CONSORCIO
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DE VALENCIA

Anestesia libre de opioides. ¿Moda o práctica clínica basada en evidencia?

Sara López Palanca (FEA)

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Servicio de Anestesia, Reanimación y Tratamiento del Dolor.

Sesión de formación continuada SARTD CHGUV
Valencia, 15 de Octubre 2018

RECUERDO HISTÓRICO

Introducción de opioides en anestesia
- Estabilidad hemodinámica
- Analgesia

Anestesia general libre de opioides

< 1960	1960	1993	2000	2005

Anestesia con agentes inhalatorios profundos (halotano) o altas dosis de hipnóticos (pentotal): +++ supresión hemodinámica.

Anestesia multimodal como «técnica ahorradora de opioides»

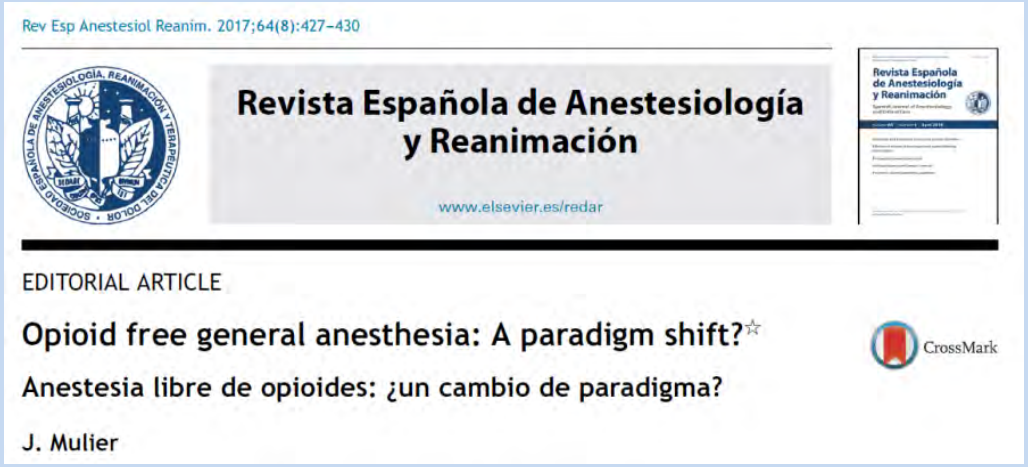
Anestesia libre de opioides en pacientes obesos sometidos a cirugía bariátrica.

Anesthesia for a patient with morbid obesity using dexmedetomidine without narcotics

[L'anesthésie chez un patient obèse morbide avec la dexmédétomidine sans narcotiques]

Roger E. Hofer MD,* Juraj Sprung MD PhD,* Michael G. Sarr MD,† Denise J. Wedel MD*

ANESTESIA LIBRE DE OPIOIDES



Rev Esp Anestesiol Reanim. 2017;64(8):427–430

Revista Española de Anestesiología y Reanimación

www.elsevier.es/redar

EDITORIAL ARTICLE

Opioid free general anesthesia: A paradigm shift?☆

Anestesia libre de opioides: ¿un cambio de paradigma?

J. Mulier

ALTERNATIVAS FARMACOLÓGICAS ANESTESIA MULTIMODAL

- Estabilidad hemodinámica
- Supresión de la respuesta simpática
- Analgesia

NECESIDADES:

Intraoperatorias:

- Bloqueo simpático y parasimpático para lograr estabilidad hemodinámica.
- Soporte a la función de todos los órganos garantizando la perfusión tisular.

Postoperatorias:

- Analgesia.

¿POR QUÉ EVITAR LOS OPIOIDES?

- Disminución de la analgesia postoperatoria (no opioide)
- Disminución de las necesidades de opidoides postoperatorias
- Disminución de los efectos secundarios de los opioides
  - Depresión respiratoria
  - Prurito
  - Náuseas y vómitos
  - Obstrucción intestinal
  - Estreñimiento
  - Retención urinaria
  - Tolerancia por hipersensibilizacion
  - Hiperalgesia inmediata → Síndrome de dolor crónico.
  - Reducción del gasto cardíaco
  - Mareos
  - Somnolencia
  - Rigidez muscular de corta duración
  - Supresión del sistema inmune

SOFA
The Society for Opioid Free Anesthesia

INDICACIONES OFA

- Obesidad
- Apnea obstructiva del sueño
- Asmáticos y EPOC
- Adicción aguda o crónica a los opioides
- Síndromes de hiperalgesia
- Dolor crónico: síndrome de dolor regional complejo.
- Pacientes alérgicos
- Cirugía oncológica ?

CONTRAINDICACIONES OFA

- **CI ABSOLUTAS:**
  - Alergia a alguno de los fármacos
  - Bloqueo cardíaco
  - Bradicardia extrema
  - Politrauma.
  - Lesión arteria coronaria principal

- **CI RELATIVAS:**
  - Isquemia miocárdica por estenosis coronaria
  - Necesidad de hipotensión controlada para evitar el sangrado quirúrgico.
  - Hipertensión aguda previa a la inducción.
  - Trastornos del SNA incluyendo la hipotensión ortostática.
  - Pacientes muy ancianos en tratamiento con Bbloqueantes.

ADYUVANTES ANALGÉSICOS

Contents lists available at ScienceDirect

Trends in Anaesthesia and Critical Care

journal homepage: www.elsevier.com/locate/tacc

REVIEW

Systemic non-opioid adjuvant analgesics: Their role in acute postoperative pain in adults

Robert Loveridge [a], Santosh Patel [b, c, *]

[a] North West Deanery, Manchester, UK
[b] Pennine Acute NHS Trust, UK
[c] School of Biomedicine, Faculty of Medical and Human Sciences, University of Manchester, UK

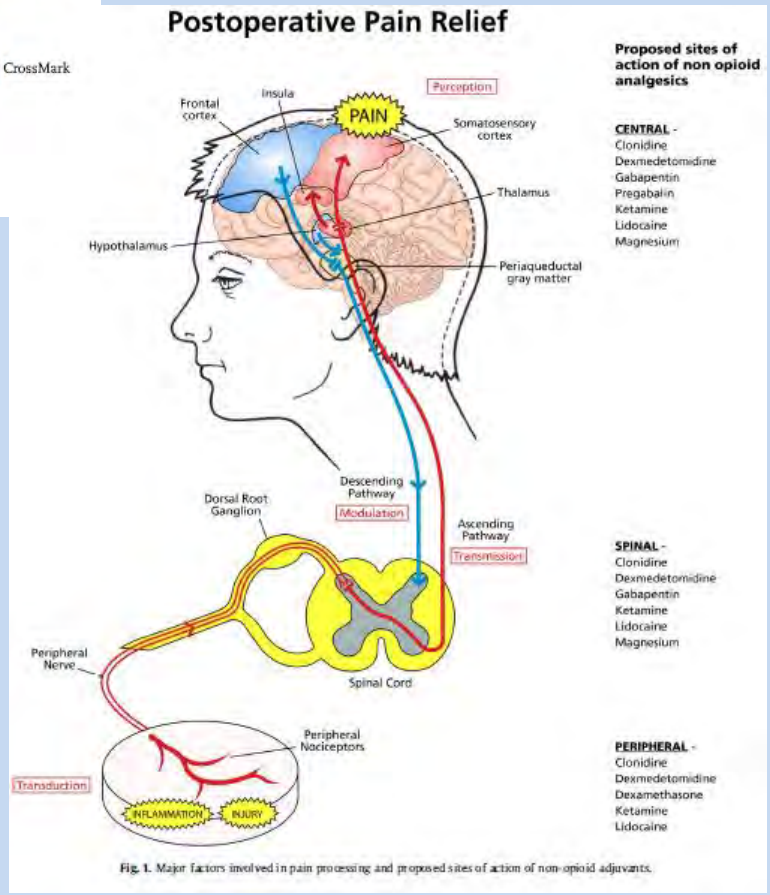


Fig. 1. Major factors involved in pain processing and proposed sites of action of non-opioid adjuvants.

