1150   1850   1947   1977   2010
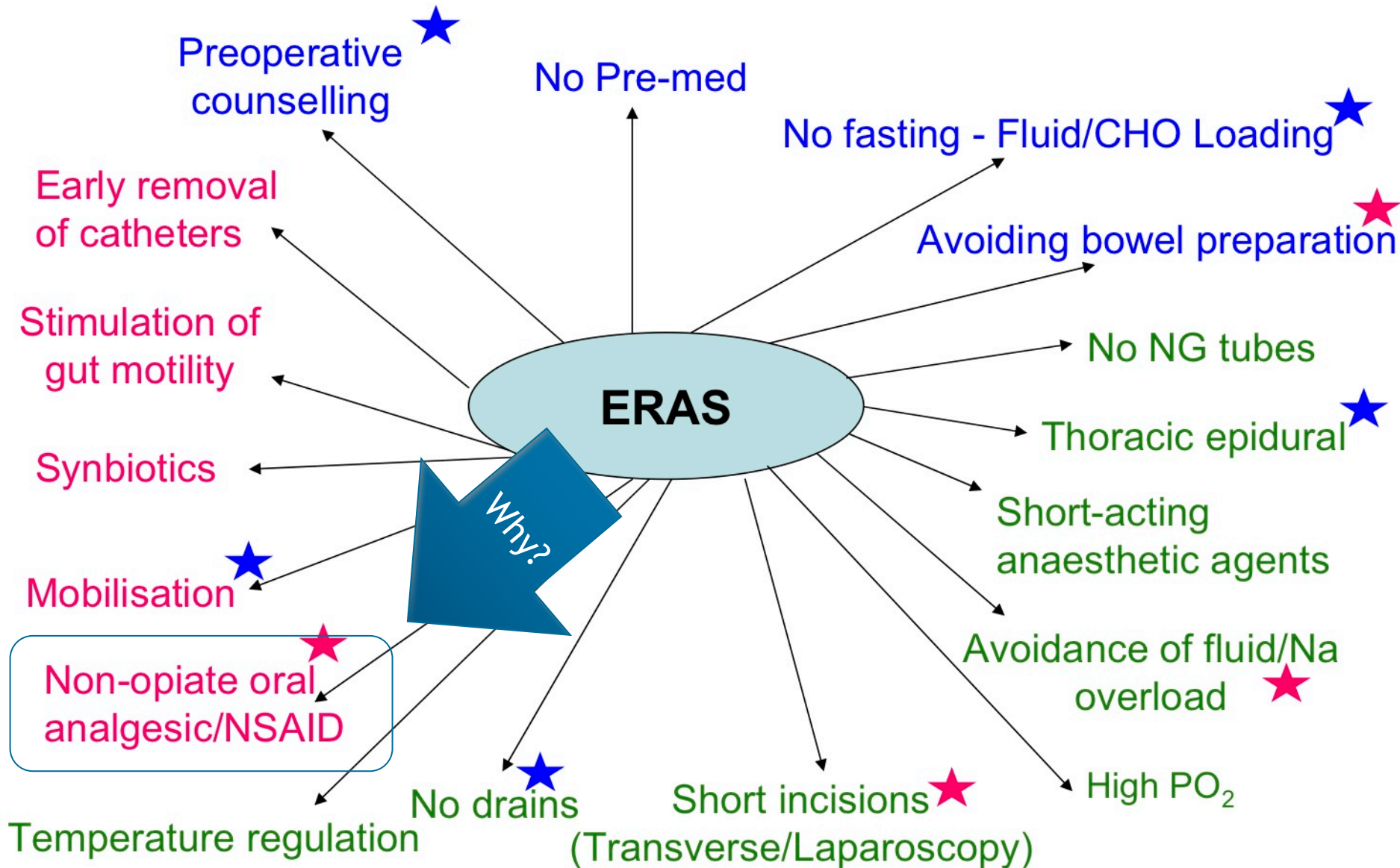
Opioid Free Anesthesia (OFA)
as a method to optimize
Enhanced Recovery After Surgery (ERAS)

Jan Paul Mulier MD PhD

Anaesthesiologist

Sint-Jan Brugge-Oostende, Belgium

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Main elements of ERAS

Preoperative counselling ⭐

No Pre-med

No fasting - Fluid/CHO Loading ⭐

Early removal of catheters

Avoiding bowel preparation ⭐

Stimulation of gut motility

No NG tubes

ERAS

Thoracic epidural ⭐

Synbiotics

Why?

Short-acting anaesthetic agents

Mobilisation ⭐

Non-opiate oral analgesic/NSAID ⭐

Avoidance of fluid/Na overload ⭐

Temperature regulation

No drains ⭐

Short incisions ⭐ (Transverse/Laparoscopy)

High PO_2

Why opioid free anesthesia?

Inflammation, repetitive stress and opioids induce hyperalgesia.

Keep the opioids for post surgical pain treatment

Recommendations from OSAS (Anesthesiology 2006;104:1081)

1. **Avoid opioids post operative in OSAS to avoid obstructive breathing.**

    Isono S. Mechanisms for increased collapsibility of the passive pharyngeal airway. Respirology. 2012;17(1):32-42.

Recommendations from ERAS (Lassen K Consensus Review of Optimal Perioperative Care ARCH SURG 2009; 144: 961)

2. **Avoid opioids post operative to improve bowel function and enhance recovery after surgery.**

3. Avoid immunosuppression (synthetic opioids !)

Being full awake, pain free and without respiratory depression is important.

