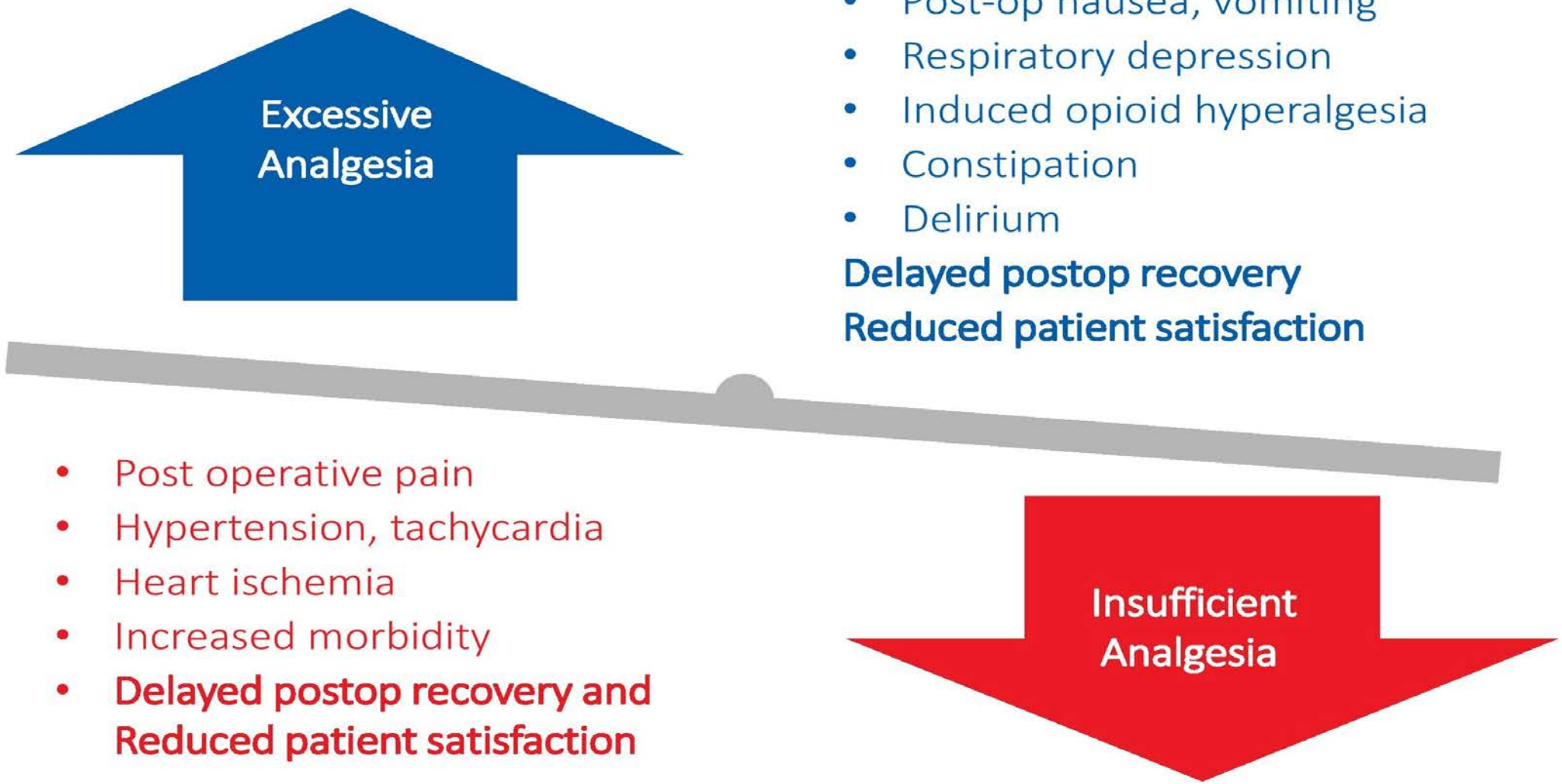
Canadian Anesthesiologists' Society
Société canadienne des anesthésiologistes
1943 – 2018

ERAS in 2018

How to reduce perioperative opioids in an ERAS population

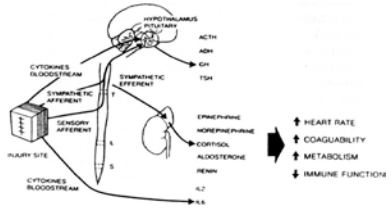
Dr Philippe Richebé, MD, PhD,
Professor, University of Montréal
Maisonneuve Rosemont Hospital, CEMTL