- **Bloqueo simpático**: alfa2-agonistas, betabloqueantes y AL.
- **Análogos del GABA:** gabapentina y pregabalina.
- **Bloqueo de los receptores NMDA**: Sulfato de Magnesio y Ketamina
- **Bloqueo de la respuesta inflamatoria**: AINE, dexametasona

Alfa2-agonistas

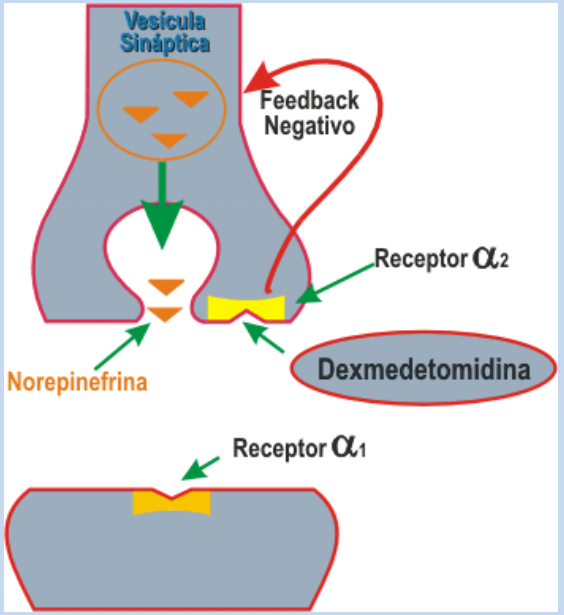
Activación receptor presináptico α2 adrenérgico → Inhibe la liberación de NT

CLONIDINA:

- Acción analgésica, ansiolítico y sedación.
- Vida media larga (10-12h)
- 150 mcg vo
- Aumento de la hipotensión intra y postoperatoria.

DEXMEDETOMIDINA

- Acción de sedación y ansiolisis
- 8 veces más específico
- Vida media corta (2h)
- Bolo 0,25 mcg/kg
- Impregnación: 0,5-1 mcg/kg/h
- Mantenimiento: 0,2-0,4 mcg/kg/h.
- Bradicardia.



Additives used to reduce perioperative opioid consumption 1: Alpha2-agonists☆

Peter H. Tonner, M.D, Chair *

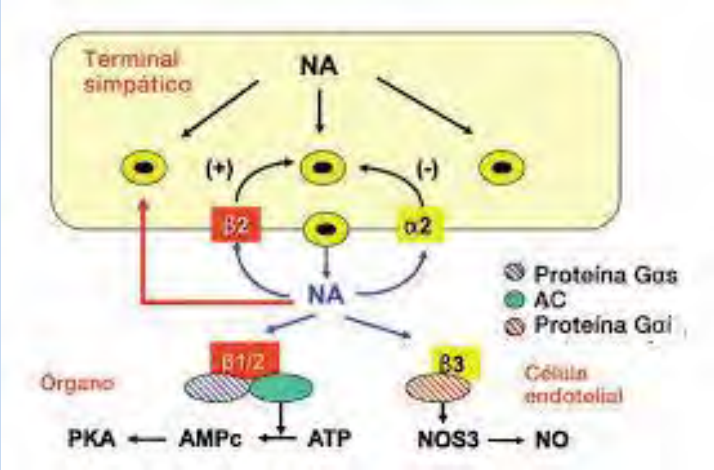
Dept. of Anaesthesiology and Intensive Care Medicine, Burgenlandklinikum, Naumburg, Germany

Practice points

- Currently used potent opioids have side effects such as respiratory depression, nausea and vomiting, delirium, hypothermia, hyperalgesia, constipation and impairment of immune function and others.
- Alpha$_2$-agonists have been used for the pre, intra and postoperative replacement of opioids.
- Clonidine and dexmedetomidine are currently the only clinically relevant alpha$_2$-agonists.
- Alpha$_2$-agonists cause sympatholysis, thus providing attenuation of blood pressure, heart rate and anaesthetic and analgesic sparing.
- Alpha$_2$-agonists provide postoperative analgesia with low risk for respiratory depression and a reduction in postoperative nausea and vomiting.
- Alpha$_2$-agonists are successfully used in bariatric surgery.

BETA BLOQUEANTES

Bloquea la unión de NA y ADR a receptores β adrenérgicos → Inhibe sistema simpático



Review Article

The effect of perioperative esmolol on early postoperative pain: A systematic review and meta-analysis

Richard Watts[1,2], Venkatesan Thiruvenkatarajan[1,2], Marni Calvert[3], Graeme Newcombe[1,2], Roelof M. van Wijk[1,2]

[1]Department of Anaesthesia, The Queen Elizabeth Hospital, Woodville, Adelaide 5011, [2]Discipline of Acute Care Medicine, The University of Adelaide, [3]Department of Anaesthesia, Royal Adelaide Hospital, North Terrace, Adelaide 5000, South Australia

Opioid consumption was also decreased in the postanesthesia care unit compared with placebo, mean difference of 5.1 mg (95% CI: 7.0–3.2, I^2 = 96.9%) morphine IV equivalents; a 69% reduction in opioid rescue dosing was noted (odds ratio [OR]: 0.31, 95% CI: 0.16–0.80, I^2 = 0.0%). A 61% reduction in postoperative nausea and vomiting was also evident (OR: 0.39, 95% CI: 0.20–0.75, I^2 = 60.7%). A reduction in propofol induction dose was noted in the esmolol group (mean difference:

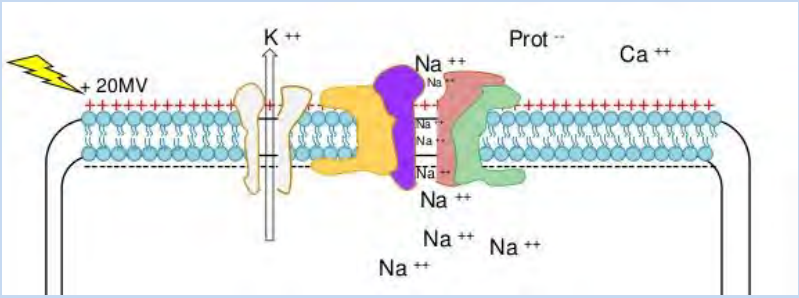
Intraoperative Esmolol Infusion in the Absence of Opioids Spares Postoperative Fentanyl in Patients Undergoing Ambulatory Laparoscopic Cholecystectomy

Vincent Collard, MD*

RESULTS: The amount of fentanyl in the postanesthesia care unit was significantly less in the esmolol group, 91.5 ± 42.7 μg, compared with the other two groups, remifentanil, 237.8 ± 54.7 μg, control, 168.1 ± 96.8 μg ($P < 0.0001$). The incidence of nausea was more frequent in the control (66.7%) and remifentanil (67.9%) groups compared with the esmolol group (30%) ($P < 0.01$). The esmolol group reached the White-Song score of 12 of 14 faster than the remifentanil group ($P < 0.01$), and left the hospital 45–60 min earlier ($P < 0.004$).

ANESTÉSICOS LOCALES

Bloquea los canales de sodio dependientes de voltaje → Inhibe la propagación del impulso nervioso



Lidocaína iv

- Acción antiinflamatoria, analgésica, antihiperalgica
- Bolo: 1,5-2 mg/kg.
- Mantenimiento 1,5-3 mg/kg/h

BJS

Meta-Analysis

Meta-analysis of intravenous lidocaine and postoperative recovery after abdominal surgery*

E. Marret, M. Rolin, M. Beaussier, F. Bonnet

Intravenous lidocaine

Jean-Pierre Estebe, MD, PhD, Senior Consultant in Anesthesiology

Department of Anesthesiology, Intensive Care, and Pain Medicine, University of Rennes, CHU of Rennes, Rue H Le Guilloux, 35033, Rennes, Cedex 9, France

Practice points

- **A**: Lidocaine with initial bolus and continuous infusion has clear analgesic benefits, particularly for sparing opioids (opioid-reduced anesthesia) or for avoiding opioids (opioid-free anesthesia).
- **B**: On the basis of various meta-analyses, the recommended lidocaine doses in the perioperative period are 1–2 mg/kg as an initial bolus followed by a continuous infusion of 1–2 mg/kg/h. For long surgical procedures, it is recommended to progressively decrease the rate of lidocaine continuous infusion (approximate reduction by 50% every 6 h). Because there is no clear benefit to prolong the infusion, it is recommended to stop the infusion of lidocaine at the end of the post-anesthesia care unit stay.