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ERAS protocol for laparoscopic bariatric surgery

- 1. Pre op elements
  - No premedication no sedatives, No prolonged fasting
  - Antibiotic, trombo prophylaxis (beach chair)
  - Weight reduction > 10 kg by only high protein diet 3 weeks before
- 2. Per op elements
  - Short acting anesthetics, local infiltration and non opioid anesthesia
  - Provide sufficient surgical workspace to shorten surgical time and improve work
    - Abd compliance monitor, Deep NMB with ctu infusion, beach chair,
  - Avoid salt & water overload but cave rhabdomyolysis
  - Maintain normothermia loading up with sufficient non opiod analgesia
  - Avoid lung atelectasis, silent aspiration, volutrauma
    - Beach chair, CPAP, LRM, early PSV, permissive hypercapnia
  - Increase blood pressure above 140 mmHg to clip bleeding vessels to prevent post op bleeding
- 3. Post op elements
  - Full decurarisation to 90% and full awake before extubation.
  - Non opiod oral analgesia/NSAIDs
  - Prevent PONV
  - No nasogastric tube and stimulation of gut mobility
  - Early removal catheters, mobilisation legs and deep inspiration, oral nutrition

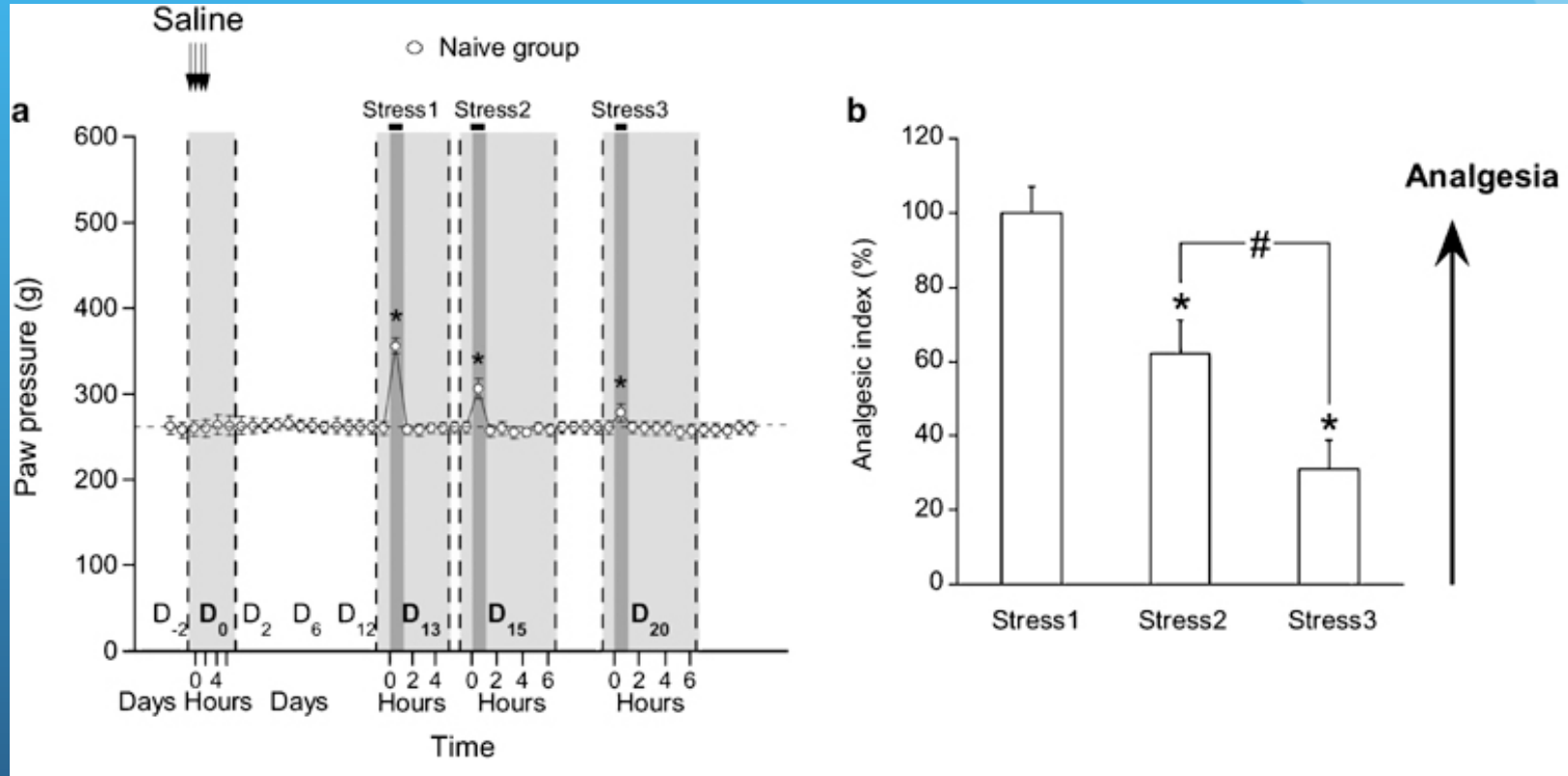# OFA is not vivisection!

Stress induces analgesia

- During stress no pain is felt

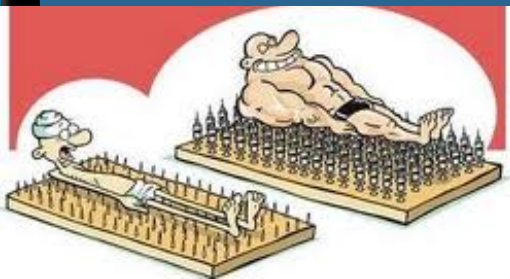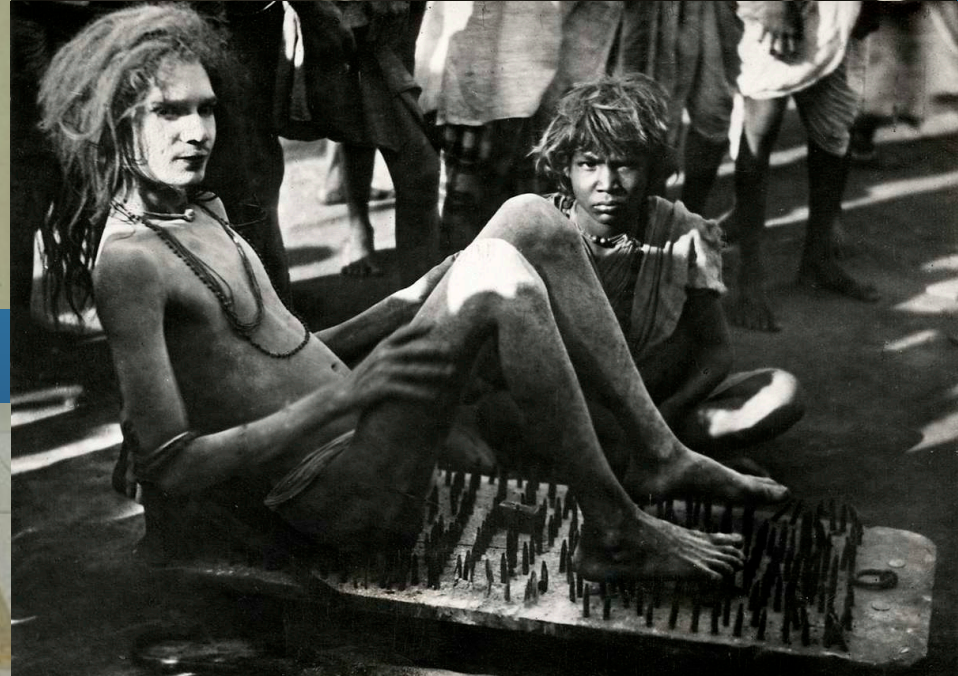- Or no other choice to survive ?