Excessive Analgesia
Post-op nausea, vomiting
Respiratory depression
Induced opioid hyperalgesia
Constipation
Delirium
Delayed postop recovery
Reduced patient satisfaction
Post operative pain
Hypertension, tachycardia
Heart ischemia
Increased morbidity
Delayed postop recovery and
Reduced patient satisfaction
Insufficient Analgesia

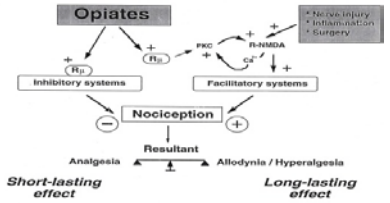
- Surgical Trauma

- Lack of good analgesia (block or multimodal)

A- Nociceptive inputs



Sensitization



B- Opioids

« Persistent Post-Surgical Pain »

- High intraoperative opioid doses

- Lack of anti-O.I.H. strategy

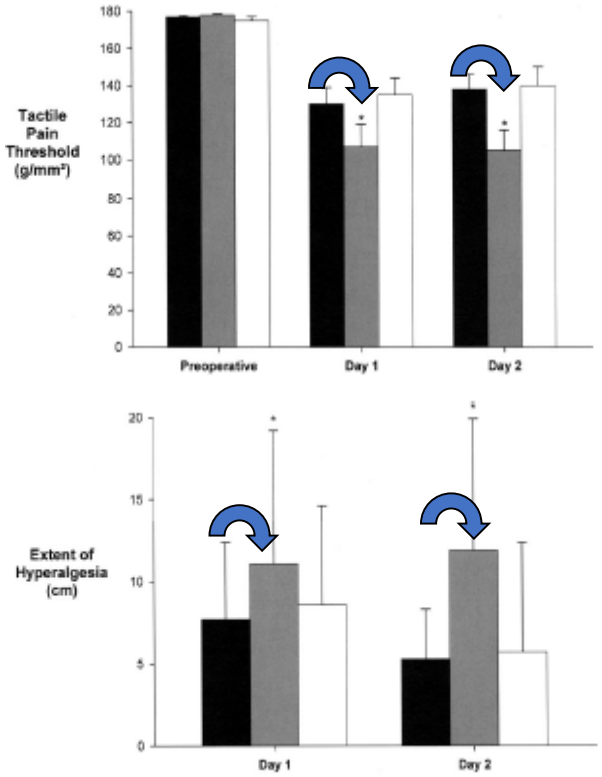
Anesthesiology 2005; 103:147–55

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.#*

	Small-dose Remifentanil (n = 25)	Large-dose Remifentanil (n = 25)	Large-dose Remifentanil–Ketamine (n = 24)
Remifentanil dose, mg	0.9 ± 0.3*	6.7 ± 3.1	6.5 ± 3.4
Desflurane, MAC/h	0.8 ± 0.2*	0.5 ± 0.2	0.6 ± 0.2
Ephedrine, No. of doses/No. of patients	9/17	10/13	50/15†
Final intraoperative temperature, °C	36.6 ± 0.7	36.3 ± 0.8	36.3 ± 0.9
Awakening time, min	14 ± 6	13 ± 5	14 ± 6
Extubation time, min	16 ± 6	14 ± 6	15 ± 4
Time to first postoperative morphine, min	35 (28–46)	24 (20–33)	41 (32–52)
Morphine given in PACU, mg	16 (10–24)	20 (17–27)	20 (14–23)
0–48 h cumulative postoperative morphine consumption, mg	68 (50–91)	86 (59–109)‡	62 (48–87)
Postoperative nausea and vomiting, No. of patients	7	8	8
Droperidol, No. of doses/No. of patients	8/7	8/8	8/8

Nociceptive threshold is lowered



Area of Hyperalgesia is bigger

Opioid-induced hyperalgesia in patients after surgery: a systematic review and a meta-analysis

D. Fletcher[1,2,3]* and V. Martinez[1,2,3]

British Journal of Anaesthesia **112** (6): 991–1004 (2014)