Impact of Intravenous Lidocaine Infusion on Postoperative Analgesia and Recovery from Surgery

A Systematic Review of Randomized Controlled Trials

Grace C. McCarthy, Sohair A. Megalla and *Ashraf S. Habib*

Department of Anesthesiology, Duke University Medical Center, Durham, North Carolina, USA

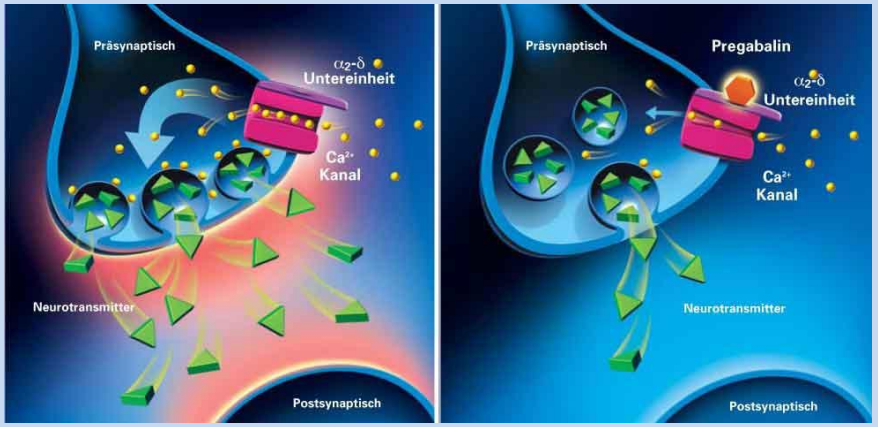
Perioperative Use of Intravenous Lidocaine

Anesthesiology 4 2017, Vol.126, 729-737.

Lauren K. Dunn, M.D., Ph.D., Marcel E. Durieux, M.D., Ph.D.

Análogos del GABA

Actúan sobre la subunidad α2δ de los canales del calcio voltaje dependientes → disminuyen la liberación de NT



- **Gabapentina**
  - 300-1200 mg vo preoperatorio
  - Sedación, náuseas, vómitos, mareos y vértigos.
- **Pregabalina**
  - Se une al canal de calcio con más afinidad y causa menos efectos adversos.
  - 50 mg vo preoperatorio

Do Surgical Patients Benefit from Perioperative Gabapentin/Pregabalin? A Systematic Review of Efficacy and Safety Anesth Analg. 2007 Jun;104(6):1545-56

British Journal of Anaesthesia 114 (1): 10–31 (2015)
Advance Access publication 10 September 2014 · doi:10.1093/bja/aeu293

BJA

REVIEW ARTICLES

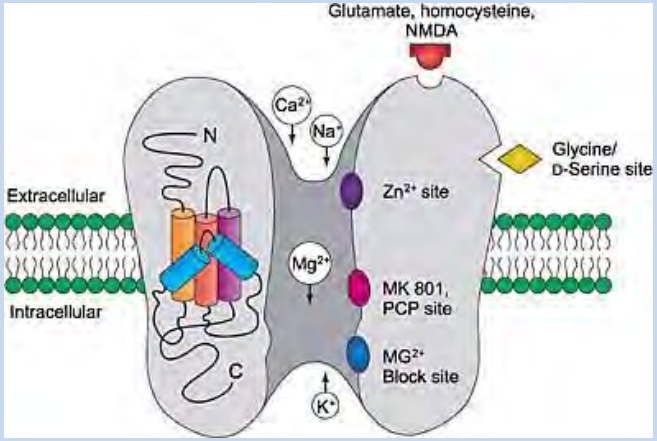
Impact of pregabalin on acute and persistent postoperative pain: a systematic review and meta-analysis

B. M. Mishriky, N. H. V

with a statistically significant reduction in pain scores at rest (MD of 0.81 at 2 h and 0.38 at 24 h), pain scores during movement (MD of 0.58 at 2 h, and 0.47 at 24 h), and opioid consumption (MD of 2.09 mg ME at 2 h, and 8.27 mg ME at 24 h) after surgery compared with placebo. The incidence of opioid-related side-effects (PONV and pruritus) was significantly reduced with pregabalin administration by 38% and 51%, respectively, relative to placebo at 24 h after surgery. The administration of pregabalin was associated with a significantly higher incidence of sedation (46% increase), dizziness (33% increase), and visual disturbance (3.5 times more likely) relative to placebo. Of note, pregabalin-treated patients achieved hos-

Antagonistas NMDA

Bloquea el receptor ionotrópico del glutamato → Disminuyen la hiperexcitabildad e hiperalgesia



- **Ketamina**
  - Anestésico, analgésico, antiinflamatorio
  - Acción analgésica prolongada por su metabolito activo norketamina
  - Pesadillas y alucinaciones
- **Sulfato de magnesio**
  - Antagonista no competitivo del receptor NMDA.
  - Bolo: 30-50 mg/kg
  - Mantenimiento: 7-15 mg/kg/h.

Practice points

- Ketamine and magnesium, differently but consistently, reduce hemodynamic variability during surgery and may be seen as complementary to provide stable anesthesia.

Research agenda

- The association of ketamine and magnesium to control the sympathetic response to surgery and to improve postoperative analgesia, in the context of opioid-free anesthesia, merits additional investigations.

Stable anesthesia with alternative to opioids: Are ketamine and magnesium helpful in stabilizing hemodynamics during surgery? A systematic review and meta-analyses of randomized controlled trials

Patrice Forget, M.D. PhD., Clinical Professor [a, *], Juan Cata, M.D., Assistant Professor [b, c]

Anesthesiology 2005; 103:147–55

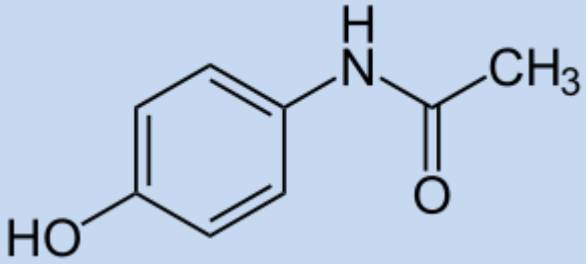
Remifentanil-induced Postoperative Hyperalgesia and Its Prevention with Small-dose Ketamine

Vincent Joly, M.D., Philippe Richebe, M.D.,† Bruno Guignard, M.D.,* Dominique Fletcher, M.D.,‡ Pierre Maurette, M.D.,§ Daniel I. Sessler, M.D.,‖ Marcel Chauvin, M.D.#*

OTROS :

- **AINES:**
  - Inhiben la COX1 Y COX2: Inhiben las PG y TXA.
  - Efecto sobre todo en la zona inflamatoria.
  - Dexketoprofeno, Diclofenaco, Ketocloraco, Metamizol

- **Paracetamol:**
  - Efecto central, atraviesan la BHE e inhibe la COX.