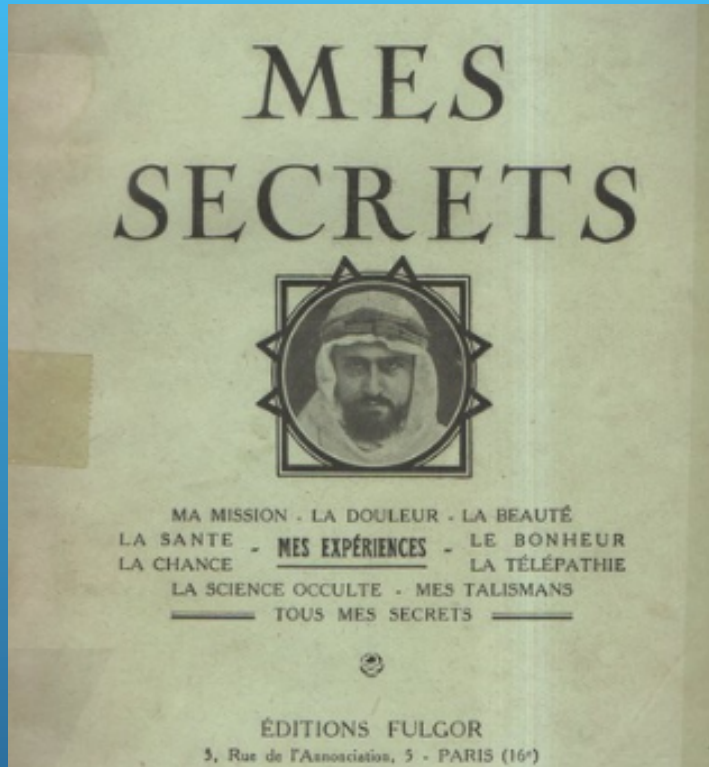But we don't want stress either

Stress induces analgesia
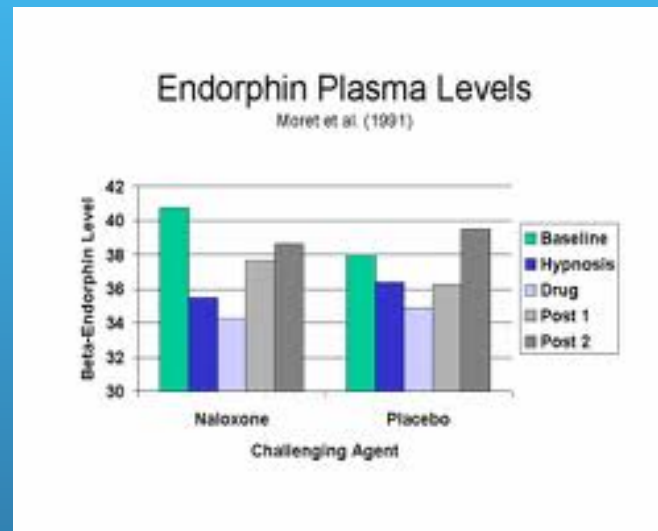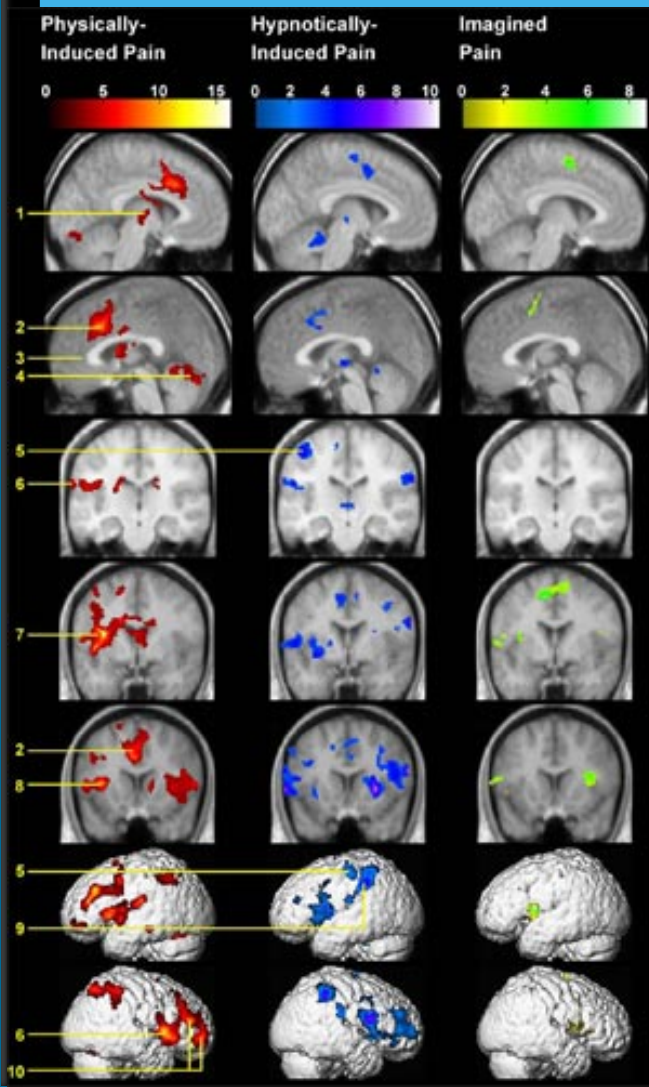## its effect drops with repetitive stress

Rivat C. Neuropsychopharmacology 2007; 32: 2217

Meditation induces analgesia but?

