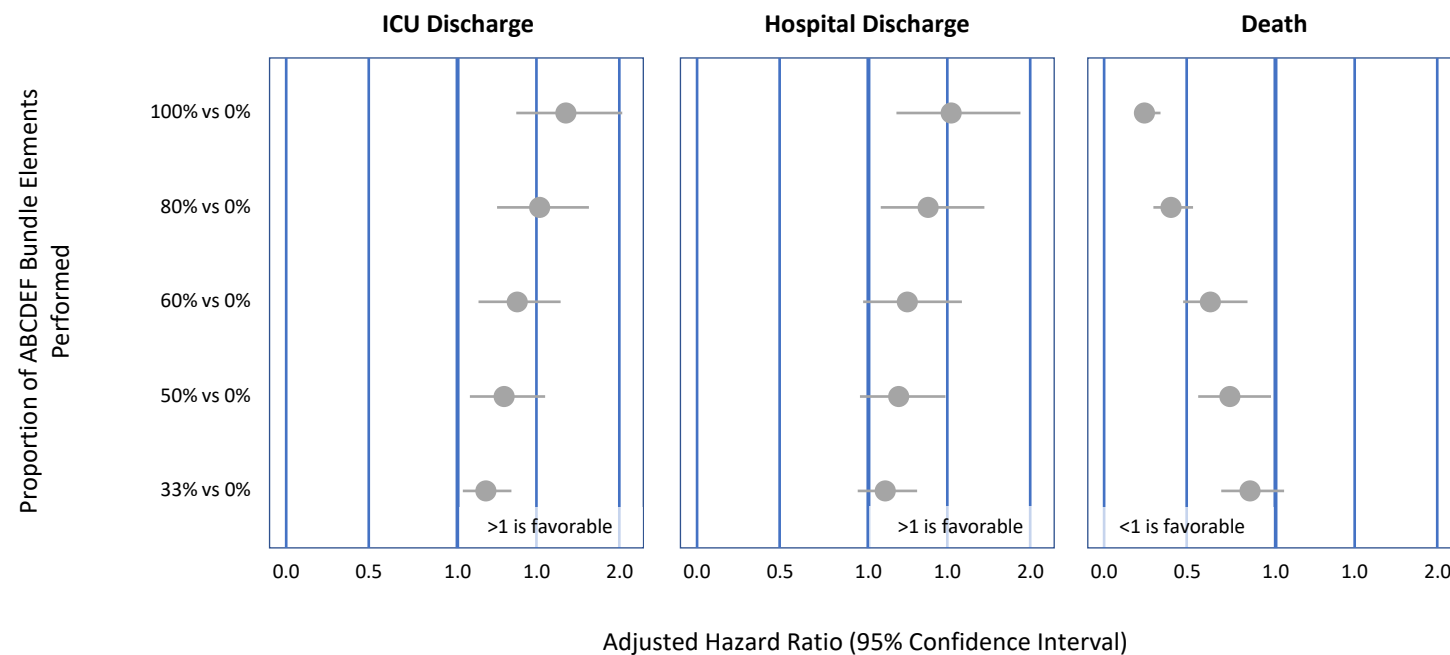
E Early Mobilisation and Exercise



F Family Engagement

Följsamhet till ABCDEF-bundle viktigt!

Association between proportional performance of the ABCDEF bundle and patient-related outcomes

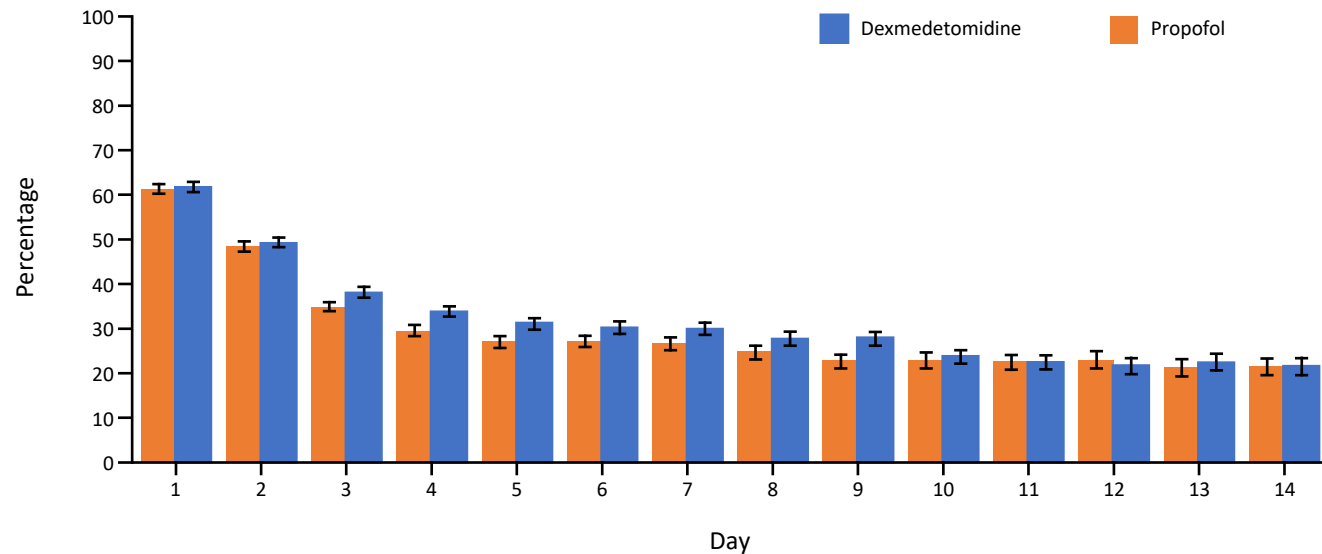


Effekter på:

- Överlevnad
- Ventilatoranvändning
- Koma / delirium
- Fastbindning
- Åter IVA

”No/Light sedation” passar inte alla

Patients with a Clinical Indication for Deep Sedation



No. at Risk

Dexmedetomidine	1952	1915	1775	1551	1351	1151	991	849	747	645	583	515	453	407
Usual care	1963	1928	1798	1610	1384	1201	1045	921	798	698	613	550	496	463

ORIGINAL ARTICLE

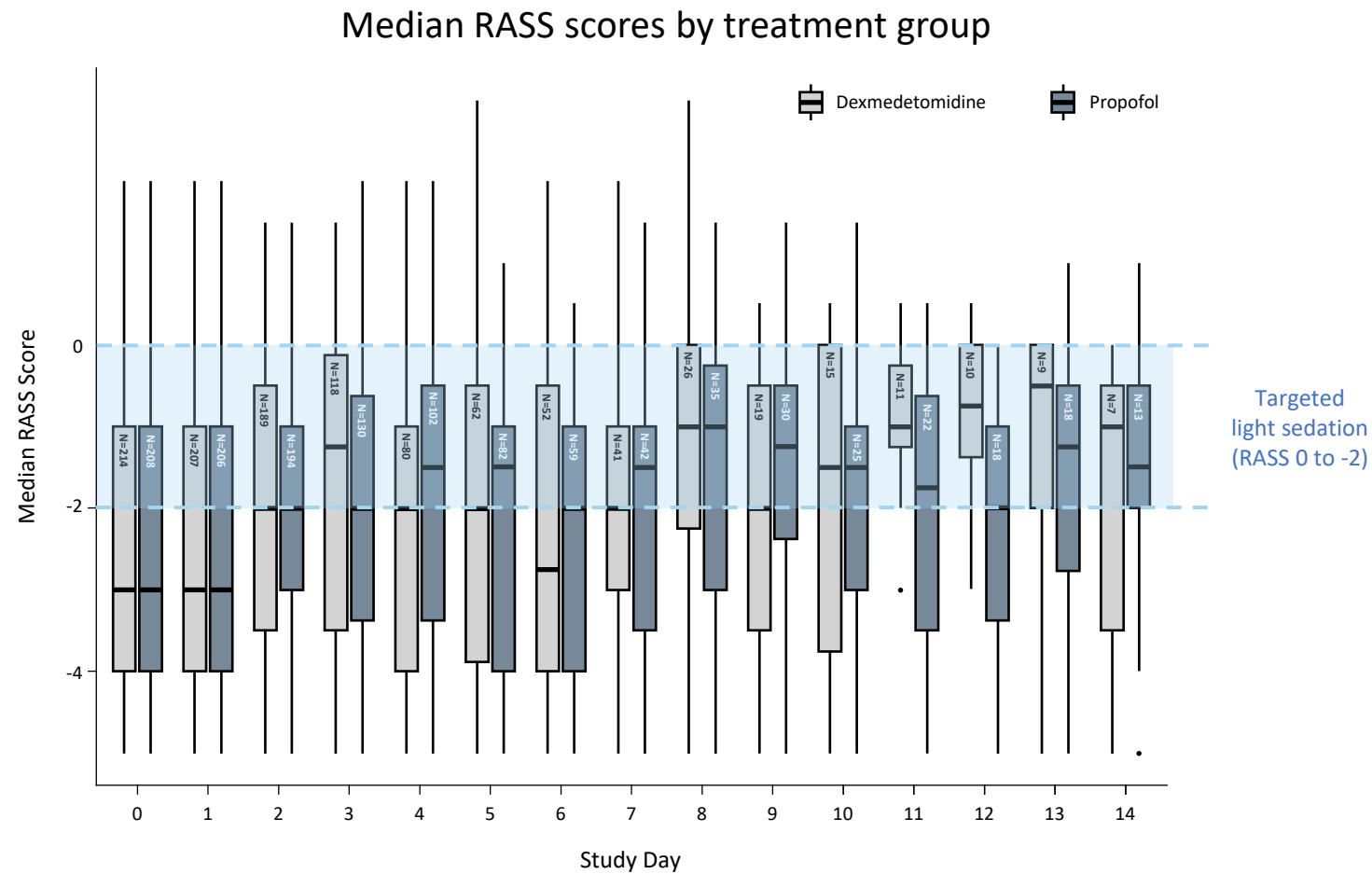
1

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*

- Sederingsnivåmål: RASS **-2 to +1**
- Pat bedömdes behöva djupare sedering (RASS -3 el mer)
 - Första 2 dagarna: ~50%
 - Första veckan: >25%
- 75% av pat i dex-gruppen behövde tillägg av annat läkemedel för att nå sederingsmålet de första två dagarna.