- **Dexametasona**
  - Inhiben la enzima fosfolipasa A2
  - Beneficiosas en tto NVPO
  - Dosis: 0,1-0,2 mg/kg

2017 "OFAM (opioid free anesthesia mixture) (Mulimix) - keep it simple

Multimodal anaesthesia developed by Jan Mulier MD PhD & Igor Zadonsky MD

1. Consider premedication: ***Clonidine (Catapressan)*** *150 mcg* or **Gabapentine** (***Lyrica)*** *150 – 300 mg po*

Before induction of anaesthesia prepare:

1. **"The Dexdor load" 20 mcg**- 5 cc syringe with 5 ml ***Dexmedetomidine*** *4 mcg/ml*
2. **"The induction & maintenance mixture"** - 50 cc syringe containing:

50 mcg ***Dexmedetomidine*** (Dexdor) *(0,5 cc of standard 100 mcg/ml solution or 12,5 cc from 4mcg/ml.)*
50 mg ***Ketamine (Ketalar)*** (*or 25 mg* ***S-Ketamine***)
500 mg ***Lidocaine (Linisol)*** *(25 ml of standard 2% solution)*
NaCl *up to total 50 ml*

2. Pre induction loading:

Start with **"The Dexdor load"** syringe direct after iv line is placed and patient has been connected to Standard monitoring latest 10 min before induction.
Give iv 0,25 mcg/kg ***Dexmedetomidine*** (max 20 mcg) (age dependent)

3. Induction:

Dexmedetomidine *0,1 mcg/kg*
Lidocaine *1 mg/kg*
Ketamine *0,1 mg/kg*
= 1ml/10 kg of solution from **"The induction & maintenance mixture"** syringe

Continue induction with ***Propofol.***
If NMB is needed give ***Rocuronium and measure TOF/PTC***
Consider ***Dexamethasone*** *10 mg;* ***Droperidol*** *0,625 – 1,25 mg,* ***Magnesium*** *40 mg/kg (~2,5 g)*
Consider giving 25 to 50 mg Ketamine extra before incision (or 0,5 mg/kg)

4. Continue maintenance of anesthesia with:

Dexmedetomidine *0,1 mcg/kg/h*
Lidocaine *1 mg/kg/h*
Ketamine *0,1 mg/kg/h*
= 1ml/10 kg/h of solution from **"The induction & maintenance mixture"** syringe

+ ***Sevoflurane or propofol infusion*** as usual
About 15 min before the end of the operation reduce maintenance dose to 0,5 ml/10 kg/h.

5. Provide anti nociception in PACU:

Continue infusion at 0,5 ml/kg/h until it ends or until patient discharge from PACU

Dexmedetomidine *0,05 mcg/kg/h*
Lidocaine *0,5 mg/kg/h*
Ketamine *0,05mg/kg/h*
= 0,5 ml/10 kg/h of solution from **"The induction & maintenance mixture"** syringe

6. Analgesia after PACU (intensive care, ward, day clinic, home)

Oral analgesics – iv analgesics – PCIA pumps

Paracetamol iv - po
NSAIDs iv - po
OFAMixture iv fixed pump rate 0,5 ml/10 kg/h if needed patient controlled bolus of 1 ml (lockout 15 min)
Morphine iv – po - sl as rescue

Different protocols used today to achieve total opioid-free general anesthesia without locoregional blocks

Eckhard Mauermann, MD, MSc, Postdoctoral Research Fellow [a, b],
Wilhelm Ruppen, MD, Chair of the Pain Relief Unit [a],
Oliver Bandschapp, MD, Consultant Anaesthetist [a, *]

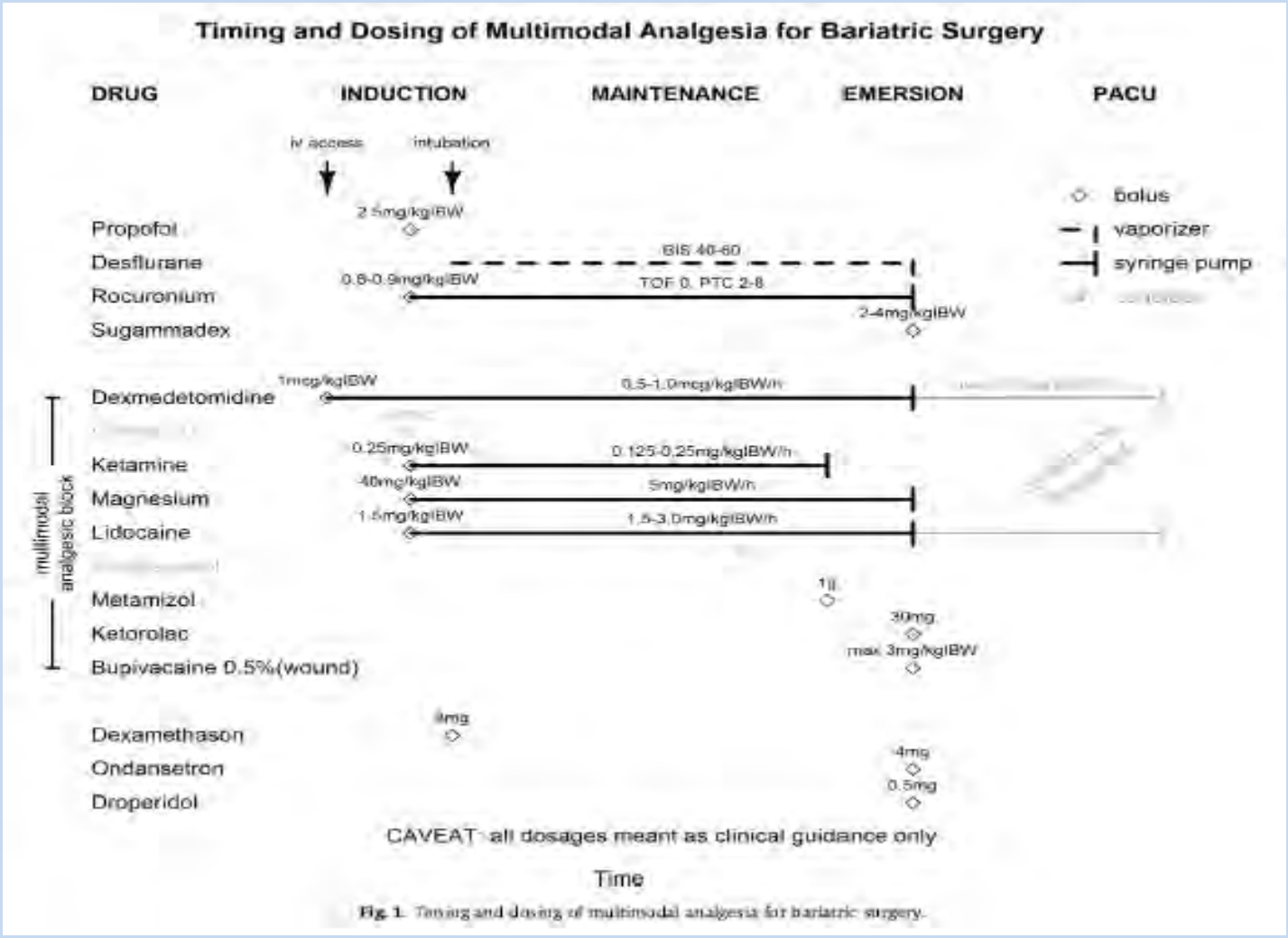


Fig 1. Timing and dosing of multimodal analgesia for bariatric surgery.


¿Moda o práctica clínica basada en evidencia?

Br. J. Pharmac. Chemother. (1968), **33**, 245–256.

ACUTE TOLERANCE TO NARCOTIC ANALGESIC DRUGS IN RATS

BY

B. M. COX, M. GINSBURG AND O. H. OSMAN

From the Department of Pharmacology, Chelsea College of Science and Technology, London, S.W.3

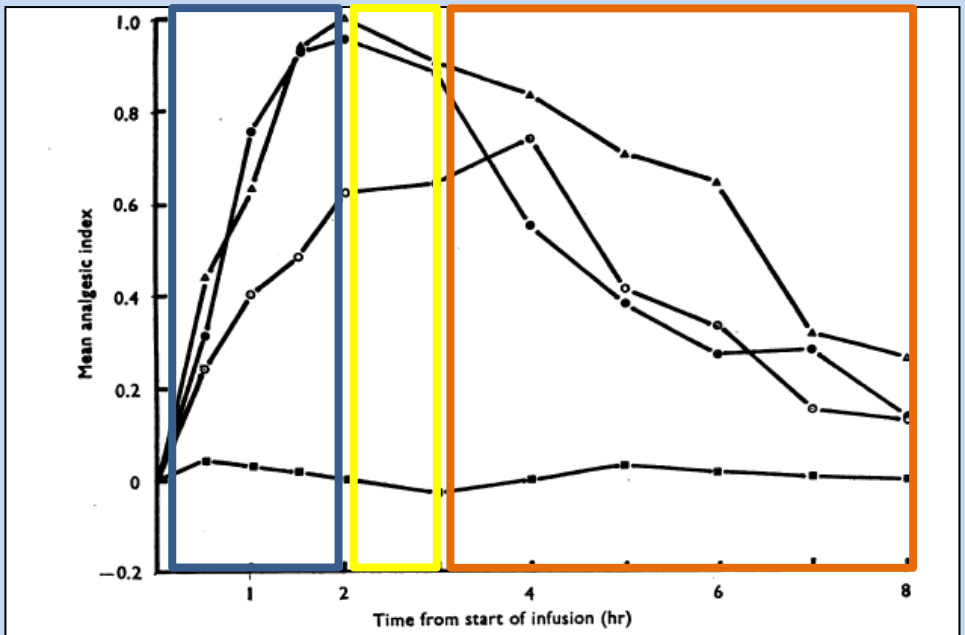


Fig. 1. Mean analgesic indices during intravenous infusions of morphine. ○, Morphine 5 mg/kg/hr (n=4); ●, morphine 7.5 mg/kg/hr (n=7); △, morphine 10 mg/kg/hr (n=5); ■, 0.9% sodium chloride solution (n=4).