Hypnosis induces pain or analgesia or sleep

Hypnosis effect on sympathetic system

- A perceived threat or injury activates the cortex that sent a message to the amygdala.
- Hypnosis is not sleep, but an altered state of consciousness in which a person blocks the amygdala function.
- The amygdala releases cortocotropin-releasing hormone that stimulates the brain stem to activate the sympathetic nervous system.
- This triggers the adrenal glands, to release epinephrine and glucocorticoids.
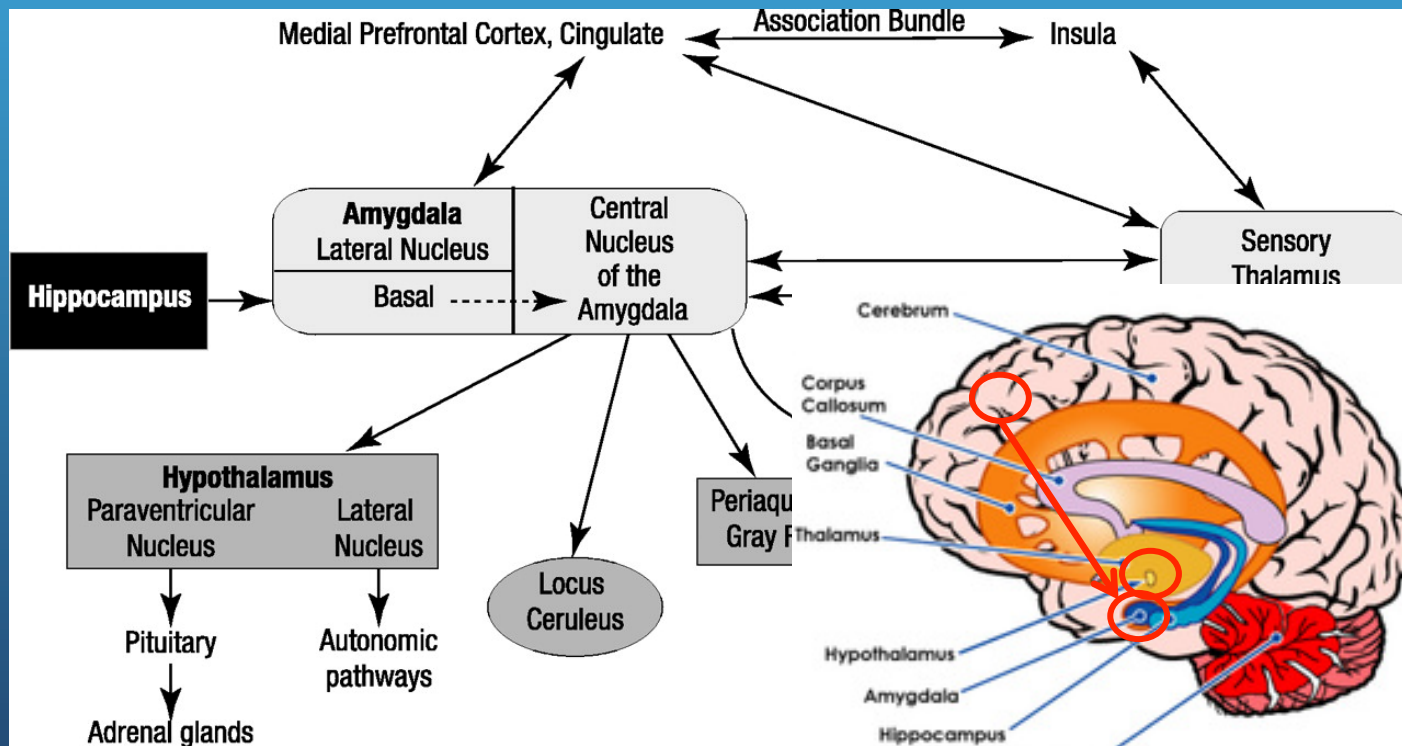
Surgery under hypnosis is possible!

- Tefikow S **Efficacy of hypnosis in adults undergoing surgery or medical procedures: A meta-analysis of randomized controlled trials.** Clin Psychol Rev. 2013;33:623

- 34 eligible RCTs were included, comprising a total of 2597 patients.

- positive treatment effects on
  - emotional distress (g = 0.53, CI 95% [0.37; 0.69]),
  - pain (g = 0.44, CI 95% [0.26; 0.61]),
  - medication consumption (g = 0.38, CI 95% [0.20; 0.56]),
  - physiological parameters (g = 0.10, CI 95% [0.02; 0.18]),
  - recovery (g = 0.25, CI 95% [0.04; 0.46]),
  - surgical procedure time (g = 0.25, CI 95% [0.12; 0.38]).
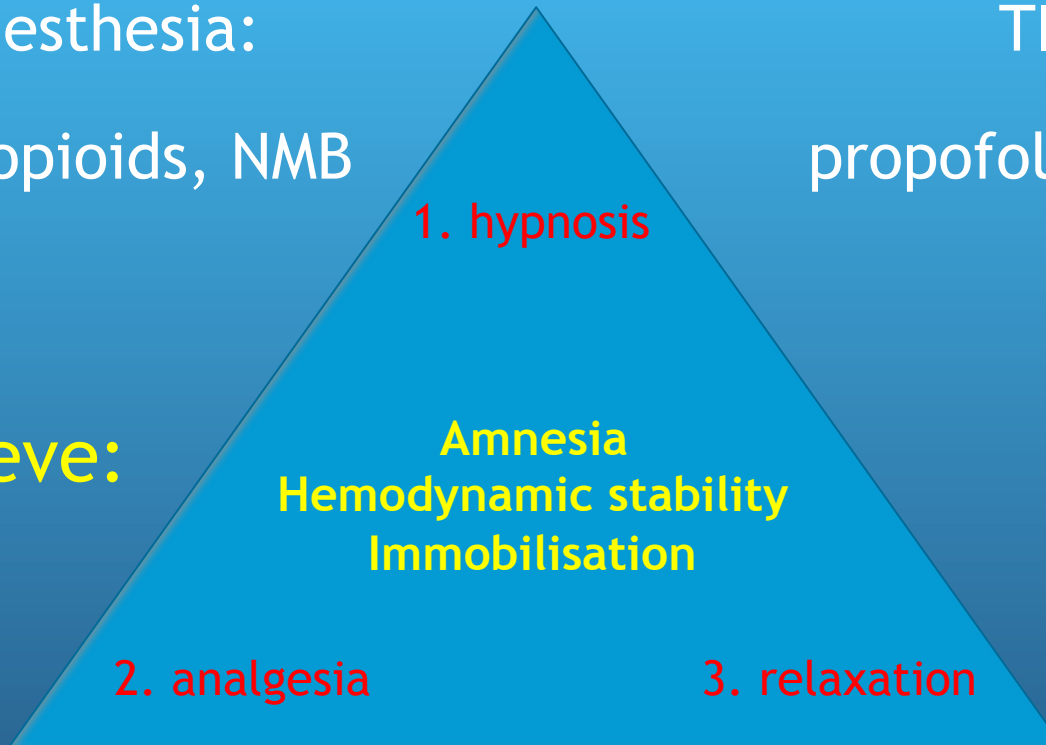
We learned that we need 1. 2. 3.