No/Light sedation kan vara svårt att uppnå



Dexmedetomidine or Propofol for Sedation in Mechanically Ventilated Adults with Sepsis

C.G. Hughes, P.T. Mailloux, J.W. Devlin, J.T. Swan, R.D. Sanders, A. Anzueto, J.C. Jackson, A.S. Hoskins, B.T. Pun, O.M. Orun, R. Raman, J.L. Stollings, A.L. Kiehl, M.S. Duprey, L.N. Bui, H.R. O'Neal, Jr., A. Snyder, M.A. Gropper, K.K. Guntupalli, G.J. Stashenko, M.B. Patel, N.E. Brummel, T.D. Girard, R.S. Dittus, G.R. Bernard, E.W. Ely, and P.P. Pandharipande, for the MENDS2 Study Investigators*

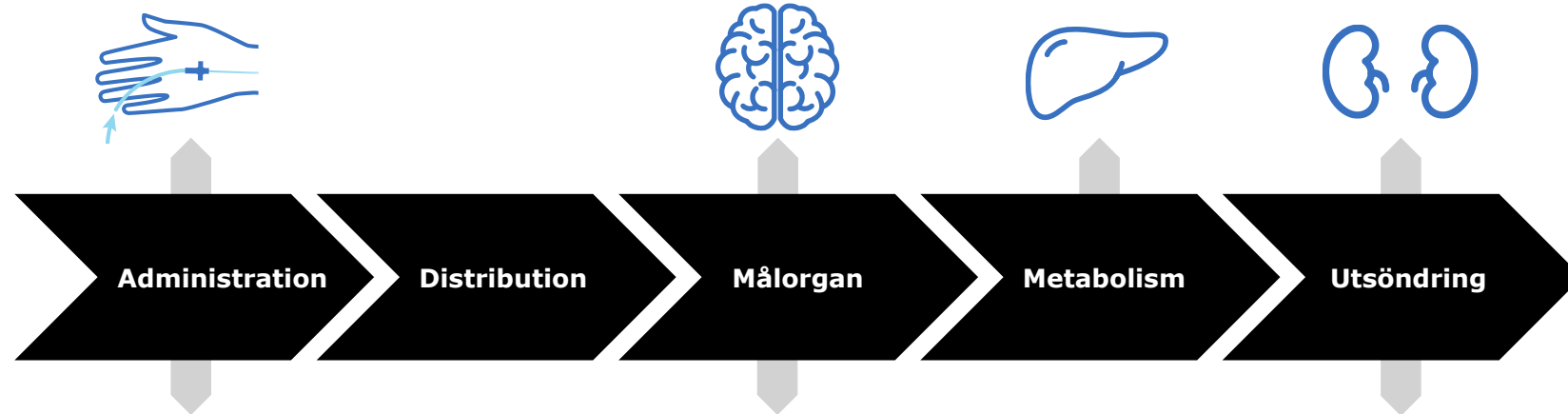
Sedativa läkemedel

	MIDAZOLAM ¹	PROPOFOL ²	DEXMEDETOMIDINE ³⁻⁵	ISOFLURANE ⁶⁻⁹	SEVOFLURANE ^{9,10}
Drug class	benzodiazepine	GABA agonist	alpha-2 receptor agonist	fluorinated ether	fluorinated ether
Metabolisation	40-60%	66%	95%	0.2%	2-5%
Degradation metabolite	α-hydroxymidazolam	Glucuronides	Glucuronides	Trifluoroacetic acid, fluorides	Fluorides, hexafluoroisopropanol
Active metabolite	Yes	No	No	No	No
Elimination	60-80% renal	88% renal	90% renal	Pulmonary exhalation	
Duration of action T _{1/2}	1.5-3.0 h	0.5-1.5 h (4-7 h)	1.9-2.5 h	< 5 min	< 5 min
80% decrement time	3-12 h (up to several days)	3.5 h-3 d	3.7 h	30-35 min	< 8 min

1. Nordt et al., J Emerg Med 1997. 2. Trapani et al., Curr Med Chem 2000. 3. Weerink et al., Clin Pharmacokin 2017. 4. Iirola et al., Crit Care 2011. 5. Venn et al., Br J Anaesth 2002. 6. Mazze et al., Anesthesiology 1974. 7. Holaday et al., Anesthesiology 1975. 8. Kharasch et al., Anesthesiology 1999. 9. Bailey et al., Anesth Analg 1997. 10. Behne et al., Clin Pharmacokin 1999.

Farmakokinetik - iv vs inhalerade läkemedel

**Intravenösa
läkemedel**



Minimum Alveolar Concentration (MAC)

MAC - hälften av patienterna reagerar inte på kirurgiskt stimuli



MAC of a volatile anaesthetic **decreases with patients' age and body temperature**,² as well as the **administration of other anaesthetics and/or opioids**.³

MAC is **not influenced by the duration** of anaesthesia/administration.

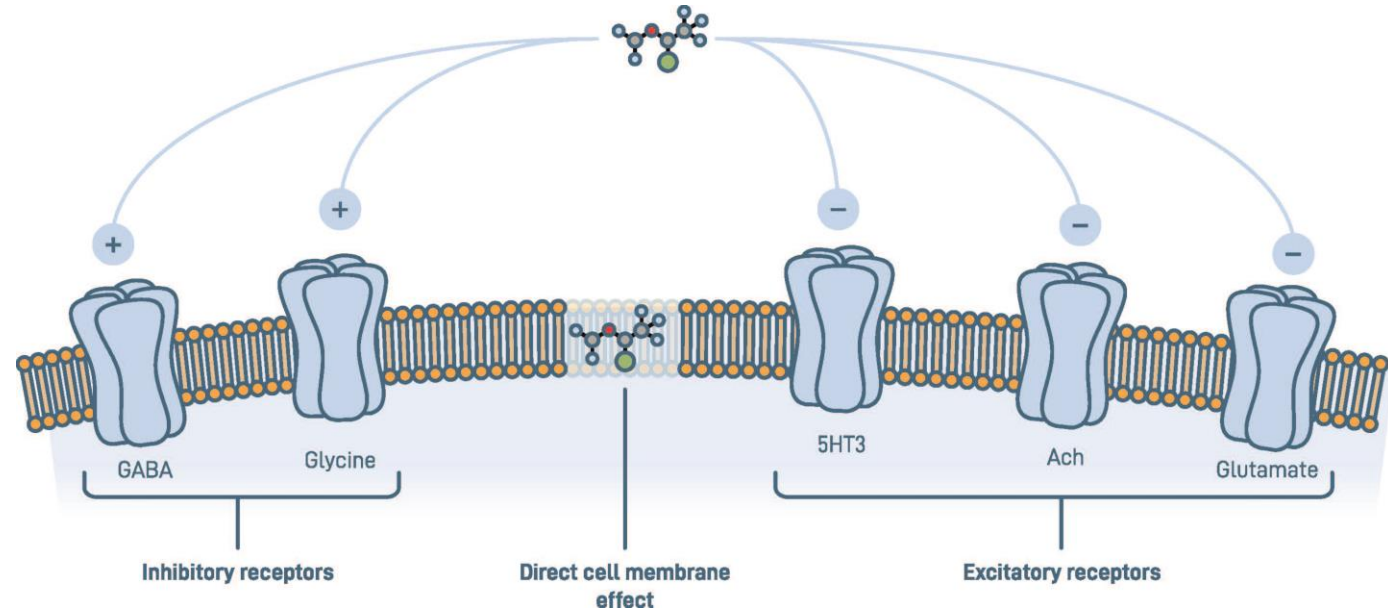
1. Eger EI II et al. Anesthesiology 1965; 26: 756-63. 2. Eger EI II et al. Anesth Analg 1987; 66: 974-6.

3. Kathoh T et al. Anesthesiology 1998; 88: 18-24.

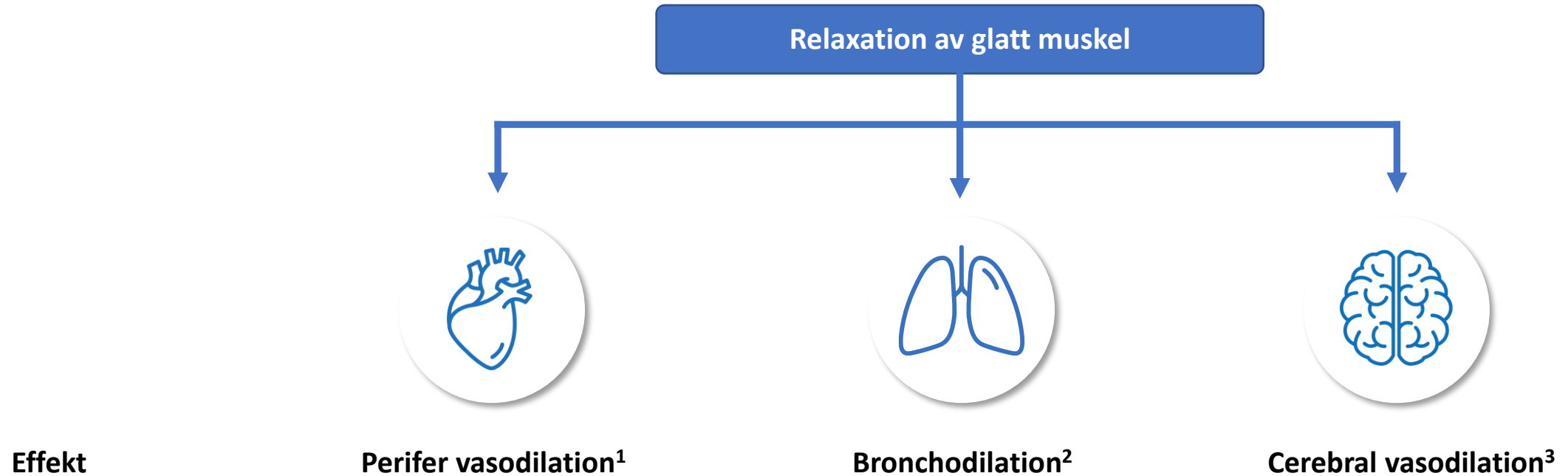
Farmakodynamik

Multiple mechanisms of action¹⁻⁴

- Potentiation of inhibitory receptors
- Inhibition of excitatory receptors
- Direct cell membrane effects



Farmakodynamik utöver sedering



1. Crystal, J Anesth Hist 2017. 2. Turner et al., Respir Care 2012. 3. Basil et al., Anesthesiology 1999.

Narkosgas för sedering på IVA - Studieresultat

THE LANCET
Respiratory Medicine

Articles

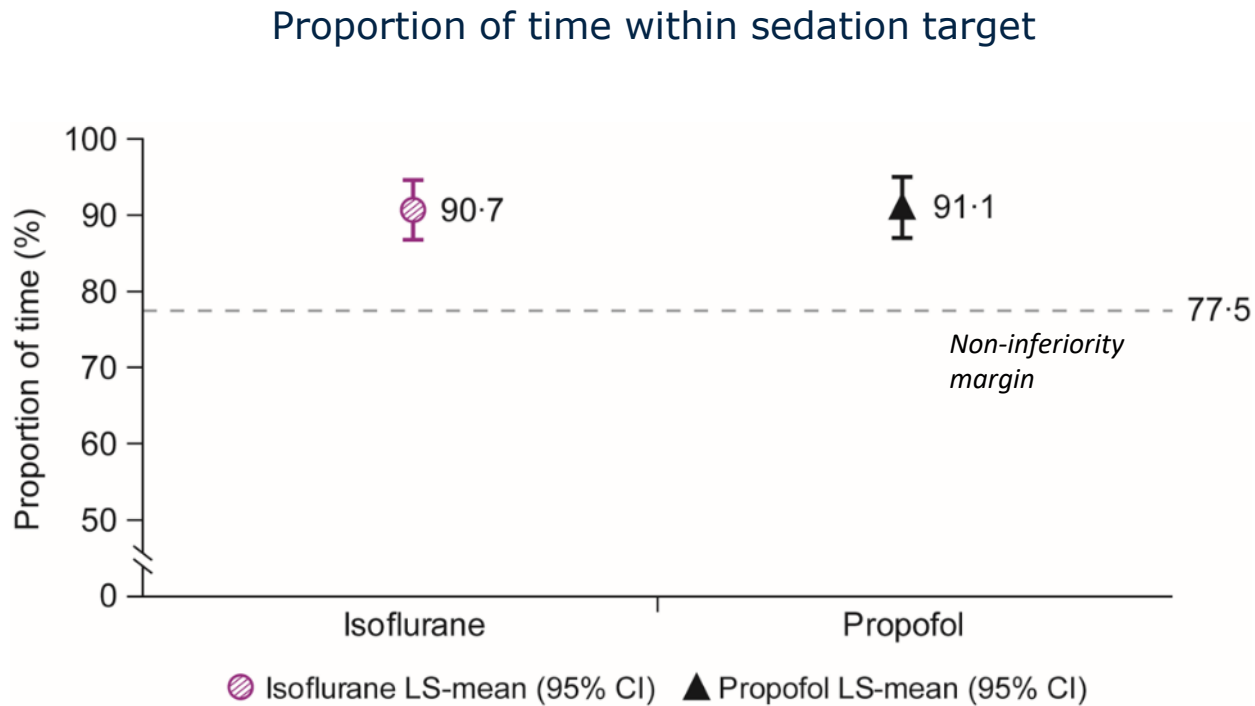
Inhaled isoflurane via the anaesthetic conserving device versus propofol for sedation of invasively ventilated patients in intensive care units in Germany and Slovenia: an open-label, phase 3, randomised controlled, non-inferiority trial



Andreas Meiser, Thomas Volk, Jan Wallenborn, Ulf Guenther, Tobias Becher, Hendrik Bracht, Konrad Schwarzkopf, Rihard Knafelj, Andreas Faltlhauser, Serge C Thal, Jens Soukup, Patrick Kellner, Matthias Drüner, Heike Vogelsang, Martin Bellgardt, Peter Sackey*, on behalf of the Sedaconda study group*

Meiser et al., Lancet Resp Med 2021.