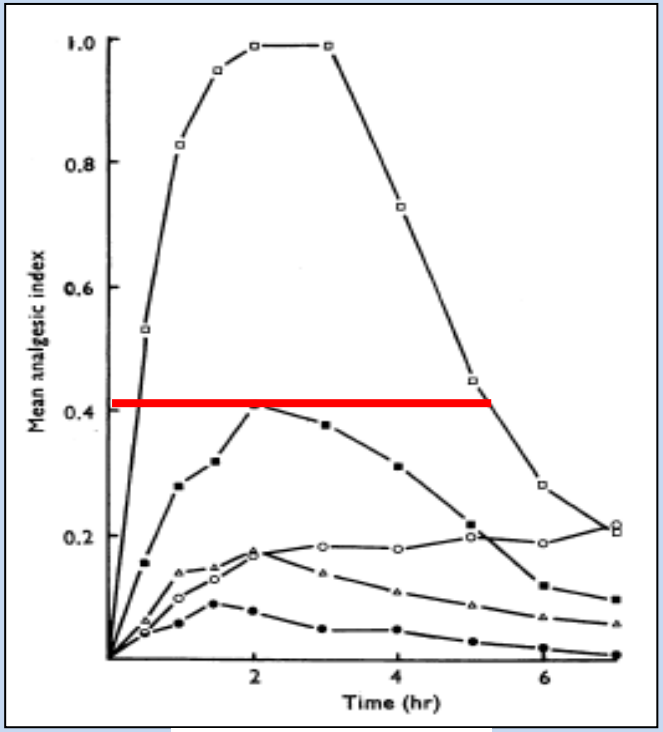


Fig. 8. Mean analgesic indices obtained from animals infused with morphine 7.5 mg/kg/hr) on 4 successive days. □, First day infusion (n=11); ■, second day infusion (n=11); △, third day infusion (n=11). On the fourth day, three animals received morphine only (●) while seven animals received morphine together with actinomycin D 10 μg/kg/hr (○). Each infusion lasted 7 hr.

Tolerancia a la morfina empezó a las 2 horas.
A las 8 horas, desaparecía el efecto analgésico.

Rapid Development of Tolerance to Analgesia During Remifentanil Infusion in Humans

H. Ronald Vinik, MD*, and Igor Kissin, MD, PhD†

*Department of Anesthesiology, University of Alabama at Birmingham, Birmingham, Alabama; and †Department of Anesthesia, Harvard Medical School, Brigham and Women's Hospital, Boston, Massachusetts

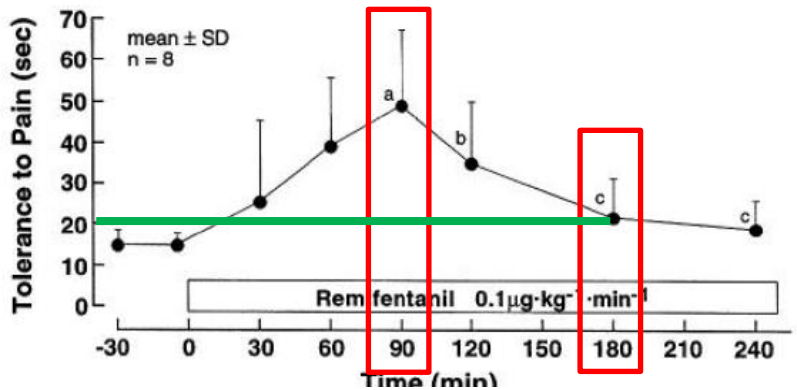


Figure 1. Time course of (constant-rate infusion of (using a cold water pain tole < 0.05 versus 90 min; ᶜP <

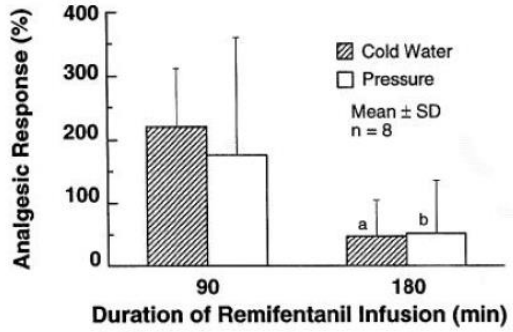


Figure 2. Comparative changes in the degree of analgesia during remifentanil infusion (constant-rate infusion of 0.1 mg · kg⁻¹ · water) and mechanical onses are percentages istration. The 90 min nifentanil at its peak, f acute tolerance. ᵃP < ᵇP < 0.05 versus the rzed using a two-way treated as a repeated-

Tolerancia diferencial

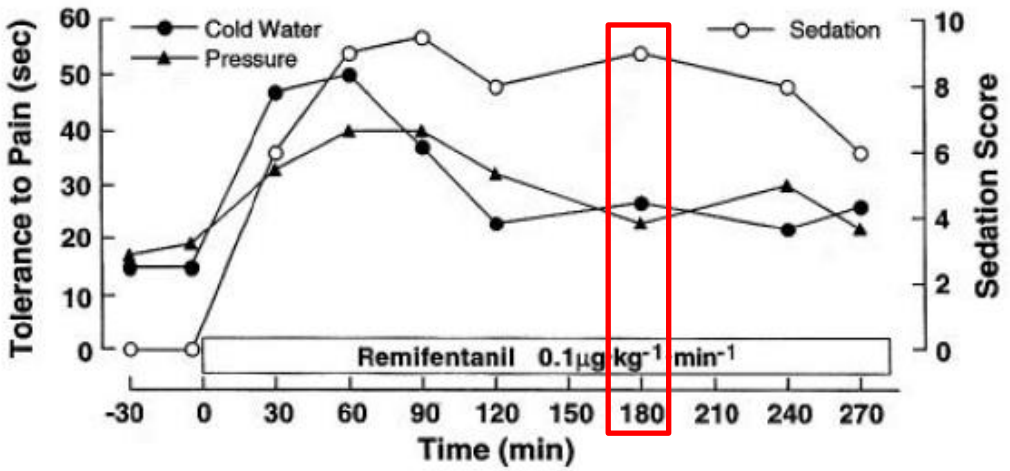


Figure 3. Individual time course for the analgesic and sedative effects of remifentanil administered as a constant-rate infusion in one of the volunteers.

Education | February 2016

Differential Opioid Tolerance and Opioid-induced Hyperalgesia: A Clinical Reality

Christina J. Hayhurst, M.D.; Marcel E. Durieux, M.D., Ph.D.