Balanced anesthesia: TIVA:
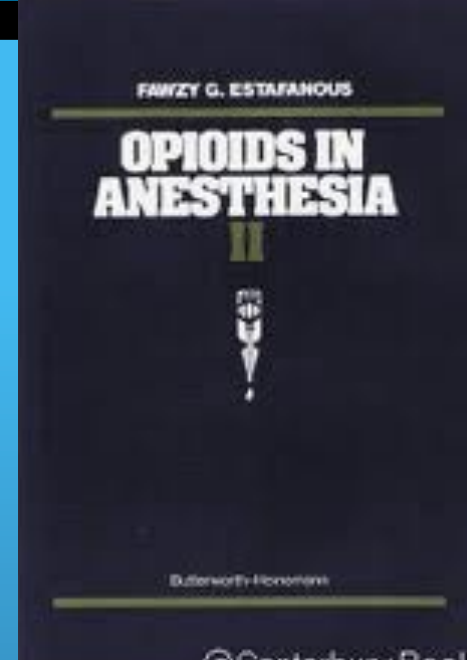
Inhalation, opioids, NMB   propofol, opioids,
NMB

1. hypnosis

To achieve:

Amnesia
Hemodynamic stability
Immobilisation

2. analgesia   3. relaxation

Do we need analgesia to achieve hemodyn stability?

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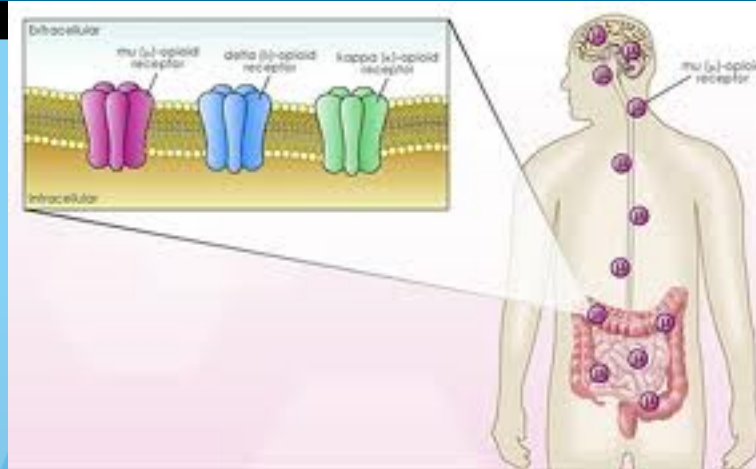
Dr Paul Janssens, 1926 - 2003

A paradigm took place, 50 years ago:

1960 Dr P Janssens invented synthetic opiates; it changed anesthesia forever from inhalation to balanced anesthesia with opioids

- Perfect suppression of sympathetic system in balanced anesthesia
  - Without cardiovascular collaps or histamine release.
- High doses possible having hypnotic effects, relaxant effects?
  - Neurolept anesthesia; stress free anesthesia; sedation; locoregional ..

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Why was opioid anesthesia successful?
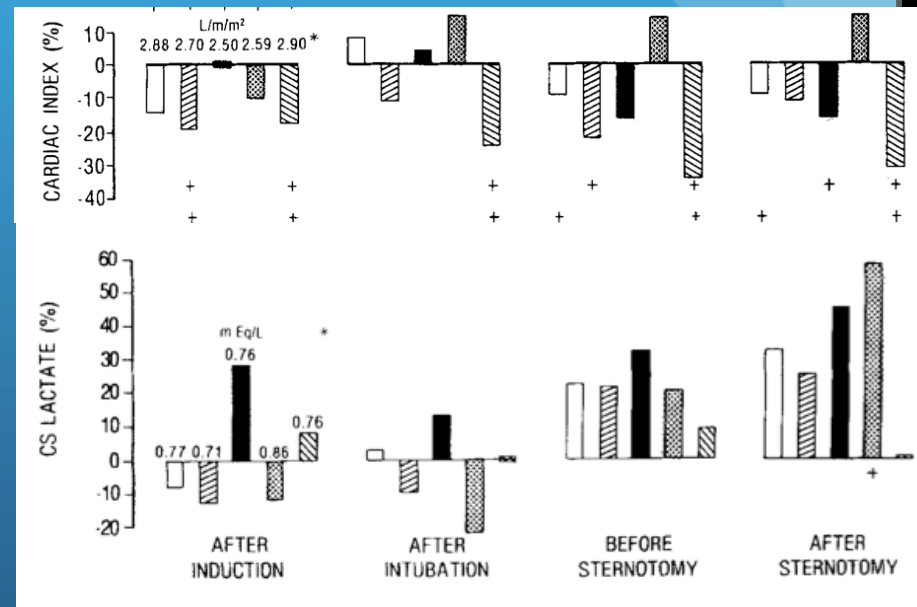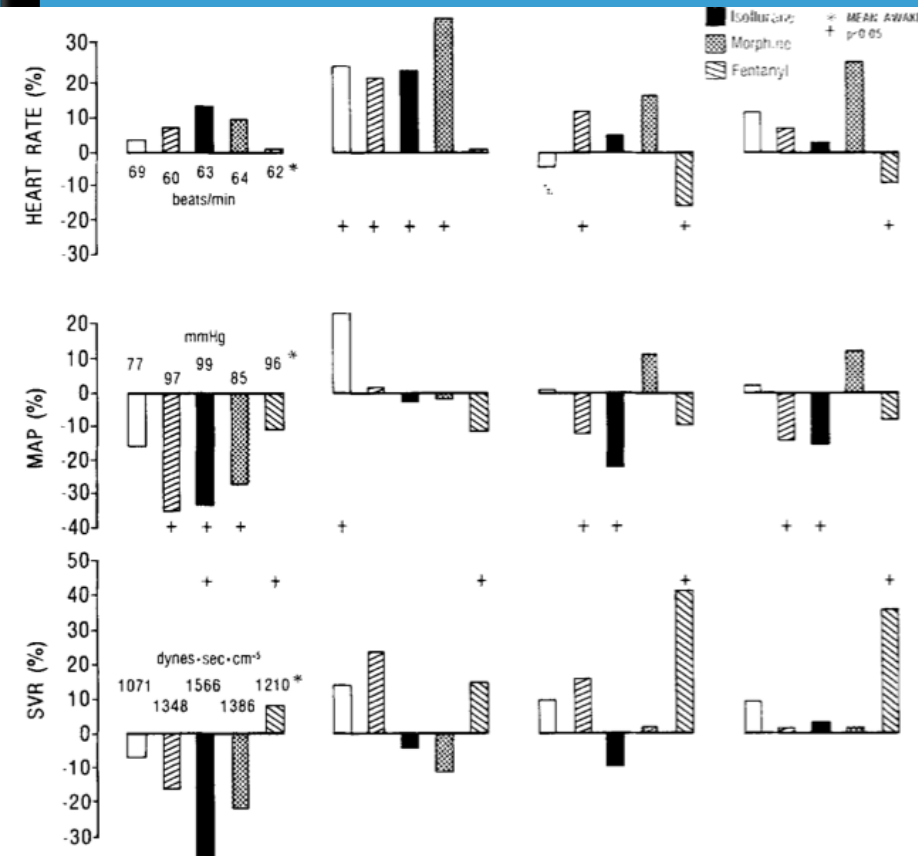
Fentanyl:
  Decrease in cardiac output; Increase in SVR, no change in contractility
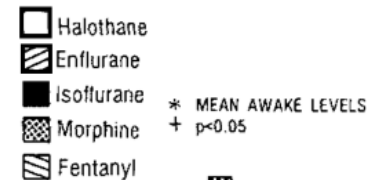 Slight decrease in HR – MAP and stable!
      No lactate production