Study (first author, year)	Number of patients in control or low opioid dose group	Number of patients in high opioid dose group	Patients/surgery	Intervention	Outcomes
Agata[53] (2010)	15 low dose	15	Elective orthognatic surgery	I.V. remifentanil (0.15 μg kg min^{-1}) *vs* (> 0.3 μg kg min^{-1})	Pain VAS at rest at 1, 3, 6, 12 and 24 h. PCA i.v. fentanyl 24 h. Haemodynamic variables 12 h. PONV and shivering 24 h
Carvalho[44] (2012)	9 control 9 low dose	9	Caesarean section	Intrathecal single shot fentanyl (5 μg) *vs* (25 μg)	Pain VAS at rest, oxygen saturation and respiratory rate 30 min, 1, 4, 8, 12 and 24 h. Intraoperative pain, nausea, hypotension, and vasopressor use. PCA i.v. morphine 24 h
Chia[7] (1999)	30 low dose	30	Hysterectomy	1 μg kg^{-1} fentanyl bolus *vs* 15 μg kg^{-1} bolus plus 100 μg h^{-1} infusion	Pain VAS at rest 4, 8, 12, and 16 h. Haemodynamic, arterial blood gas, and sedation scores. PCA i.v. morphine 24 h
Cho[40] (2008)	30 control 30 low dose	30	Gynaecology	I.V. remifentanil (target 1 ng ml^{-1}) *vs* high-dose remifentanil (target 3 ng ml^{-1})	Pain VAS at rest 15, 30, 45, 60 min and 6, 12, 24, and 48 h. Sedation, agitation. PCA i.v. morphine 48 h. PONV requiring antiemetic
Cooper[6] (1997)	30 control	30	Caesarean section	Intrathecal single shot fentanyl (25 μg) *vs* placebo	Intraoperative most severe pain; intraoperative nausea, vomiting, drowsiness. Pain VAS at rest and during coughing at 15 min, 3, 6, 10, and 23 h. PON, POV, pruritus, drowsiness. PCA i.v. morphine 24 h
Cooper[45] (2002)	18 control	18	Caesarean section	Intrathecal single shot fentanyl (25 μg) *vs* placebo	Pain VAS at rest and during coughing in PACU and then at 2, 4, 10, and 20 h. Intraoperative pain; PON, POV, pruritus, drowsiness. PCA epidural fentanyl
Cortinez[10] (2001)	30 control	30	Gynaecology	I.V. remifentanil (0.23 μg kg min^{-1}) *vs* placebo	Pain VAS during coughing at 15, 30, 45, 90 min, 2, and 24 h. PCA i.v. morphine 24 h, PONV, sedation, hypoxemia (pulse oximeter), respiratory depression; patient satisfaction
Fechner[21] (2013)	18 low dose	16	Coronary artery bypass graft	I.V. sufentanil (target 0.4 ng ml^{-1}) *vs* remifentanil (target 0.8 ng ml^{-1})	Pain NRS at rest and during deep inspiration, PCA i.v. morphine 48 h. Cognitive function, sedation, constipation, PONV. Primary and secondary hyperalgesia
Guignard[9] (2000)	25 low dose	24	Colorectal surgery	I.V. remifentanil (0.1 μg kg min^{-1}) *vs* (0.3 μg kg min^{-1})	Pain VAS at rest at 24 h. PCA i.v. morphine 48 h. PON, POV, pruritus, dysphoria, diplopia, hallucinations
Hansen[43] (2005)	18 control	21	Major abdominal surgery	I.V. remifentanil (0.4 μg kg min^{-1}) *vs* placebo	Summed pain VAS at rest and during coughing at 4, 6, and 24 h. PCA i.v. morphine 24 h. PON, POV, sedation
Joly[11] (2005)	25 low dose	25	Major abdominal surgery	I.V. remifentanil (0.05 μg kg min^{-1}) *vs* (0.4 μg kg min^{-1})	Pain verbal scale for 3 h then pain VAS at rest every 4 h for 44 h. Pain VAS when peak flow measurement at 24 and 48 h. PCA i.v. morphine 48 h. PONV, laryngospasm, bronchospasm, respiratory depression, muscular rigidity, agitation, and shivering Primary and secondary hyperalgesia