Anesthesiology 2 2016, Vol.124, 483-488. doi:10.1097/ALN.0000000000000963

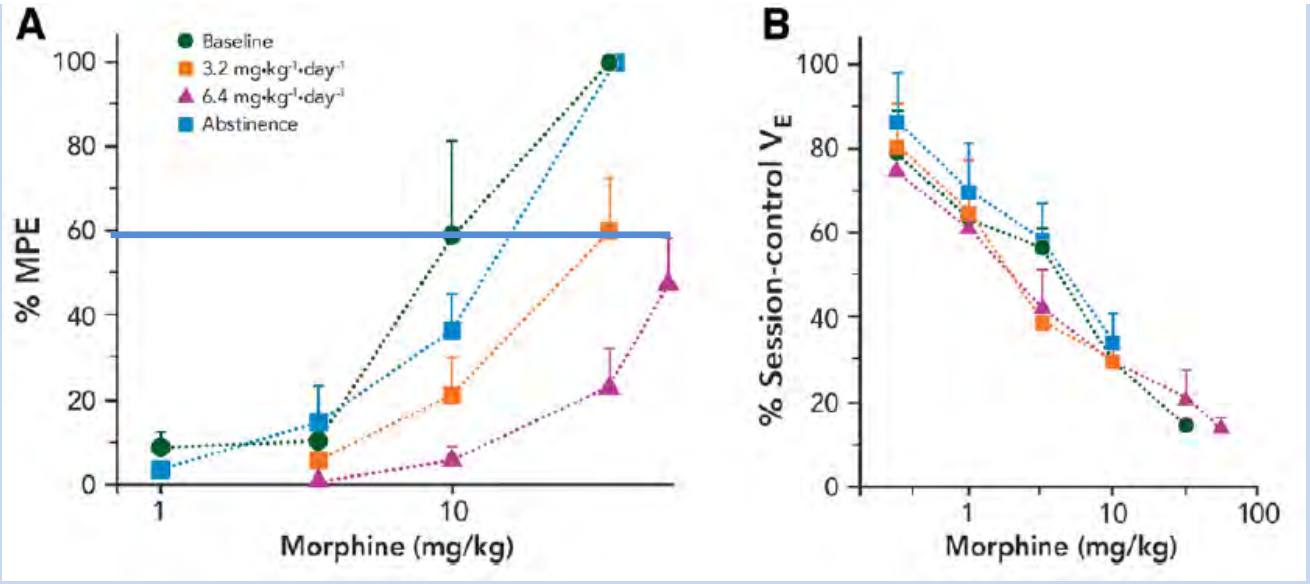
ops slower and to a lesser degree. Although this issue has been insufficiently investigated, particularly in the perioperative setting, it appears that opioid tolerance development is fastest and most profound for the analgesic actions, less for the respiratory depressant effects, and least for the peripheral effects, such as the slowing of gastrointestinal motility.[4] The latter has major implications for the postoperative period.

relevant. Patients receiving chronic opioids for pain control, especially at high doses, should be assumed to have developed less tolerance to opioid-induced respiratory depression than to analgesia. This means that equianalgesic doses of opioids administered perioperatively will induce more respiratory depression in opioid-tolerant than in opioid-naive patients (note that the dose required to reach this equianalgesic effect will likely be much greater in the opioid-tolerant patient). In

Ventilation in Morphine-Maintained Rhesus Monkeys. II: Tolerance to the Antinociceptive But Not the Ventilatory Effects of Morphine ,

Carol A. Paronis and James H. Woods

Journal of Pharmacology and Experimental Therapeutics July 1997, 282 (1) 355-362;



Opioids, respiratory depression, and sleep-disordered breathing

Mahesh Nagappa, MD, Assistant Professor [a,1], Toby N. Weingarten, MD, Associate Professor of Anesthesiology [b,2], Gaspard Montandon, PhD, Staff Scientist [c], Juraj Sprung, MD, Professor of Anesthesiology [b,3], Frances Chung, FRCPC, Professor [d,*]

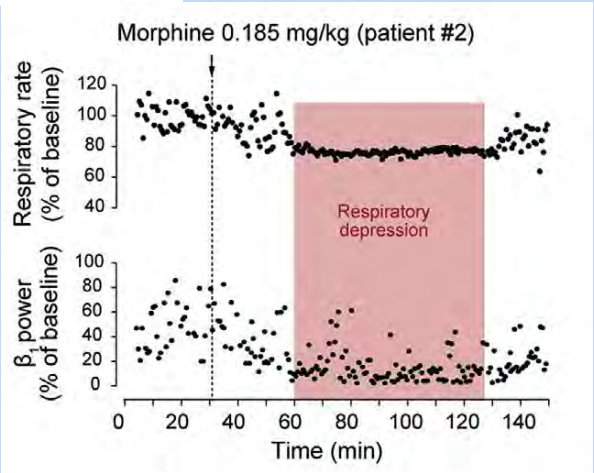
[a] *Department of Anesthesia & Perioperative Medicine, University Hospital, Victoria Hospital and St. Joseph Hospital, London Health Sciences Centre and St. Joseph Health Care, Western University, London, ON, Canada*
[b] *Department of Anesthesiology, Mayo Clinic, Rochester, MN, USA*
[c] *Keenan Research Centre for Biomedical Science, St. Michael's Hospital, Department of Medicine, University of Toronto, Canada*
[d] *Department of Anesthesiology and Pain Medicine, Toronto Western Hospital, University Health Network, University of Toronto, Toronto, ON, Canada*

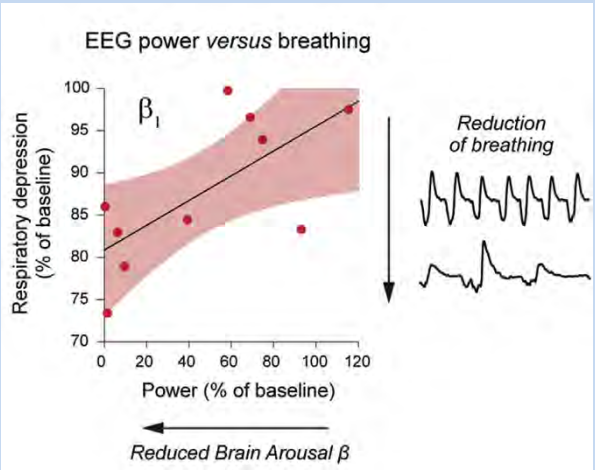
Efectos respiratorios de los opioides:

- Hipoventilación (↓ FR, ↓ flujo vía aérea)
- ↓ Quimiosensibilidad C02
- Depresión respiratoria
- ↑ Trastornos respiratorios del sueño

Factores de riesgo que depresión respiratoria inducida por opioides:

- Estado de activación cerebral: ↑ sueño de ondas lentas
- Edad avanzada
- Obesidad
- Trastornos respiratorios durante el sueño
- Opioides
- Medicamentos sedantes: MDZ, gabapentina





Opioids, respiratory depression, and sleep-disordered breathing

Mahesh Nagappa, MD, Assistant Professor [a,1],
Toby N. Weingarten, MD, Associate Professor of Anesthesiology [b,2], Gaspard Montandon, PhD, Staff Scientist [c],
Juraj Sprung, MD, Professor of Anesthesiology [b,3],
Frances Chung, FRCPC, Professor [d,*]

Trastornos respiratorios del sueño:

- ↑ Prevalencia
- Ronquidos, SAOS, SOH, Síndrome de apnea central del sueño
- No diagnóstico en el momento de la intervención quirúrgica
- Diagnóstico: Polisomnografía
- Evaluación preoperatoria del riesgo de depresión respiratoria postoperatoria: STOP-BANG

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STOP-Bang Questionnaire

Please answer the following questions by checking "yes" or "no" for each one	*Yes*	*No*
Snoring (Do you snore loudly?)	❑	❑
Tiredness (Do you often feel tired, fatigued, or sleepy during the daytime?)	❑	❑
Observed Apnea (Has anyone observed that you stop breathing, or choke or gasp during your sleep?)	❑	❑
High Blood **P**ressure (Do you have or are you being treated for high blood pressure?)	❑	❑
BMI (Is your body mass index more than 35 kg per m^2?)	❑	❑
Age (Are you older than 50 years?)	❑	❑
Neck Circumference (Is your neck circumference greater than 40 cm [15.75 inches]?)	❑	❑
Gender (Are you male?)	❑	❑

Score 1 point for each positive response.

Scoring interpretation: 0 to 2 = low risk, 3 or 4 = intermediate risk, ≥ 5 = high risk.