Sederingseffektivitet Iso vs Prop

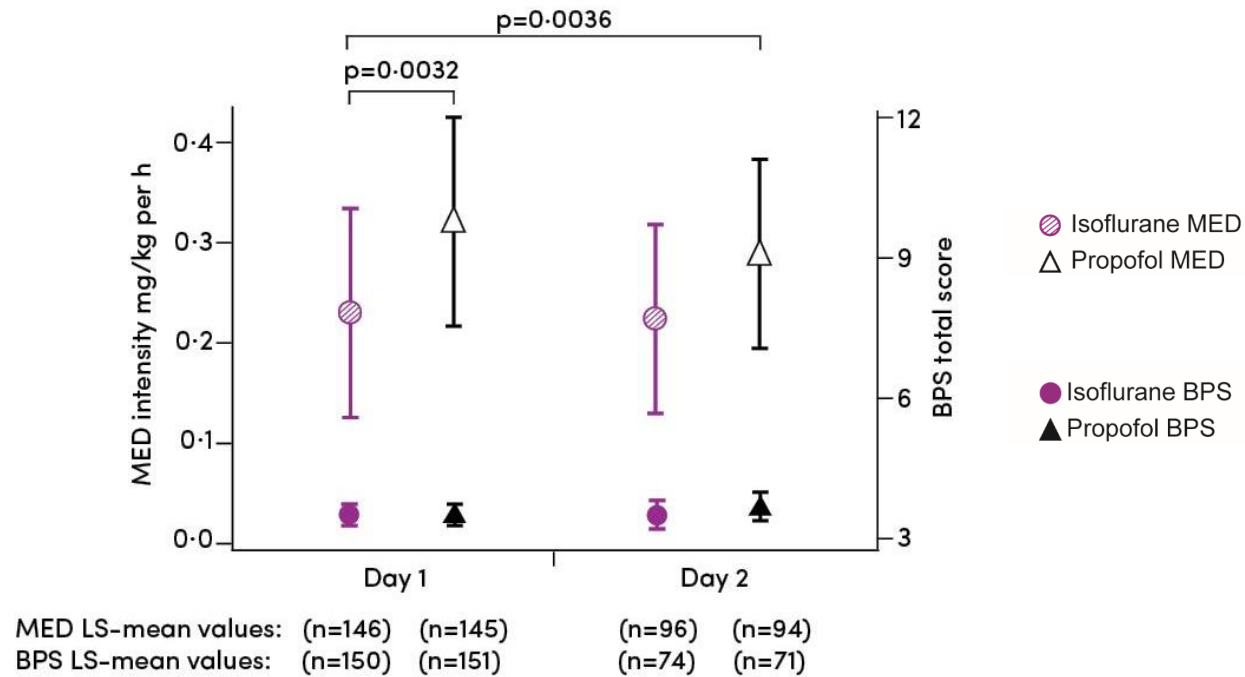


- 301 pat, 4 länder
- Isofluran godkänt i Europa för intensivvårdssedering

RASS=Richmond Agitation-Sedation Scale

Opioidreduktion

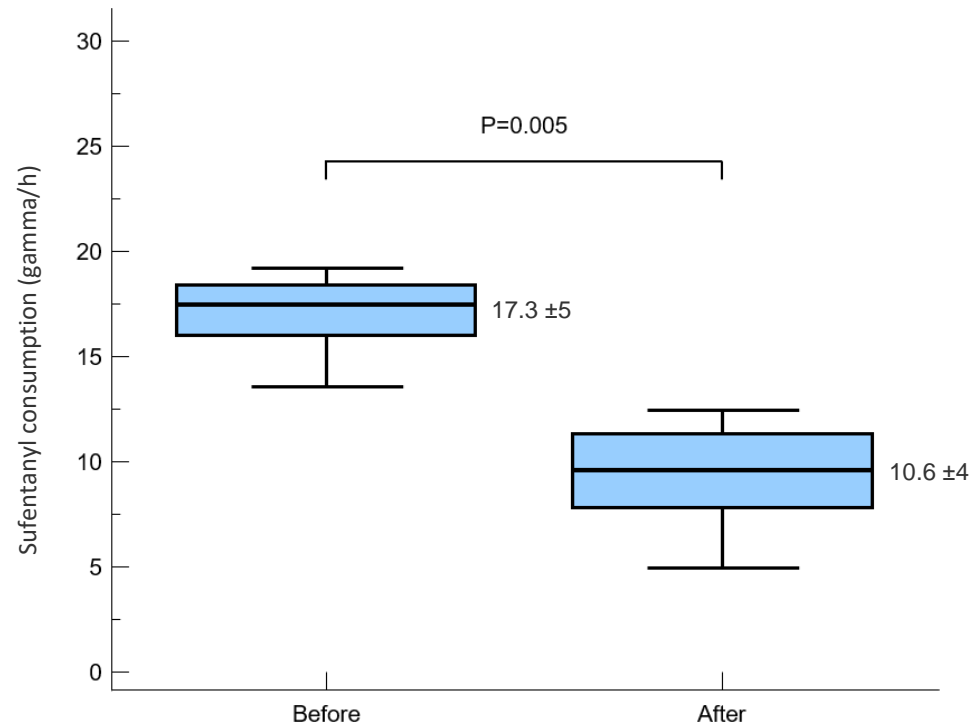
Morphine equivalent dose intensity and pain scale



- 29% lägre opioid-användning

MED=Morphine Equivalent Dose. BPS=Behavioural Pain Scale

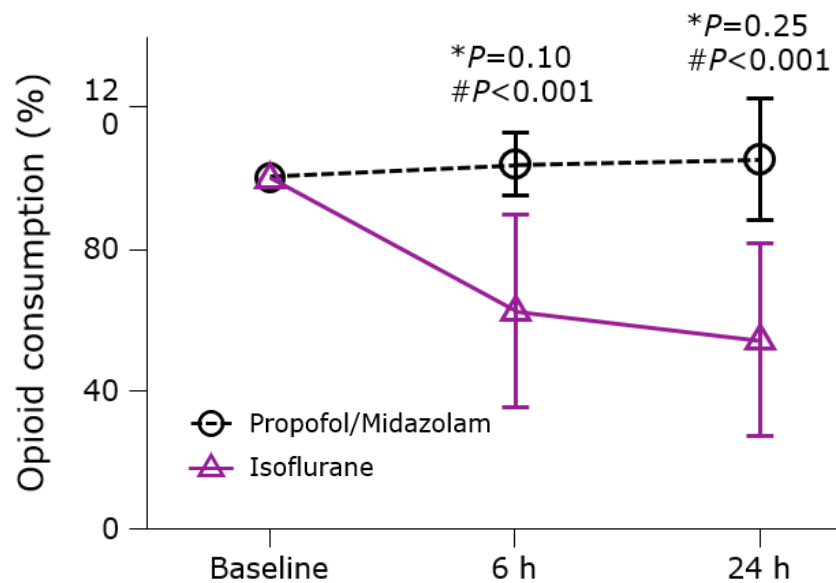
Opioidreduktion vid Covid-19 ARDS efter byte från midazolam till isofluran



- 11 Covid-19 patienter.

Opioidreduktion och spontanandning hos ARDS-patienter

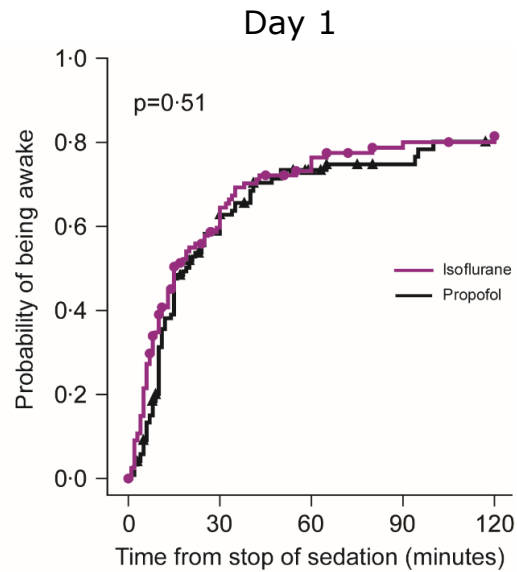
Opioid consumption before and during isoflurane sedation compared with propofol/midazolam



	Propofol/ Midazolam <i>n</i> = 19	Isoflurane <i>n</i> = 19	<i>P</i>
SAPS II, points			
Before	43.2 ± 15.2	40.2 ± 9.6	.47
6 h	41.4 ± 14.9	39.2 ± 9.8	.61
24 h	42.6 ± 13.8	35.7 ± 10.2	.10
Remifentanyl, µg/kg/min			
	<i>n</i> = 14	<i>n</i> = 16	
Before	0.22 ± 0.09	0.19 ± 0.10	.39
6 h	0.23 ± 0.10	0.10 ± 0.04*	.007
24 h	0.25 ± 0.09	0.09 ± 0.04*	< .001
Sufentanil, µg/kg/h			
	<i>n</i> = 5	<i>n</i> = 3	
Before	0.68 ± 0.59	0.46 ± 0.66	.64
6 h	0.68 ± 0.58	0.29 ± 0.45	.20
24 h	0.52 ± 0.55	0.29 ± 0.45	.38
Spontaneous breathing			
Before	3 (16)	2 (11)	.64
6 h	3 (16)	12 (63)	.003
24 h	3 (16)	17 (90)	< .001

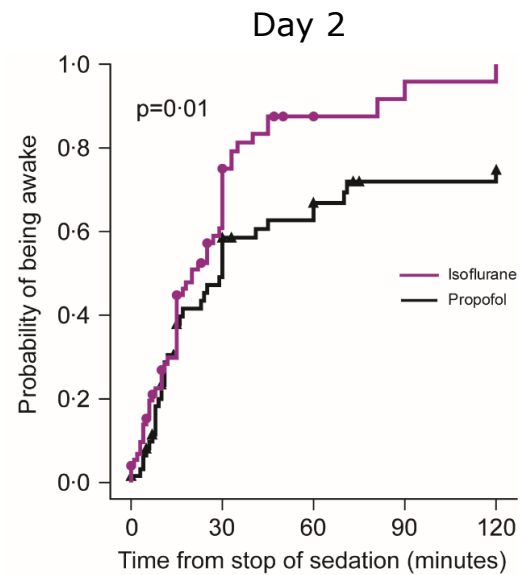
Uppvakningstider

Time to wake-up during SAT



Number of patients with RASS <0

Isoflurane	122	42	25	16	14
Propofol	121	46	23	14	10



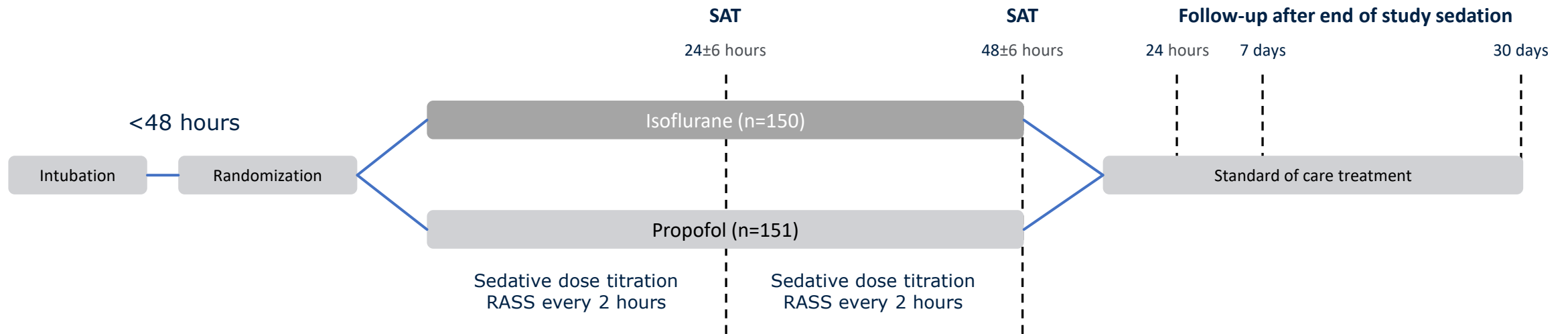
Number of patients with RASS <0

Isoflurane	75	22	4	2	1
Propofol	65	27	18	9	9

- Uppväckning dag 2
 - Isofluran:
20 min (IQR 10-30 min)
 - Propofol:
30 min (IQR 11-120 min)

SAT = spontaneous awakening trial.