Moffitt E The Coronary Circulation and Myocardial Oxygenation in Coronary Artery Disease: Effects of Anesthesia Anesth-Analg 1986;65:395-410
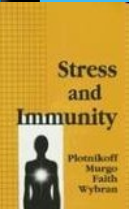
Why a new Paradigm today?

1. <u>Immuno suppression by opioids?</u>
Wybran J. Suggestive evidence for receptors for morphine and methionine-enkephalin on normal human blood T lymphocytes. J Immunol. **1979**;123:1068-70

1992 Dr Paul Janssens invented Remifentanyl but refused to market Remifentanyl and sold it to Beecham afraid of unknown long-lasting effects of opioids…

Sacerdote P. Non-analgesic effects of opioids: mechanisms and potential clinical relevance of opioid-induced immunodepression. Curr Pharm Des. **2012**;18(37):6034-42.

- **Morphine decreases natural and acquired immunity**, both directly and indirectly via the activation of central receptors.
- the immunological effects of opioid are receiving considerable attention because of concerns that opioid-induced changes in the immune system **may affect the outcome of surgery** or of variety of disease processes, **including bacterial and viral infections and cancer**.
- The impact of the opioid-mediated immune effects could be particularly **dangerous in selective vulnerable populations**, such as the elderly or immunocompromised patients.
- Choosing **anesthetic drugs without an effect on immune responses** may be an important consideration in anesthesia.

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Why a new Paradigm today?

2. Fentanyl induces fixed **neurologic sequels?** (Periventricular Leucomalacia)

- *Neonatal outcome and prolonged analgesia in neonates. Anand et al. Arch Pediat Adolesc Med 1999; 153: 331-8*
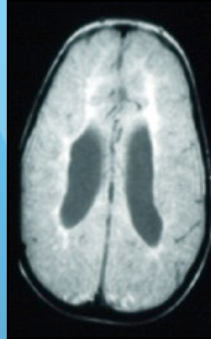
3.Opioids induced hyperalgesia?: Patients receiving opioids become *more sensitive to pain.*

- Opioids are *short lasting analgesics* and *long-during hyperalgesics by upregulation of compensatory pronociceptive pathways*
- Angst MS. Opioid-induced hyperalgesia: a qualitative systematic review. Anesthesiology. 2006;104:570-87

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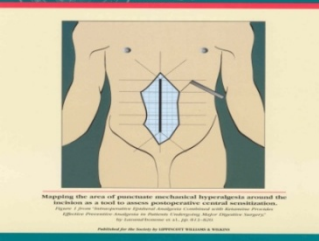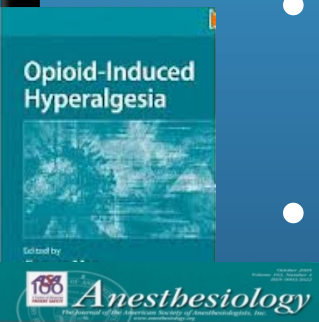
More pain after opioids….
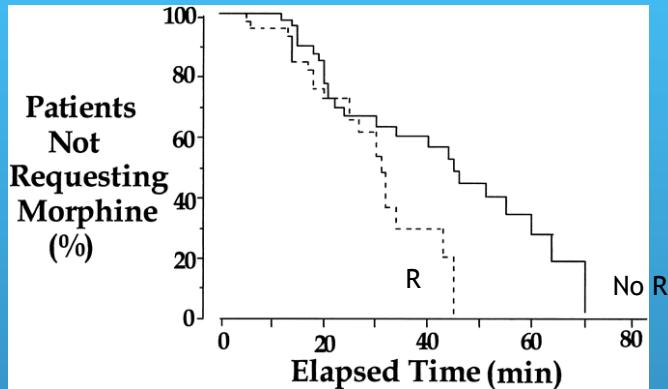
Intraoperative Remifentanil Increases Postoperative Pain and Morphine Requirements
(Guignard, Chauvin: Anesthesiology 2002)

Independent Predictive Factors of Severe Postoperative Pain in the Postanesthesia Care Unit

The dose of intraoperative opioid !!