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- Evaluación preoperatoria del riesgo de depresión respiratoria postoperatoria: STOP-BANG

Management Plan to Reduce Risks in Perioperative Care of Patients with Presumed Obstructive Sleep Apnea Syndrome

Bhargavi Gali, M.D.[1]; Francis X. Whalen, Jr., M.D.[1]; Peter C. Gay, M.D.[2]; Eric J. Olson, M.D.[2]; Darrell R. Schroeder, M.S.[3]; David J. Plevak, M.D.[1]; Timothy I. Morgenthaler, M.D.[2]

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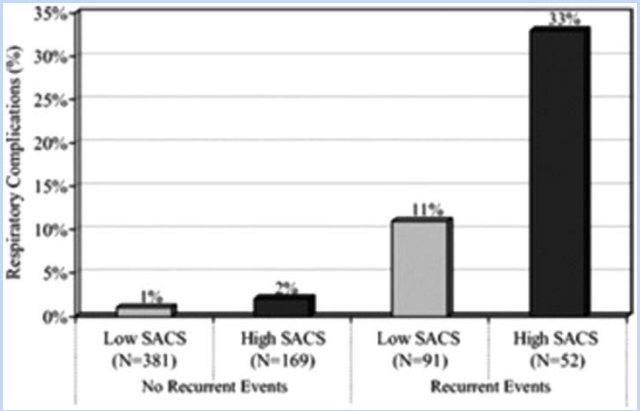
Table 1
Mayo Clinic criteria for respiratory-specific depressive episodes in the PACU [39].

Respiratory event	Definition
Hypoventilation	<8 respirations/min (3 episodes needed for yes)
Apnea	≥10 s (only 1 episode needed for yes)
Desaturation	Pulse oximetry < 90% or preoperative saturation (3 episodes for a yes)
Pain/sedation mismatch	RASS score −2 through −5 and pain score >5 (1 episode needed for a yes)

Modified with permission form Gali B et al. Anesthesiology. 2009; 110: 869–77 [39].
Patients are screened for respiratory-specific depressive episodes during Phase I recovery for 30-min evaluations. If a patient has any events in two or more of the three evaluation periods, the patient is considered to have experienced recurrent events [39].
Abbreviation: PACU: Postanesthesia Care Unit; RASS: Richmond Agitation-Sedation Scale [53].



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- Evaluación preoperatoria del riesgo de depresión respiratoria postoperatoria: STOP-BANG
- Bicarbonato sérico: puede ↑ la precisión predictiva del instrumento de cribado
- Características fisiopatológicas: ↑ percepción del dolor, ↑ sensibilidad a los opioides, ↑ eventos adversos respiratorios postoperatorios.

Anesthesiology 2006; 105:665–9

Recurrent Hypoxemia in Children Is Associated with Increased Analgesic Sensitivity to Opiates

Karen A. Brown, M.D., André Laferrière, B.A.,† Indrani Lakheeram, M.D.,‡ Immanuela Ravé Moss, M.D., Ph.D.§*

Pediatric Anesthesia
Section Editor Peter J. Davis

Perioperative Complications of Adenotonsillectomy in Children with Obstructive Sleep Apnea Syndrome

Journal of Clinical Anesthesia and Pain Medicine

Scient Open Access

Research Article

A Randomized Controlled, Double-Blind Trial Evaluating the Effect of Opioid-Free Versus Opioid General Anaesthesia on Postoperative Pain and Discomfort Measured by the QoR-40

Jan P Mulier[1,2,3*], Ruben Wouters[1,2], Bruno Dillemans[4], Marc Dekock[5]

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Table 3: Postoperatively in the post-anaesthesia care unit (PACU).

yes/no mean (SD)	OA(22)	OFA(23)	p-value *	test
lowest saturation < 94% with 6 l/min oxygen mask yes/no	11/11	2/21	0.002 *	chi-square
obstructive breathing yes/no	3/18	0/23	0.067	chi-square
PONV yes/no	14/7	3/20	<0.001 *	chi-square
shivering or having cold yes/no	5/16	0/23	0.013 *	chi-square
mean VAS score	4.9 (0.8)	1.7 (0.9)	<0.001 *	t-test
Morphine used (mg)	15.3 (7.1)	4.9 (2.1)	0.004 *	t-test
highest SAP (mmHg)	166.4 (12.4)	123.6 (5.5)	<0.001 *	t-test
highest heart rate (beats/min)	92.0 (6.8)	79.5 (5.4)	0.004 *	t-test
lowest SAP (mmHg)	135.2 (7.6)	111.8 (4.8)	<0.001 *	t-test
lowest heart rate (beats/min)	73.5 (7.1)	68.9 (5.4)	0.284	t-test
major adverse events yes/no	6/14	0/23	0.007 *	chi-square

Table 4: Postoperatively in the ward.

mean (SD)	OA (22)	OFA (23)	p-value *	test
emotional state	7.2 (0.8)	8.1 (0.5)	0.051	chi-square
physical comfort	7.9 (1.0)	10.4 (0.5)	<0.001*	chi-square
psyche support	6.6 (0.3)	6.7 (0.4)	0.62	chi-square
physical independence	3.8 (0.6)	4.7 (0.4)	0.007*	chi-square
pain score	4.5 (0.6)	6.1 (0.4)	<0.001*	chi-square
sleep score	0.5 (0.3)	0.8 (0.2)	0.040*	chi-square
total Qo40 score %	74 (6)	89 (3)	<0.001*	chi-square
cortisol change	10.5 (5.0)	3.6 (4.4)	0.029*	t-test
VAS score	3.3 (0.7)	2.0 (0.7)	0.016*	t-test
Morfine need (mg)	18.2 (5.6)	14.7 (4.7)	0.330	t-test
LOS (days)	3.68 (0.40)	3.30 (0.36)	0.147	t test

Table 6: Linear regression analysis evaluating the factors having impact on the VAS scores at PACU and next day.

	At PACU		Following day in ward	
	Coefficient	p-value *	Coefficient	p-value *
Age (years)	-0.029	0.402	0.01	0.727
Body mass index (Kg/m^2)	0.001	0.977	-0.039	0.305
Gender (male=1)	0.175	0.833	0.715	0.283
OSAS (yes=1)	0.418	0.637	-0.301	0.670
Information desire Component	-0.1	0.613	-0.056	0.725
Combined anxiety component	0.114	0.357	0.147	0.143
Kalkman points	-0.077	0.425	-0.088	0.265
OFA or OA (OFA=1)	-3.045	0.000*	-1.195	0.043*

Table 7: Linear regression analysis evaluating the factors having impact on the morphine consumption at PACU and next day.

	At PACU		Following day in ward	
	Coefficient	p-value *	Coefficient	p-value *
Age (years)	-0.177	0.337	0.064	0.736
Body mass index (Kg/m^2)	0.279	0.268	-0.365	0.177
Gender (male=1)	2.132	0.626	-6.263	0.176
OSAS (yes=1)	1.369	0.769	2.081	0.707
Information desire component	-0.383	0.717	-1.01	0.355
Combined anxiety component	0.806	0.225	0.187	0.790
Kalkman points	-0.551	0.291	-0.159	0.766
OFA or OA (OFA=1)	-9.848	0.014*	-0.124	0.975

Society for Ambulatory Anesthesiology
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SPECIAL ARTICLE

CME Consensus Guidelines for the Management of Postoperative Nausea and Vomiting

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Table 1. Risk Factors for PONV in Adults

Evidence	Risk factors
Positive overall	Female sex (B1)
	History of PONV or motion sickness (B1)
	Nonsmoking (B1)
	Younger age (B1)
	General versus regional anesthesia (A1)
	Use of volatile anesthetics and nitrous oxide (A1)
	Postoperative opioids (A1)
	Duration of anesthesia (B1)
	Type of surgery (cholecystectomy, laparoscopic, gynecological) (B1)
Conflicting	ASA physical status (B1)
	Menstrual cycle (B1)
	Level of anesthetist's experience (B1)
	Muscle relaxant antagonists (A2)
Disproven or of limited clinical relevance	BMI (B1)
	Anxiety (B1)
	Nasogastric tube (A1)
	Supplemental oxygen (A1)
	Perioperative fasting (A2)
	Migraine (B1)

Table 2. Strategies to Reduce Baseline Risk

Avoidance of general anesthesia by the use of regional anesthesia[11,52] (A1)
Use of propofol for induction and maintenance of anesthesia[47] (A1)
Avoidance of nitrous oxide[43,54,55] (A1)
Avoidance of volatile anesthetics[47,2121,47] (A2)
Minimization of intraoperative (A2) and postoperative opioids[9,21,25,54,56–58] (A1)
Adequate hydration[261,325](A1)

GA = general anesthesia.