Sedaconda-studien



Återhämtning efter sedering

Kognitiv återhämtning

Mediantid från sederingsstopp till att patient kunde skriva sin hemadress

Spridning: 25-75%

Midazolam

275 min

75-1440 min

Isofluran

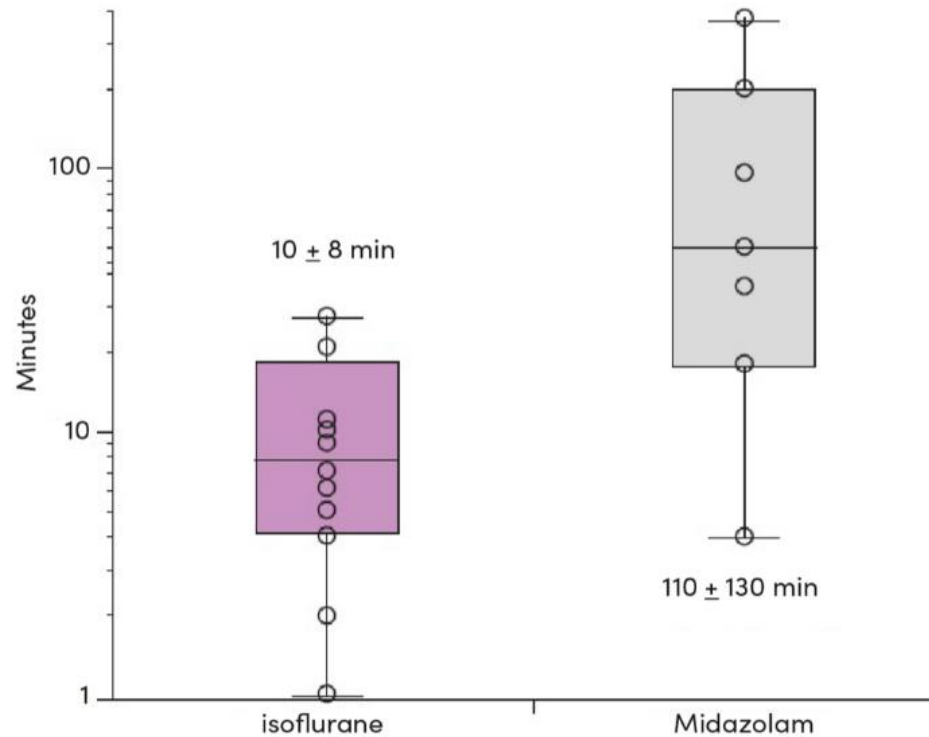
58 min

20-270 min

Kognitiv återhämtning

- efter 96 timmars sedering

Time to follow verbal command from termination of sedation



- Tid till att följa uppmaning
 - Isofluran:
10 ± 8 min
 - Midazolam:
110 ± 130 min

Propofol inte så oproblematiskt?

RESEARCH

Open Access

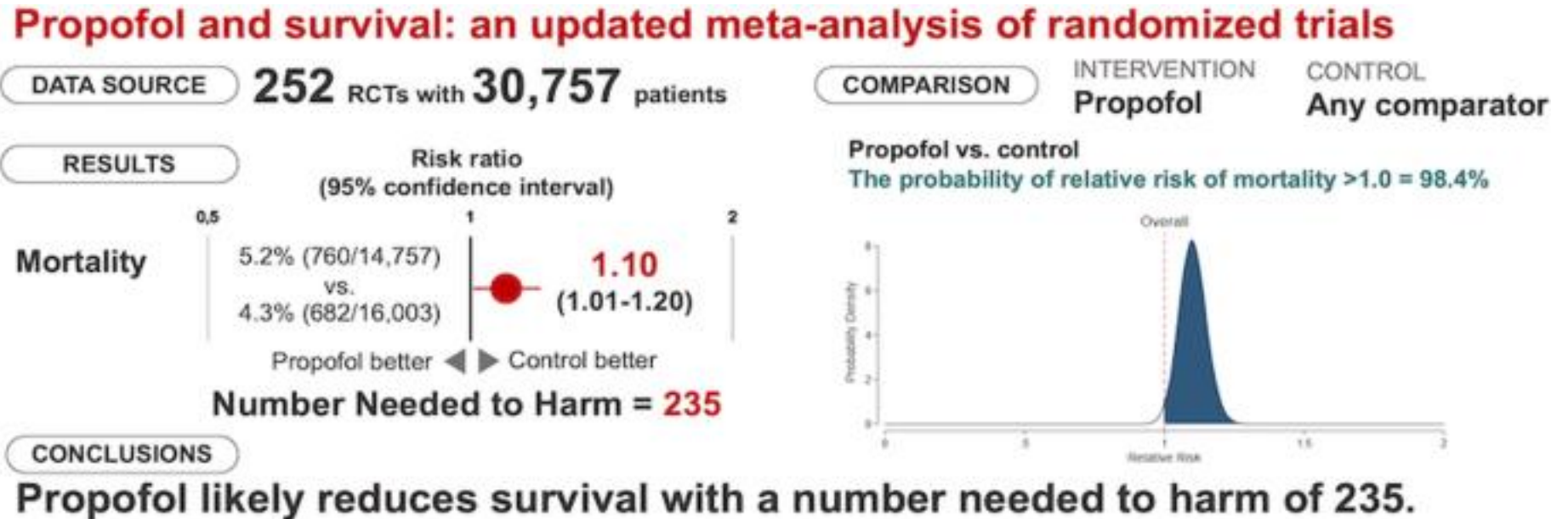


Propofol and survival: an updated meta-analysis of randomized clinical trials

Yuki Kotani^{1,2,3†}, Alessandro Pruna^{1†}, Stefano Turi¹, Giovanni Borghi¹, Todd C. Lee⁴, Alberto Zangrillo^{1,2}, Giovanni Landoni^{1,2*} and Laura Pasin⁵

J-L Vincent:

“Indeed, in research there is rarely a last word, and we should always keep our minds open to new data whether or not they support our current standpoint.”



IVA-tid / ventilatortid





Journal of Critical Care

Volume 78, December 2023, 154350



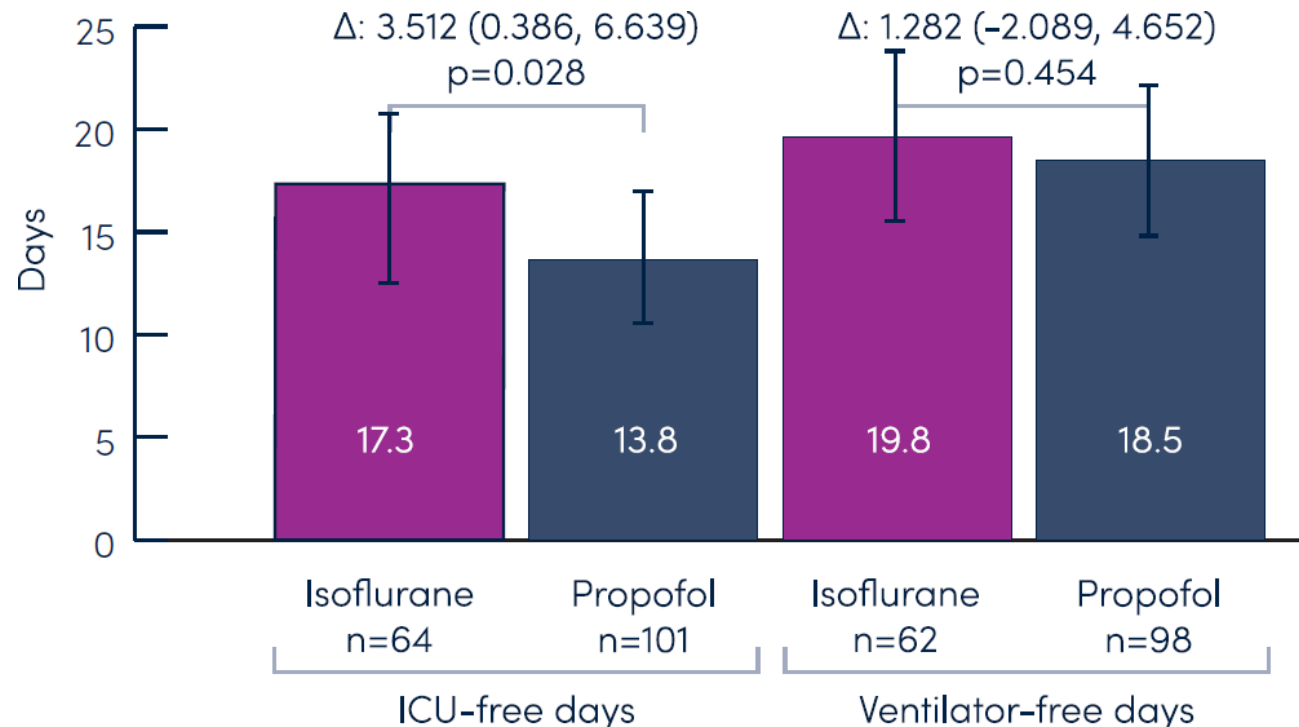
ICU- and ventilator-free days with isoflurane or propofol as a primary sedative – A post-hoc analysis of a randomized controlled trial

Hendrik Bracht MD, PhD^a  , Andreas Meiser MD^b, Jan Wallenborn MD^c, Ulf Guenther MD^d,
Klaus M. Kogelmann MD^e, Andreas Faltlhauser MD^f, Konrad Schwarzkopf MD^g,
Jens Soukup MD^h, Tobias Becher MDⁱ, Patrick Kellner MD^j, Rihard Knafelj MD, PhD^k,
Peter Sackey MD^l, Martin Bellgardt MD^m, the Sedaconda Study Group¹

IVA-tid / ventilatortid

Post-hoc analysis¹ of the Sedaconda study²
(n=178)

Duration of ICU stay and mechanical ventilation



- 3,5 d kortare IVA-vårdtid
- Tid från extub till att lämna IVA:
 - Isofluran: 2,5 d
 - Propofol: 4,7 d

1. Bracht et al. J Crit Care 2023.
2. Meiser et al. 2021

Mindre polyfarmaci och RRT med isofluran vs prop

Secondary 30-day follow-up data	Isoflurane	Propofol	p value
Proportion of patients receiving other sedatives*	47.8%	74.3%	0.0003
Mean (SD) number of days with registered other sedatives*	2.0 (3.8)	6.9 (8.3)	<0.0001
30-day mortality	24.6%	19.3%	0.454
Proportion of patients starting renal replacement therapy in the 30 days after randomization	2.9%	18.3%	0.0019

*other sedatives: midazolam, lorazepam, diazepam, ketamine, clonidine, dexmedetomidine, temazepam, zolpidem, zopiclone



Read about [our approach to COVID-19](#)

Home > NICE Guidance > Health and social care delivery > Acute and critical care

Sedaconda ACD-S for sedation with volatile anaesthetics in intensive care

Medical technologies guidance [MTG65] Published: 27 January 2022 [Register as a stakeholder](#)

1. Recommendations

- 1.1 Sedaconda ACD-S (Anaesthetic Conserving Device) is recommended as a cost-saving option for delivering inhaled sedation in an intensive care setting when the volatile anaesthetics isoflurane or sevoflurane are being considered.
- 1.2 Further research is recommended to identify any health conditions or groups of patients that would benefit more from inhaled sedation with Sedaconda ACD-S than from standard care.