Continued

27 studies over 15 years

About 1500 patients

All types of opioids

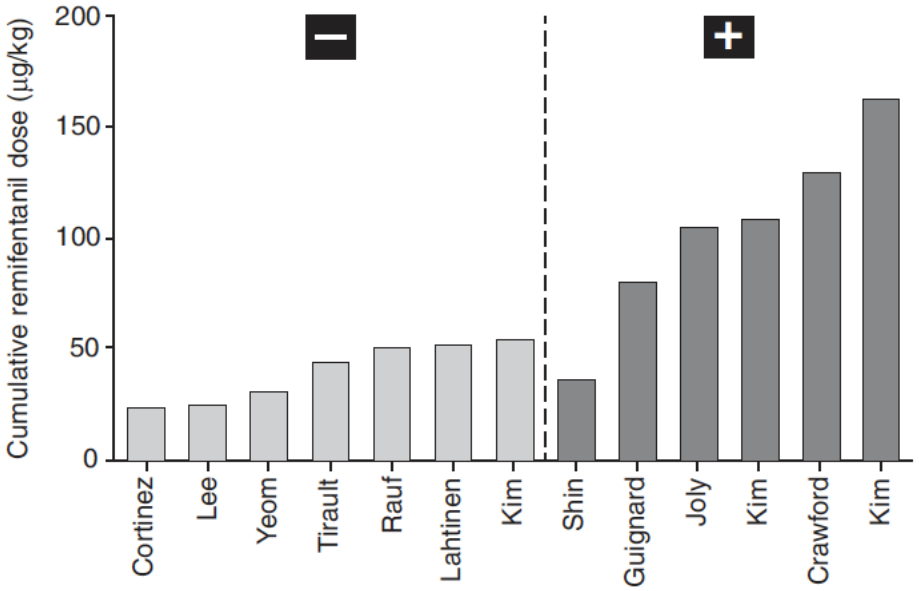
Mostly remifentanil, though

All surgeries

Intraoperative Use of Remifentanil for TIVA: Postoperative Pain, Acute Tolerance, and Opioid-Induced Hyperalgesia

Martin S. Angst, MD

Journal of Cardiothoracic and Vascular Anesthesia, Vol 29, No S1 (June), 2015: pp S16–S22



Remifentanil studies:

- light gray bars = « small doses » of remifentanil = negative study regarding OIH (23-54 mcg/kg)
- dark gray bars = « high doses of remifentanil » = positive studies regarding OIH (35-162 mcg/kg)

Chronic Pain as an Outcome of Surgery

A Review of Predictive Factors

Anesthesiology 2000; 93:1123–33

Frederick M. Perkins, M.D., Henrik Kehlet, M.D., Ph.D.†*

Persistent postsurgical pain: risk factors and prevention

Henrik Kehlet, Troels S Jensen, Clifford J Woolf

Lancet 2006; 367: 1618–25

	Estimated incidence of chronic pain	Estimated chronic severe (disabling) pain (>5 out of score of 10)	US surgical volumes (1000s)†
Amputation[2]	30–50%	5–10%	159 (lower limb only)
Breast surgery (lumpectomy and mastectomy)[3]	20–30%	5–10%	479
Thoracotomy[4–7]	30–40%	10%	Unknown
Inguinal hernia repair[8–10]	10%	2–4%	609
Coronary artery bypass surgery[11–13]	30–50%	5–10%	598
Caesarean section[14]	10%	4%	220

Narcotic Sparing Analgesia in ERAS

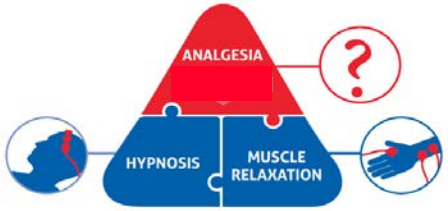
Before surgery

- Proper patient evaluation: chronic pain? Chronic opioid exposure…
- Patient Education prior surgery
- Set proper expectations for your patient
- Start multimodal analgesia before entering the OR
- Place preoperative epidural WHEN necessary prior to OR entrance if possible and test it

Narcotic Sparing Analgesia in ERAS

During surgery

- Epidural versus Regional: Epidural is no more recommended for colorectal laparoscopic surgery!
- Prefer TAP block or RS blocks if laparoscopic surgery or preperitoneal infiltration
- IV lidocaine is also an option when epidural is not needed
- NSAIDs have to be discussed with the surgical team and based on patient's evaluation
- Adjuvant analgesics: NMDA modulators (Ketamine, N2O, dextromethorphan, magnesium might be added), Alpha-2 agonists might be used
- Gabapentinoids are not recommended in this type of surgery
- Intraoperative nociception MONITORS



Narcotic Sparing Analgesia in ERAS

After surgery

- Proper orders must be implemented for each chosen strategy: PCEA, Regional Blocks (TAP, RS, CWI), PCA, multimodal analgesia permitted…
- Multimodal must be continued
- If epidural placement, a STOP-test must be proposed at POD2 to avoid delaying the patient’s discharge
- Ketamine, IV lidocaine might be continued postoperatively when needed

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