Risk Factors	Points
Female Gender	1
Non-Smoker	1
History of PONV	1
Postoperative Opioids	1
Sum =	0 ... 4

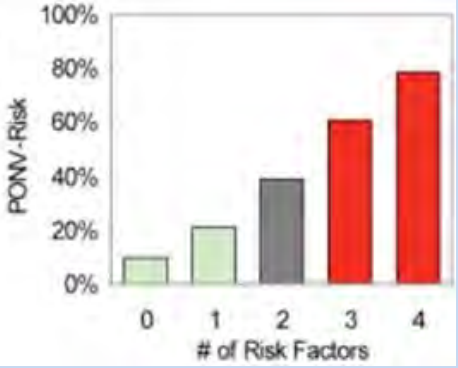
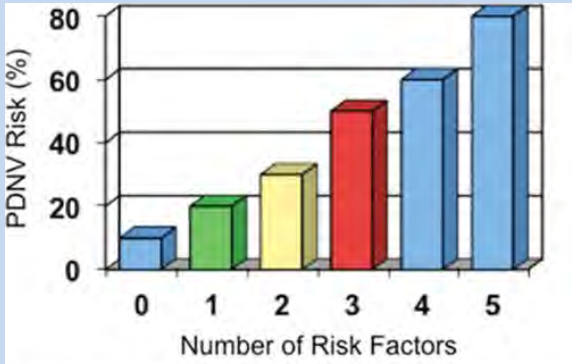


Figure 1. Risk score for PONV in adults. Simplified risk score from Apfel et al.[9] to predict the patient's risk for PONV. When 0, 1, 2, 3, and 4 of the risk factors are present, the corresponding risk for PONV is about 10%, 20%, 40%, 60%, and 80%, respectively. PONV = postoperative nausea and vomiting.



Risk Factors	Points
Female sex	1
History of PONV	1
Age <50 years	1
Use of opioids in the PACU	1
Nausea in the PACU	1
Sum	**0…5**

Figure 2. Simplified risk score for PDNV in adults. Simplified risk score from Apfel et al.[19] to predict the risk for PDNV in adults. When 0, 1, 2, 3, 4, and 5 risk factors are present, the corresponding risk for PDNV is approximately 10%, 20%, 30%, 50%, 60%, and 80%, respectively. PDNV = postdischarge nausea and vomiting; PONV = postoperative nausea and vomiting; PACU = postanesthesia care unit.

British Journal of Anaesthesia 112 (5): 906–11 (2014)
Advance Access publication 18 February 2014 · doi:10.1093/bja/aet551

BJA

Opioid-free total intravenous anaesthesia reduces postoperative nausea and vomiting in bariatric surgery beyond triple prophylaxis

P. Ziemann-Gimmel*, A. A. Goldfarb, J. Koppman and R. T. Marema

Table 3 Patients requiring AERM and reporting PONV. CI, confidence interval; $PONV_t$, total number of patients reporting postoperative nausea and vomiting; AE_{PACU}, number of patients requiring AERM in PACU; AE_{post}, number of patients requiring AERM in the postoperative period, excluding PACU; AE_{total}, number of patients requiring AERM in the postoperative period. *Fisher's exact test

	Classic group ($n=59$)	TIVA group ($n=60$)	P-value*	RR (95% CI)
AE_{PACU}, n (%)	18 (30.5%)	13 (21.7%)	0.30	1.13 (0.91, 1.40)
AE_{post}, n (%)	16 (27.1%)	9 (15.0%)	0.12	1.17 (0.97, 1.41)
AE_{total}, n (%)	26 (44.1%)	17 (28.3%)	0.09	1.28 (0.97, 1.69)
$PONV_t$, n (%)	22 (37.3%)	12 (20.0%)	0.04	1.27 (1.01, 1.61)

Table 4 Comparison of PONV severity. CI, confidence interval; n/a, not applicable. *Wilcoxon rank-sum test; †Fisher's exact test

PONV severity	Classic group ($n=59$)	TIVA group ($n=60$)	P-value	RR (95% CI)
None	37 (62.7%)	48 (80.0%)		
Mild	13 (22.0%)	9 (15.0%)		
Moderate	2 (3.4%)	3 (5.0%)		
Severe	7 (11.9%)	0 (0%)	0.02*	n/a
Retching	7 (11.9%)	0 (0%)	0.006†	1.13 (1.02, 1.25)
Vomiting	5 (8.5%)	0 (0%)	0.02†	1.09 (1.00, 1.19)

2 grupos:

- Clásico: anestesia inhalatoria + opiáceos
- TIVA: Dexmedetomidina + propofol + ketamina.

Resultados NVPO:
- Clásico: 22 pac (37.3%)
- TIVA: 12 pac (20%)

RRR= 46,4%.
RAR= 17,3%
NNT = 6 (5.78)

Requerimiento de AERM no fue diferente en el grupo Classic (48) en comparación con el grupo TIVA (26) ($P = 0.07$)

CURRENT OPINION

Opioids and tumour metastasis: does the choice of the anesthetic-analgesic technique influence outcome after cancer surgery?

Cara Connolly[a] and Donal J. Buggy[a,b]

OPIOIDES, INMUNIDAD Y CÁNCER:

- Amplia actividad inmunomoduladora.
- Inhibir tanto la inmunidad celular como la humoral
- Modular la producción de citoquinas inflamatorias
- Actividad proangiogénica → activación de VEGF

LA CIRUGÍA MAYOR:

- "Respuesta al estrés" : supresión transitoria de la inmunidad celular (células T, las células B y las células NK) durante este período vulnerable
- El período postoperatorio inmediato es un momento especialmente susceptible para la formación de metástasis

DOLOR:

- Dolor activa la respuesta al estrés y suprime el sistema inmunológico
- Opioides siguen siendo los analgésicos de elección en el perioperatorio de la cirugía del cáncer

ESTUDIOS:

- Los estudios clínicos en esta importante área han sido pocos, limitados en número, principalmente retrospectivos y difíciles de interpretar.
- Naturaleza heterogénea → resultados contradictorios → factor protector a factor de riesgo.
- Estudios sugieren una asociación entre los pacientes con cáncer que reciben analgesia con opioides perioperatorios y un peor pronóstico que los que reciben anestesia regional.

Existe evidencia clínica experimental, animal y retrospectiva que sugiere que puede haber una asociación entre la administración de opioides y los resultados después de la cirugía de cáncer. Sin embargo, los resultados no han sido concluyentes, y se requieren ensayos clínicos prospectivos para investigar una posible relación causal e identificar las verdaderas diferencias entre los regímenes anestésicos. Hasta entonces, no hay pruebas suficientes para apoyar la alteración de la práctica anestésica clínica en pacientes sometidos a cirugía de cáncer.

CONCLUSIONES

- Fármacos adyuvantes:
  - Reducción en la puntuación en las escalas de dolor y en el consumo de opioides
  - Las consecuencias clínicas de estos beneficios deben demostrarse en ensayos y metaanálisis controlados.
  - ↓ los efectos secundarios inducidos por opioides pero pueden causar efectos secundarios propios que limiten su uso.

- Pacientes de alto riesgo (Obesidad, trastornos respiratorios del sueño) que pueden beneficiarse de OFA.

- Necesidad de ensayos clínicos prospectivos con amplio tamaño muestral para definir pautas de dosificación, eficacia y beneficios de la OFA respecto a la anestesia convencional con opioides.


THANK
YOU
GRACIAS
ARIGATO
SHUKURIA
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SHUKRIA
TINGKI
DANKSCHEEN
TASHAKKUR ATU
YAQHANYELAY
SUKSAMA
EKHMET
GRAZIE
MEHRBANI
MAAKE
KOMAPSUMNIDA
JUSPAXAR
GOZAIMASHITA
EFCHARISTO
PALDIES