Read about [our approach to COVID-19](#)

[Home](#) > [NICE Guidance](#) > [Health and social care delivery](#) > [Acute and critical care](#)

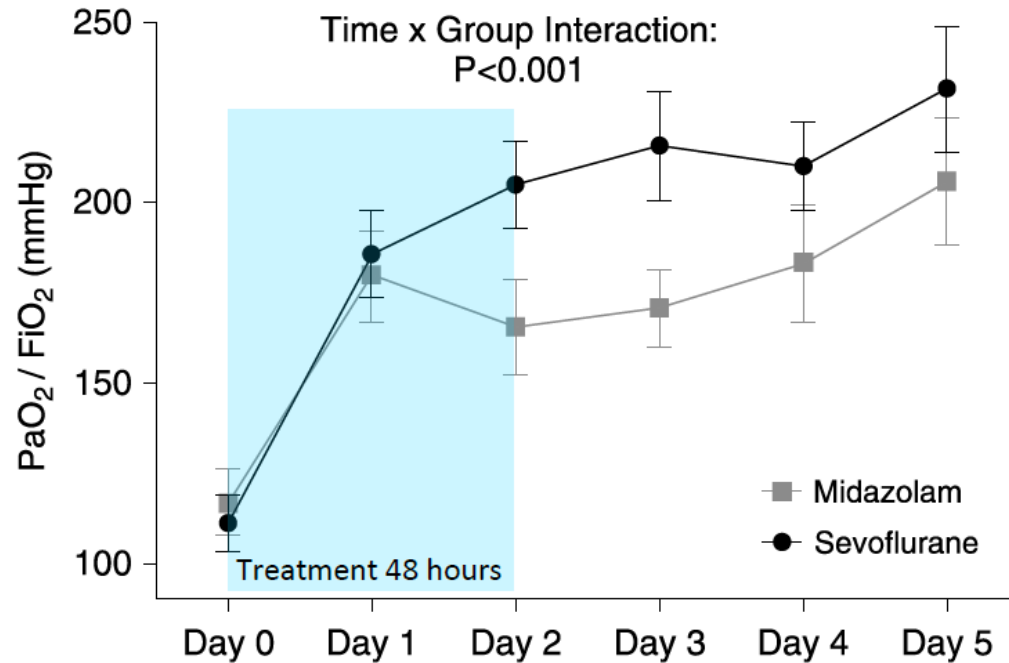
Sedaconda ACD-S for sedation with volatile anaesthetics in intensive care

Medical technologies guidance [MTG65] Published: 27 January 2022 [Register as a stakeholder](#)

“Cost modelling shows that, over 30 days, Sedaconda ACD-S is cost saving compared with intravenous propofol sedation by £3,833.76 per adult.”

ARDS

Evolution of PaO₂/FiO₂ ratio (mmHg) during the 120-hour observation period (intervention during the first 48 hours)



- Dag 2 – lägre nivåer av både plasma och BAL-nivåer av sRAGE i sevo-gruppen

ARDS, cytokines and other indicators

EFFECTS OF INHALED ANAESTHETICS ON ARDS		General findings in ARDS (Sweeney 2016) ¹	Findings in Corona virus infection and ARDS (Huang 2020) ²	Effects of Inhaled Anaesthetics (isoflurane and/or sevoflurane) vs Intravenous Anaesthetics (controls)				
				Voigtsberger 2009 ³ (rat model)	Ferrando 2013 ⁴ (pig model)	Strosing 2016 ⁵ (mouse model)	Kellner 2017 ⁶ (rat model)	Jabaudon 2017 ⁷ (human)
Pro-inflammatory cytokines	TNF-alpha	↑	↑	↓	↓	NA	NA	↓
	IL-1 beta	↑	↑	↓	↓	↓	NA	NS
	IL-6	↑	NA	↓	↓	NA	↓	↓
	IL-8	↑	↑	NA	↓	NA	NA	↓
	IL-10	↑	↑	NA	NA	NA	NS	NA
	MCP-I	↑	↑	↓	NA	NA	NS	NA
	CINC-I	↑	NA	↓	NA	NA	↓	NA
Other markers of lung injury	White blood cell count in alveoli	↑	NA	↓	↓	↓	↓	NA
	Lung fluid permeability/edema	↑	NA	↓	↓	NA	↓	NA
	Alveolar histological disruption	↑	NA	Maintained	NA	Maintained	NA	NA
	S-RAGE	↑	NA	NA	NA	NA	NA	↓
	Oxygenation	↓	↓	↑	↑	↑	↑	↑

1. Sweeney et al., Lancet 2016. 2. Huang et al., Lancet 2020. 3. Voigtsberger et al. Anesthesiol 2009. 4. Ferrando et al., Eur J Anaesthesiol 2013. 5. Strosing et al., Anesth Analg. 2016. 6. Kellner et al., Anesth Analg. 2017. 7. Jabaudon et al., Am J Resp Crit Care Med 2016. 8. Sackey et al., Crit Care Med. 2004. 9. Mesnil et al., Intensive Care Med. 2011.

Astma - bronkospasm

Intensive Care Med (2006) 32:927–933
DOI 10.1007/s00134-006-0163-0

PEDIATRIC BRIEF REPORT

Venkat Shankar
Kevin B. Churchwell
Jayant K. Deshpande

Isoflurane therapy for severe refractory status asthmaticus in children

Isoflurane resulted in:

- An immediate clinical improvement in all 11 children
- An improvement in arterial pH
- A reduction in partial pressure of arterial carbon dioxide (PaCO₂) in all 11 patients

Rapid weaning from mechanical ventilation occurred in 10 patients.

Isoflurane for Life-Threatening Bronchospasm: A 15-Year Single-Center Experience

David A Turner MD, David Heitz RRT, Mehrengise K Cooper FRCPH,
P Brian Smith MD MPH MHS, John H Arnold MD, and Scot T Bateman MD

Isoflurane led to improvement in pH and pCO₂ in patients with life-threatening bronchospasm:

- Between 4 to 24 hours, there was a statistically significant decrease in PIP (p=0.006)
- FIO₂ decreased within 4 hours of initiation of isoflurane (p=0.001)
- FIO₂ decreased from 4 to 24 hours (p =0.02)

Säkerhetsaspekter

Malign Hyperthermia (MH)

- Sedation with isoflurane is contraindicated in patients with known or suspected genetic susceptibility to MH.¹
- MH is a rare genetic disorder (incidence 1/10.000–250.000²) where isoflurane sedation may trigger a skeletal muscle hypermetabolic state.

Intracranial Pressure (ICP)

- During sedation with isoflurane, ICP may increase slightly.¹
- Caution should be taken when administering isoflurane to patients with increased ICP, and ICP must be monitored in such patients.¹

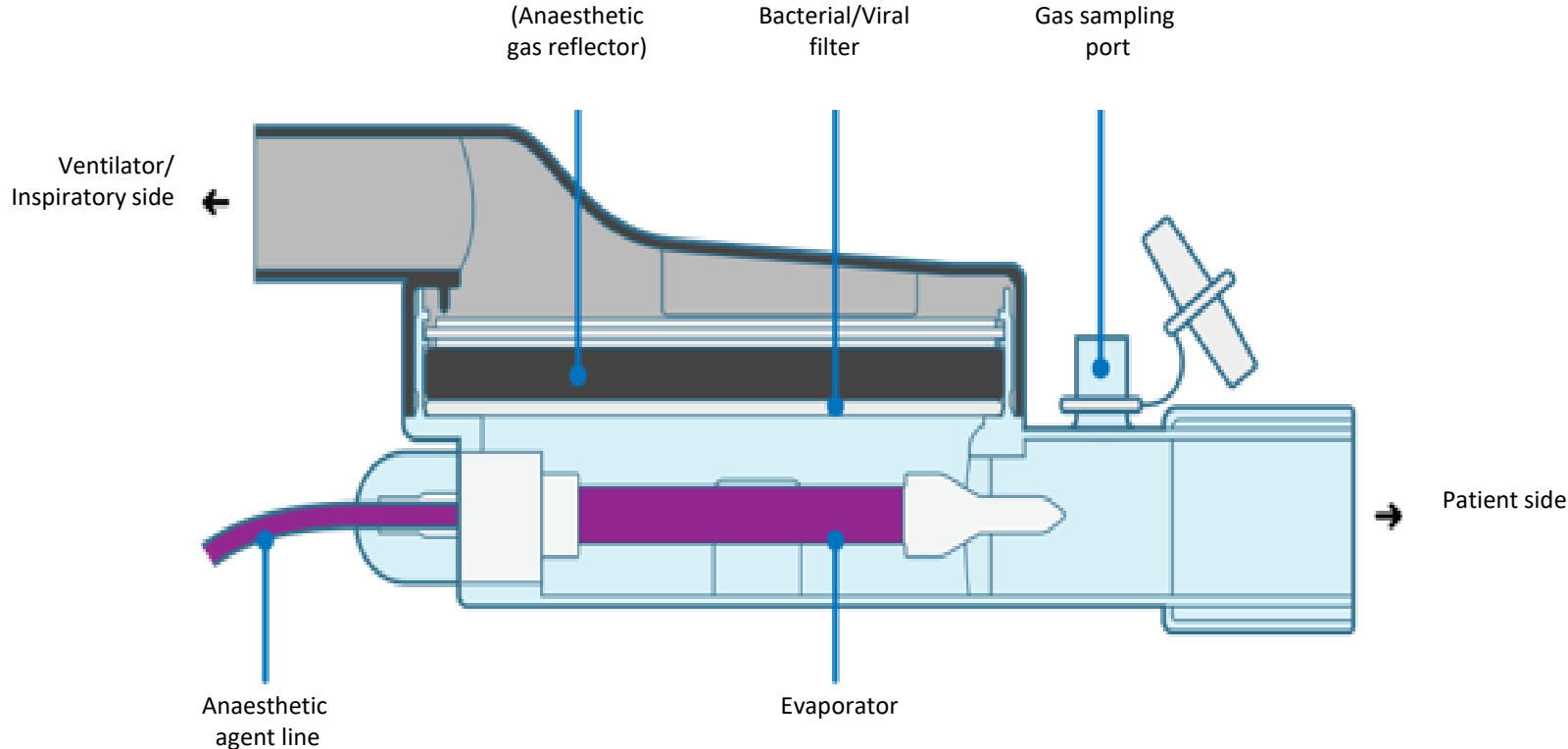
Malign hypertermi och PRIS

	Malignant Hyperthermia (MH) ¹⁻⁴	Propofol Infusion Syndrome (PRIS) ⁵⁻⁸
Triggers	Volatile anaesthetics Succinylcholine	Propofol
Dose-dependent	No	Yes (>4 mg/kg/d; >48h)
Incidence	1:10.000-1:250.000	1,1%
Therapy	Antidote dantrolene Withdrawal of agent, cooling	No antidote Symptomatic
Prevention	Medical history of family MH No use in muscle disease	<4 mg/kg/h, <7 d No use in children <16 y
Mortality	<5%	51%

1. Larach et al., Anesthesiology 1994. 2. Glahn et al., Brit J Anaesth 2010. 3. Rosenberg et al., Orphanet J Rare Dis 2015. 4. Bandschapp et al., Swiss Med Wkly 2012. 5. Roberts et al., Critical Care 2009. 6. Krajčová et al., Critical Care 2015. 7. Mirrakhimov et al., Crit Care Res Pract 2015. 8. Eziefule et al., Am J Perinatol Rep 2016.