(Aubrun, F. et al. Anesth Analg 2008;106:1535)

Intensity of post op pain is proportional to the dose of opioids given during anaesthesia.

Low dose fentanyl after high dose fentanyl

. no analgesia and hyperalgesia,
. effect is stronger when also inflammation

Non-Nociceptive Environmental Stress Induces Hyperalgesia, Not Analgesia, in Pain and Opioid-Experienced Rats

Cyril Rivat[1], Emilie Laboureyras[1], Jean-Paul Laulin[1,2], Chloé Le Roy[1], Philippe Richebé[1,3] and Guy Simonnet*[1]

[1]Laboratoire 'Homéostasie-Allostasie-Pathologie', Université Victor Ségalen Bordeaux 2, Bordeaux, France; [2]Department of Cellular Biology and Physiology, Université Bordeaux 1, Talence, France; [3]Department of Anesthesia and Intensive Care II, Centre Hospitalier Universitaire de Bordeaux, Bordeaux, France

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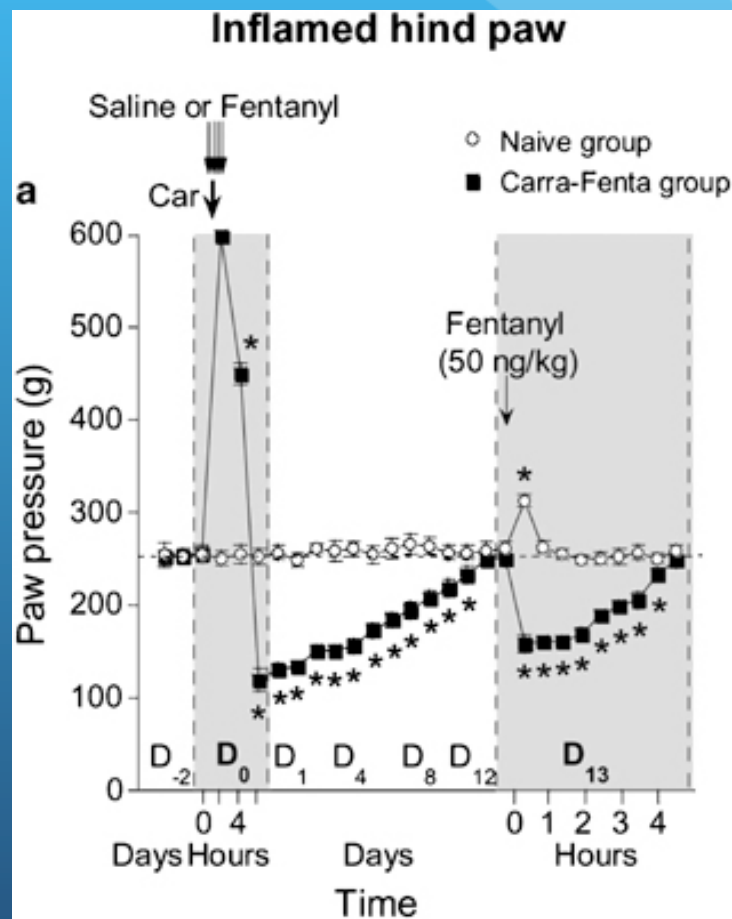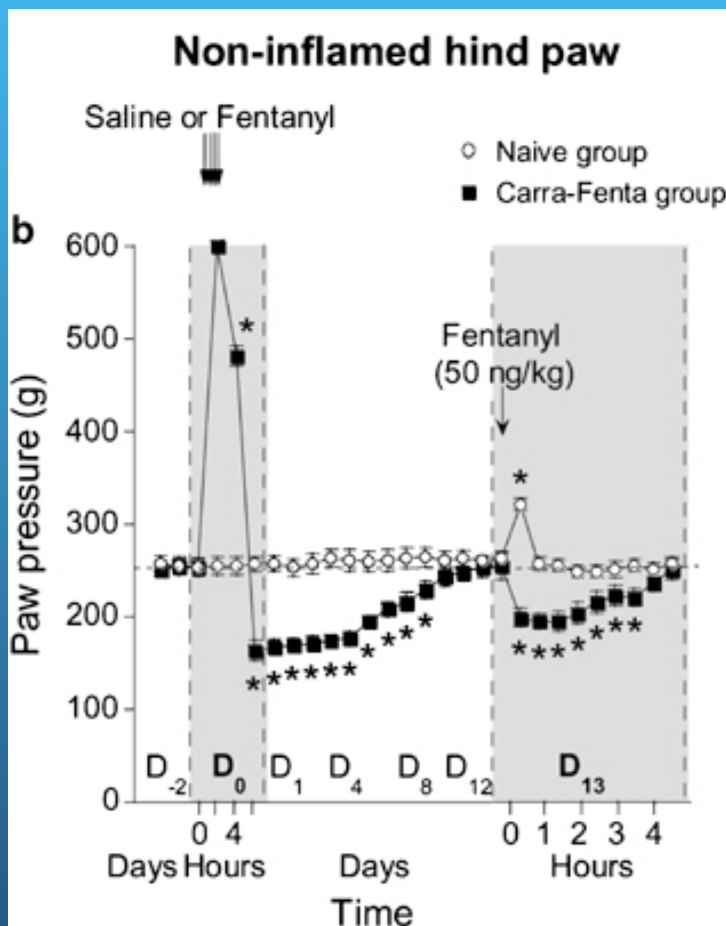
Ketamine blocks the hyperalgesia due to fentanyl and inflammation.
only at first dose and first stress effect
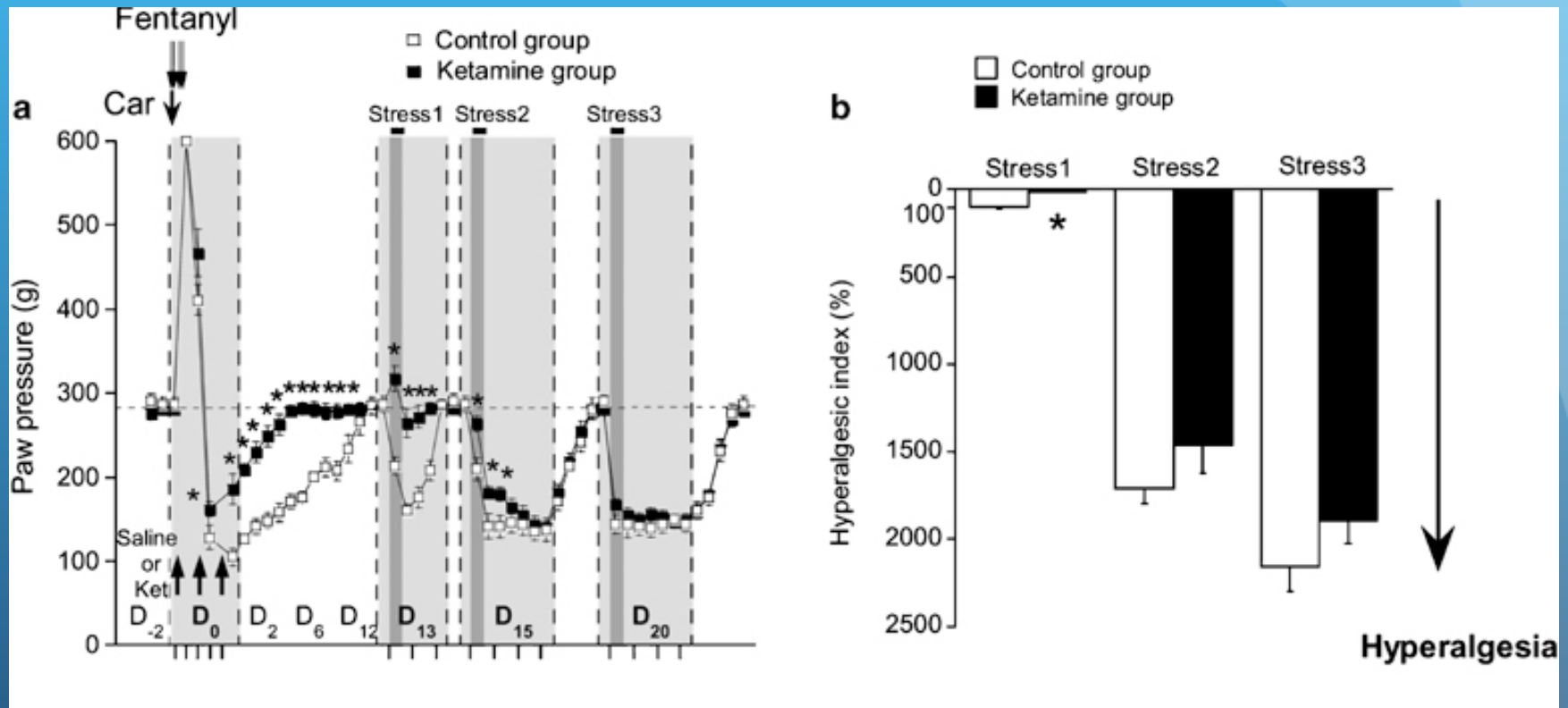
Stress - inflammation – opioids
Philippe Richebé