AnaConDa



Mirus



A woman with a bandage on her forehead is lying in bed, using a Pentrox inhaler. The inhaler is a clear plastic tube with a green base and a white mouthpiece. The woman is looking down at the inhaler with her eyes closed.

Pentrox[®]
Methoxyflurane

Fast, effective pain relief is only a few breaths away.
84.6% of patients get pain relief within 6-10 breaths

Alpha-reflector 90-talet

APPARATUS

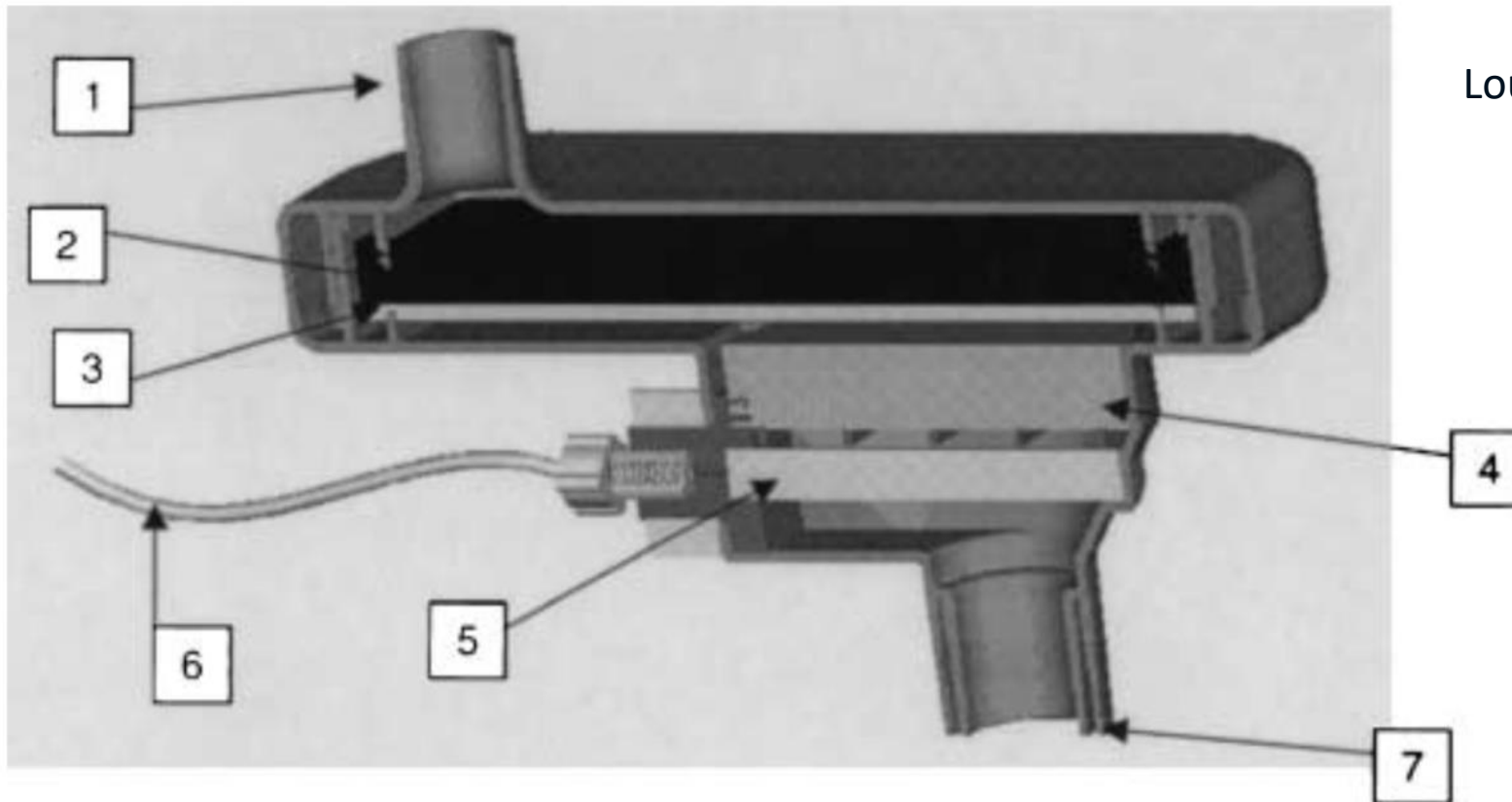
A new device to reduce the consumption of a halogenated anaesthetic agent*

M. Enlund,¹ L. Wiklund² and H. Lambert³

1 Consultant Anaesthetist, University Department of Anaesthesia & Intensive Care, Samariterhemmet Sjukhus Uppsala, Sweden

2 Professor of Anaesthesia & Intensive Care, University Hospital, Uppsala, Sweden

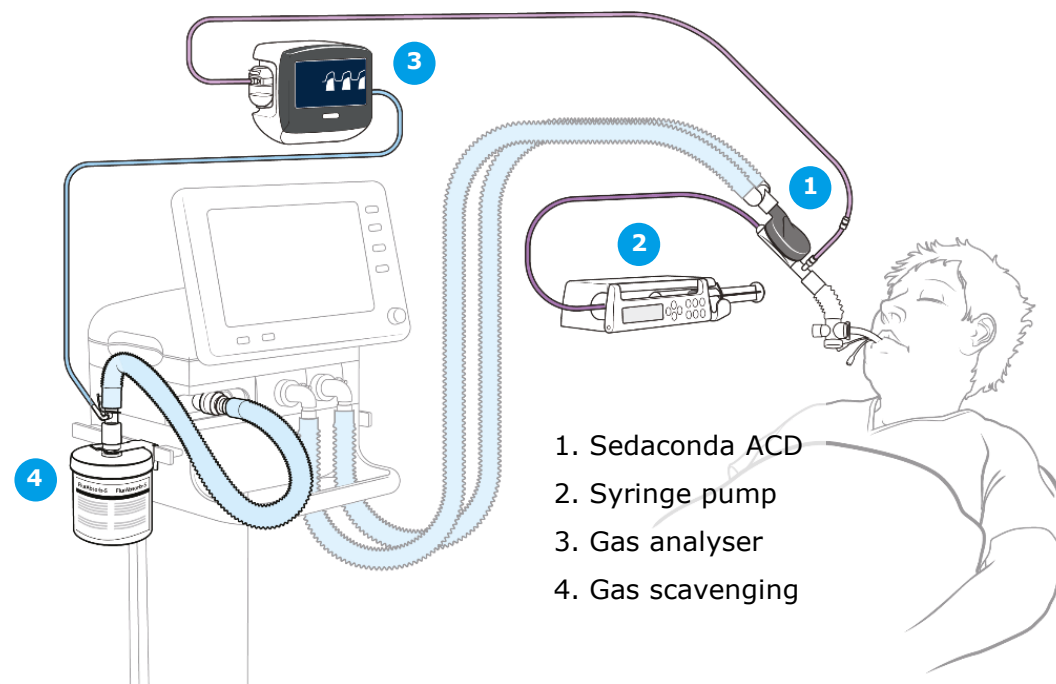
3 Director of Research, Hudson RCI AB, SE-194 27 Upplands Väsby, Sweden



Louis Gibeck – HME-filtrets uppfinnare

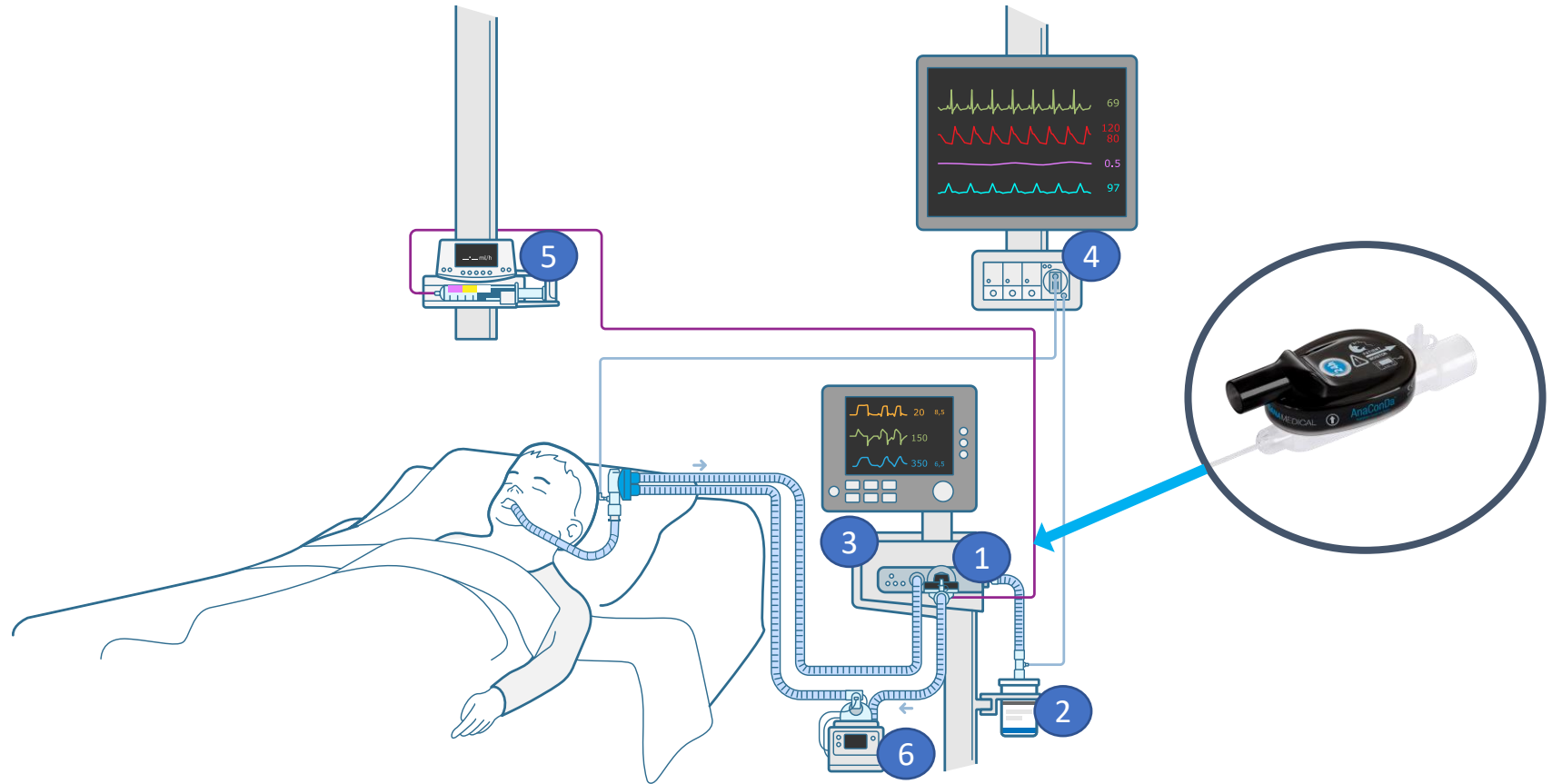


Sedaconda ACD setup



Små tidalvolymmer / Ventilatorplacering av ACD

1. AnaConDa/AnaConDa-S
2. Gas scavenging
3. Ventilator
4. Gas analyser
5. Syringe pump
6. Humidifier



Guidelines

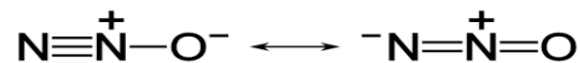
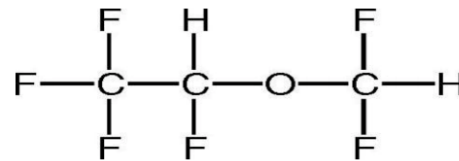
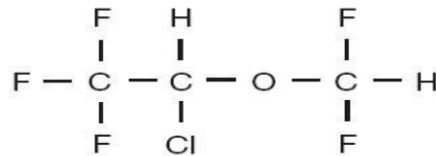
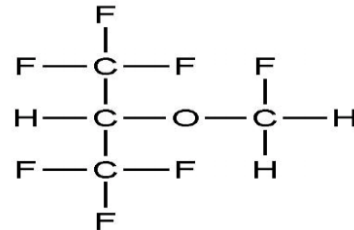
Action guidance for addressing pollution from inhalational anaesthetics

J. A. Devlin-Hegedus,^{1,2}  F. McGain,^{3,4}  R. D. Harris^{5,6} and J. D. Sherman^{7,8} 

Inhalationsgaser

- 5% av akutsjukhusens CO₂ utsläpp
- 50% av utsläppen från periop vård

Inhalational anaesthetic agents



Sevoflurane

GWP 130

Bottle (250ml) 44kg CO₂e

Isoflurane

GWP 510

Bottle (250 ml) 190 kg CO₂e

Desflurane

GWP 1300

Bottle (100 ml) 886 kg CO₂e

Nitrous oxide

GWP 310

Cylinder (3.4 kg) 1054 kg CO₂e

ANESTHESIOLOGY

2021
December

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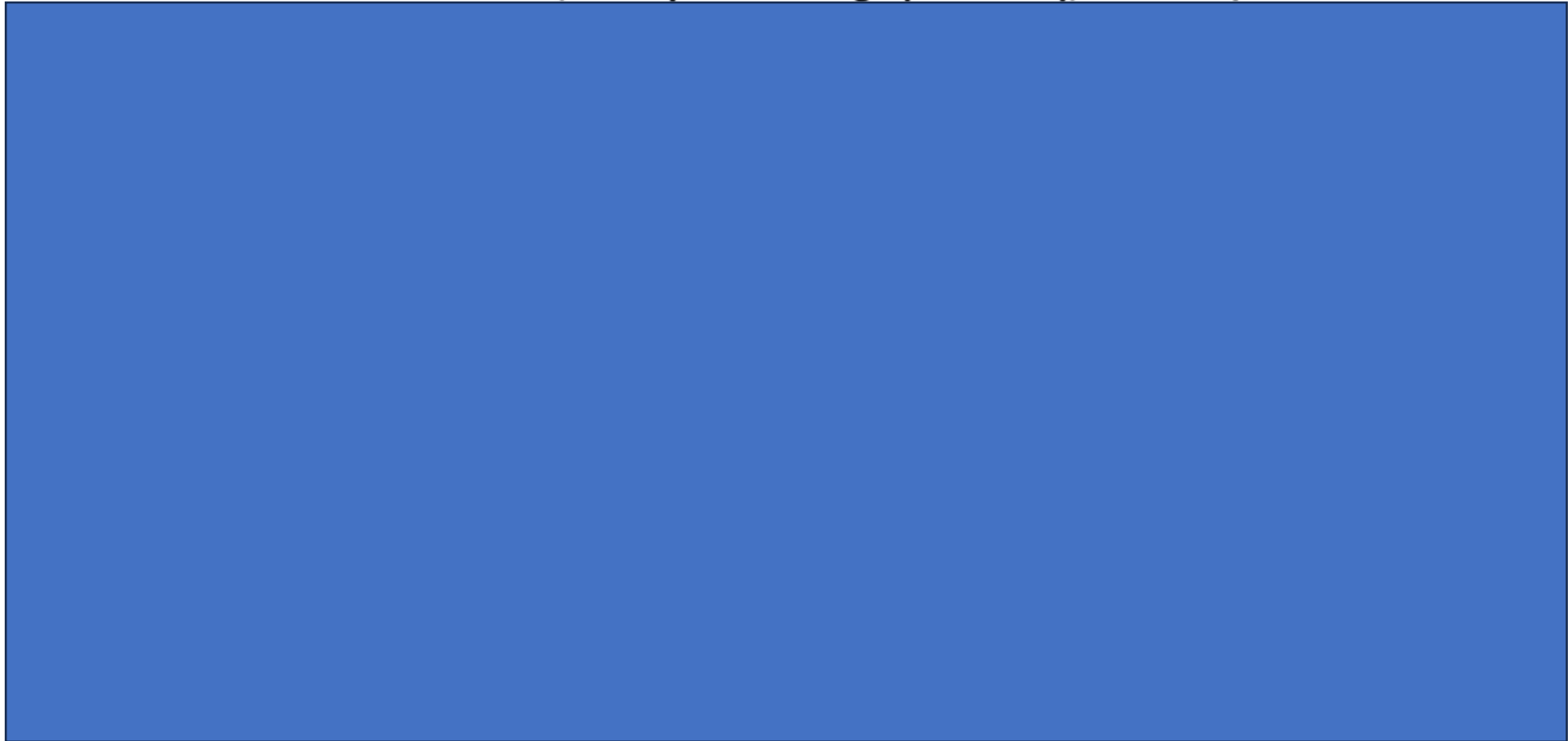


The Environmental Footprint of Anesthesia

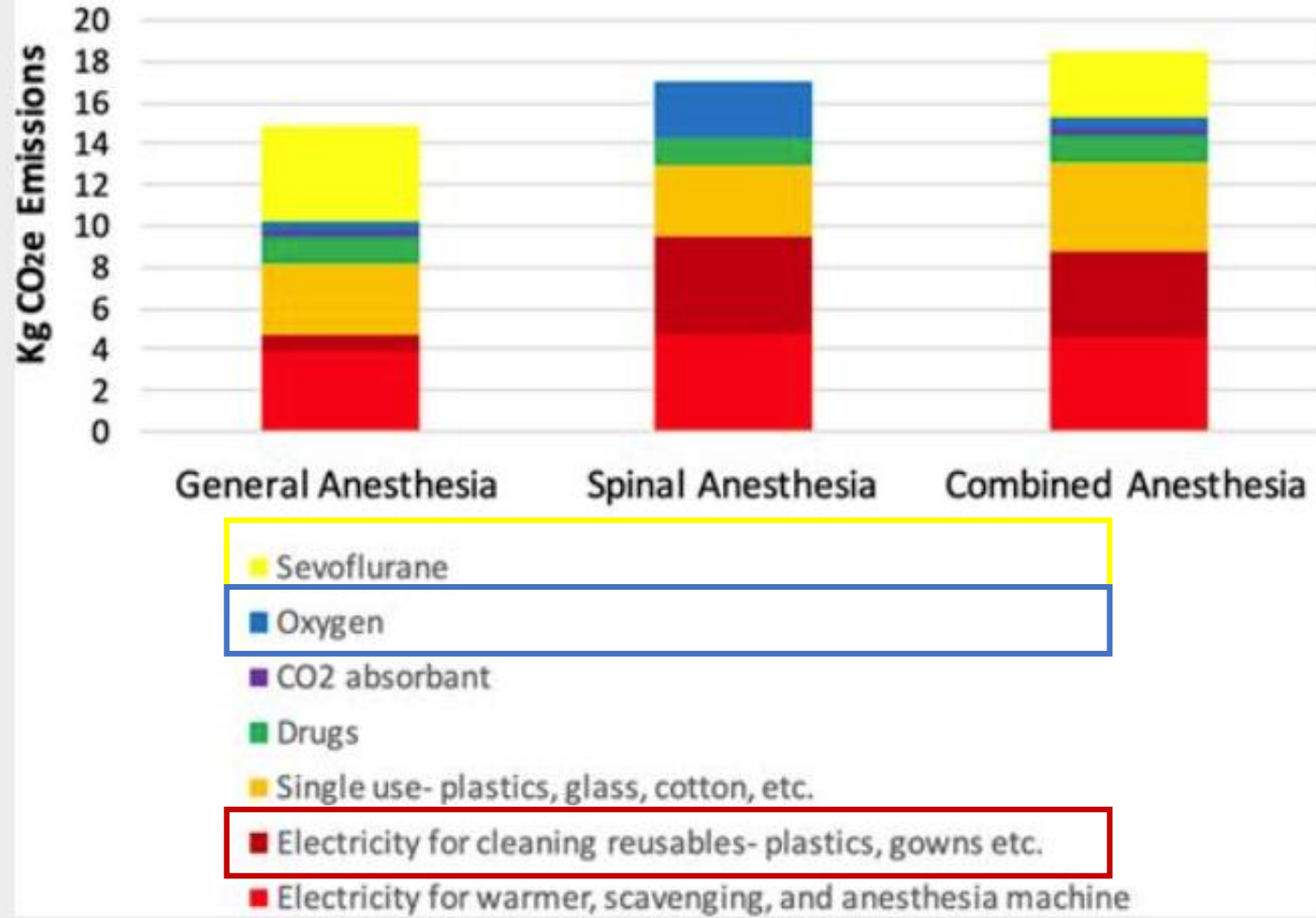
Volume 135
Number 6
anesthesiology.org

The Official Journal of the American Society of Anesthesiologists

**CO₂e Emissions for General, Spinal, and Combined
Anesthesia: Mean, Interquartile Range (25%-75%), and Min./Max.**



Categorizations of CO₂e Emissions: General, Spinal, and Combined Anesthesia



Gasuppsamling

svt NYHETER

Nyheter

Lokalt

Sport

SVT Play

Barn

/ JÄMTLAND



▶ 2 min

Hör Toni Jonsson, anestesijuksköterska på Östersunds sjukhus, om hur Centraloperation har installerat ett filter som samlar in de miljöfarliga anestesigaserna.

Visa alla (2)

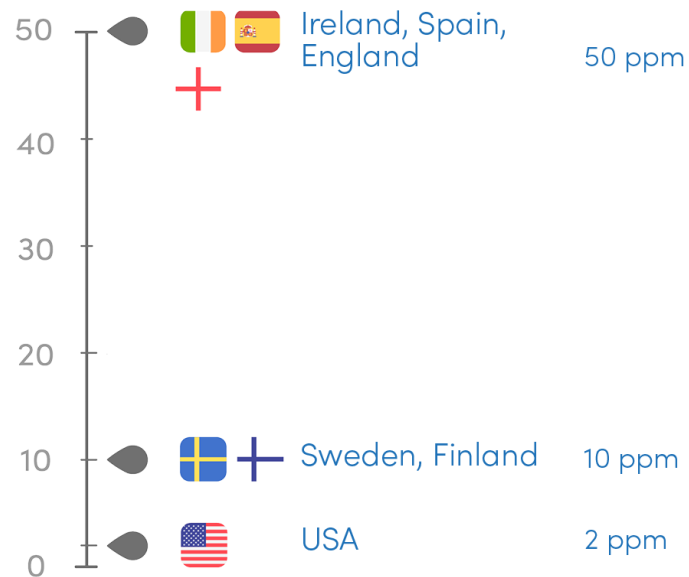
Östersunds sjukhus först i landet med filter för miljöfarliga anestesigas

UPPDATERAD 4 MAJ 2022 PUBLICERAD 4 MAJ 2022



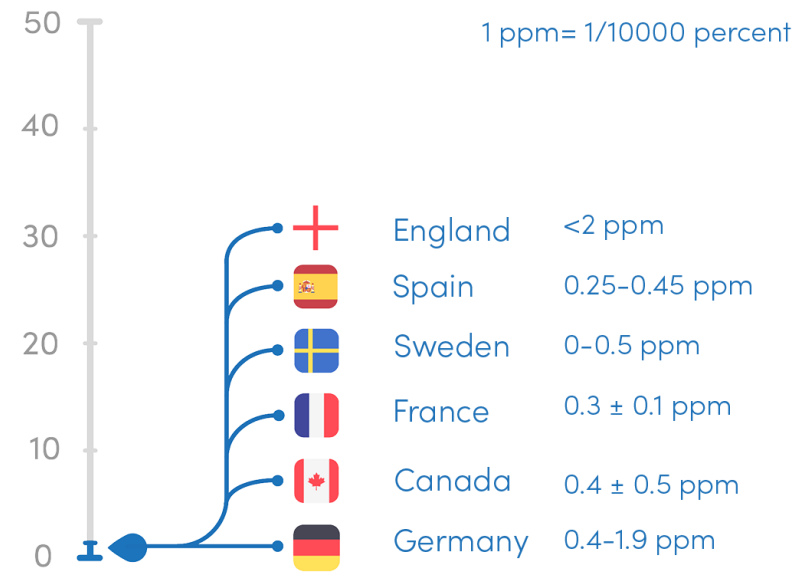
Arbetsmiljö - läckage till IVA-rummet med ACD?

Exposure limits for isoflurane



Average time-weighted exposure limits for an 8-h working day (adapted from ref¹)

Measured exposure levels



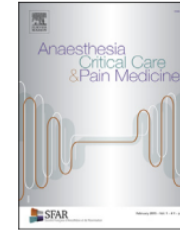
Mean concentrations measured in the air remain below 2 ppm over time (well below recommended safety thresholds)



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Anaesthesia Critical Care & Pain Medicine

journal homepage: www.elsevier.com



Review article

Inhaled sedation in the intensive care unit

Matthieu Jabaudon ^{a,b,*}, Ruoyang Zhai ^b, Raiko Blondonnet ^{a,b}, Woodys Lengua Ma Bonda ^b

^a Department of Perioperative Medicine, CHU Clermont-Ferrand, Clermont-Ferrand, France

^b GReD, Université Clermont Auvergne, CNRS, INSERM, Clermont-Ferrand, France

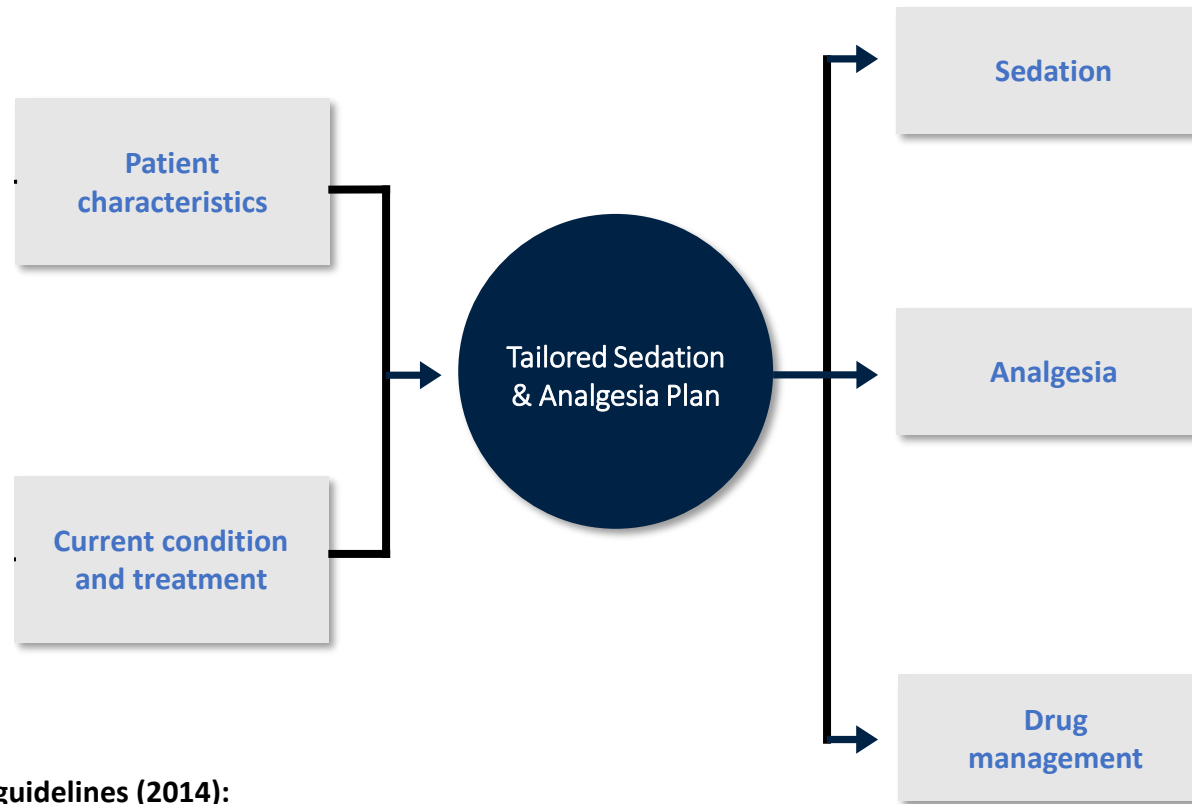


Taken together, the evidence available to date supports the potential clinical benefits of using halogenated agents for ICU sedation, although further research is needed to confirm its efficacy and safety in large populations of critically ill patients, and its specific effects on important outcomes, such as lung and neurocognitive functions, among others.

...

However, the use of inhaled sedation may represent more than an alternative to intravenous sedation, and some national guidelines, such as in Germany, already suggest that inhaled sedation should be considered as a first-line strategy for mechanically ventilated patients for whom short wake-up times are targeted

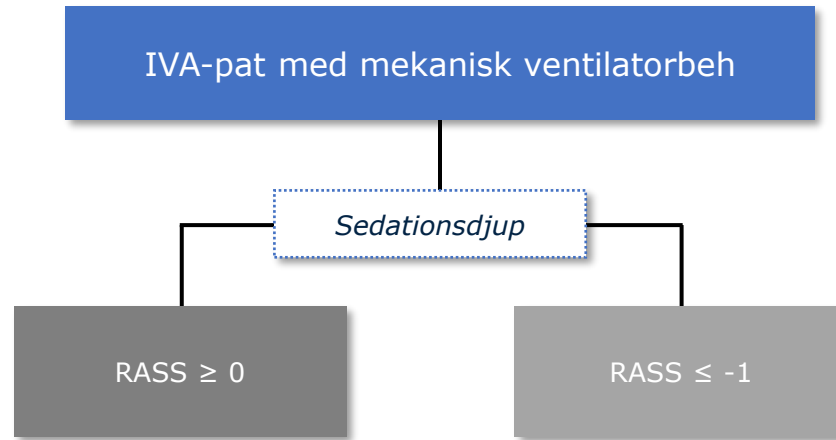
Personcentrerad vård och sedering



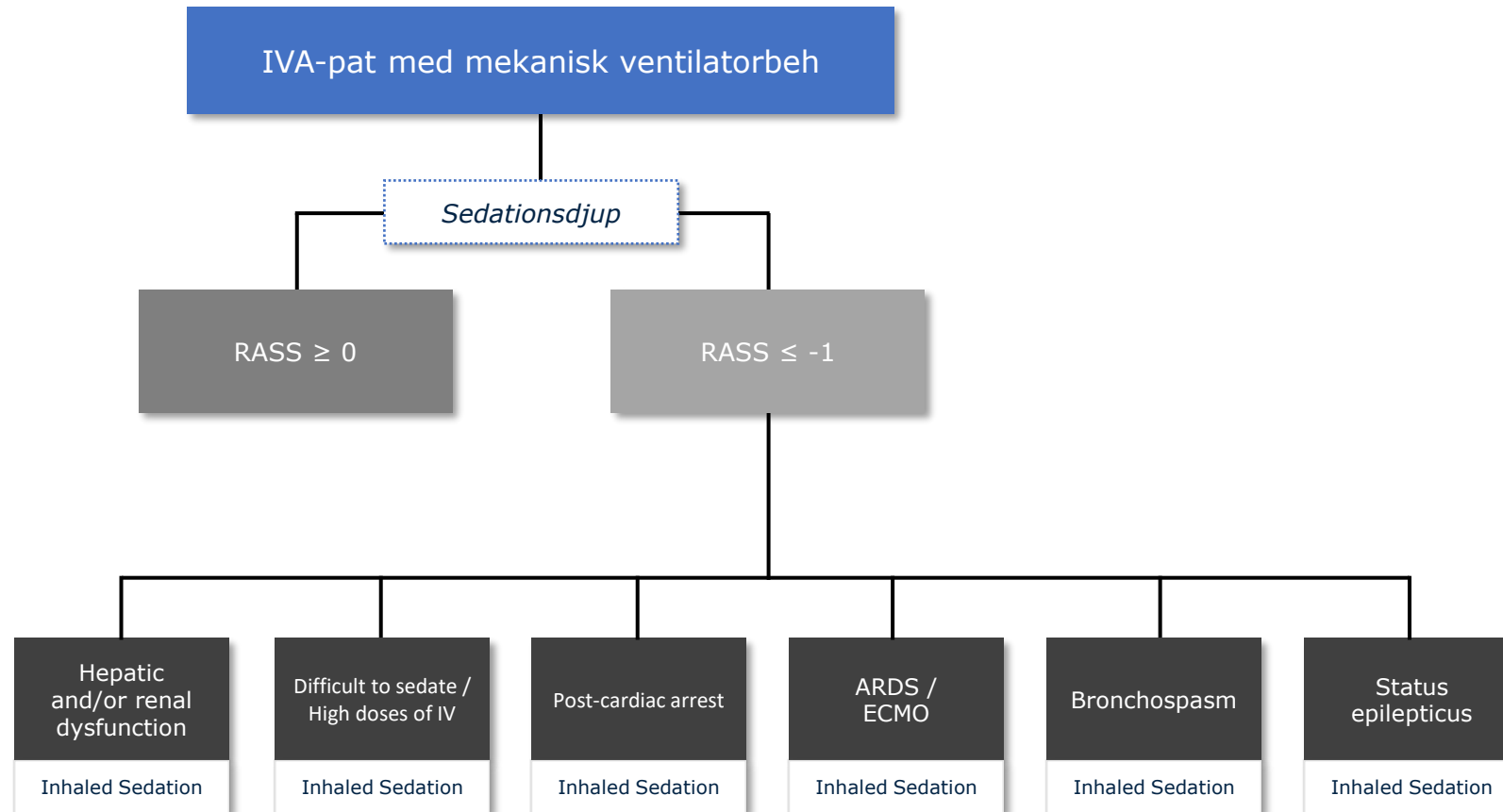
- **UK Analgesia and Sedation guidelines (2014):**
“There is insufficient evidence to recommend one regimen over another, and so the agents chosen should be individualized to the patient’s requirements, characteristics and the clinical situation.”¹
- There is no “one-size-fits-all” solution²

1. https://www.ics.ac.uk/Society/Guidance/PDFs/Analgesia_and_Sedation.
2. Sackey et al., Anesthesiology 2010.

Lämpliga patientgrupper för inhalationssedering



Lämpliga patientgrupper för inhalationssedering



*Patient groups recommended by a panel of experts in the NICE guidelines¹

Matilda, Anästhesistin, 1894





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