- Stress
  - Analgesia during stress
  - Hyperalgesia after stress

- Repeated stress
  - Analgetic effect during stress reduces with repetition

- Stress and NMBA antagonists (ketamine, BN2572)
  - Reduces hyperalgesia after first (ket) and after repetitive stress (BN2572)

- Inflammation
  - Hyperalgesia during inflammation
  - Prolonged (2 weeks) hyperalgesia after inflammation

- Stress and inflammation
  - Hyperalgesia during stress instead of analgesia during stress

- Synthetic opioids (opiates same effect)
  - Analgesia during increased plasma levels
  - Hyperalgesia (2 weeks) after opioids

- Repeated synthetic opioids
  - Analgesia during plasma levels reduces with repetition

- Inflammation and synthetic opioids
  - Stronger and longer hyperalgesia after combination
  - Hyperalgesia increases further for stress and repetitive stress

Avoid hyperalgesia by NMDA blockers

- Adding ketamine or BN 2572 (most effective)

- Adding N20

- Adding magnesium ? Not through blood brain barrier!

  - But work also on

- Avoiding inflammation, reduce or avoid opioids, avoid repetitive stress,…

Acute hyperalgesia after isolated exposure
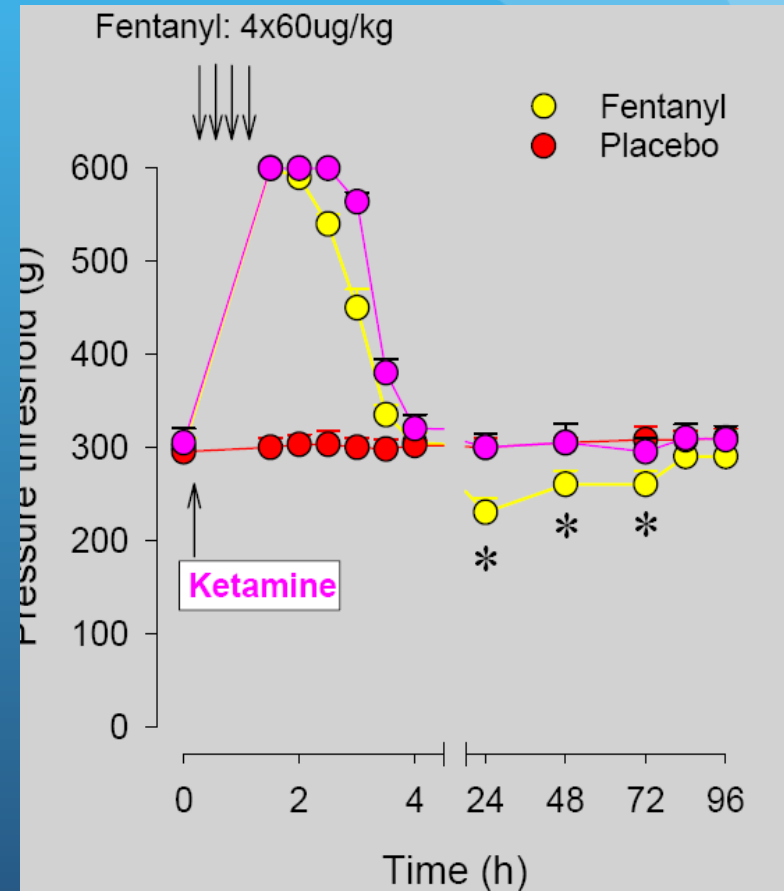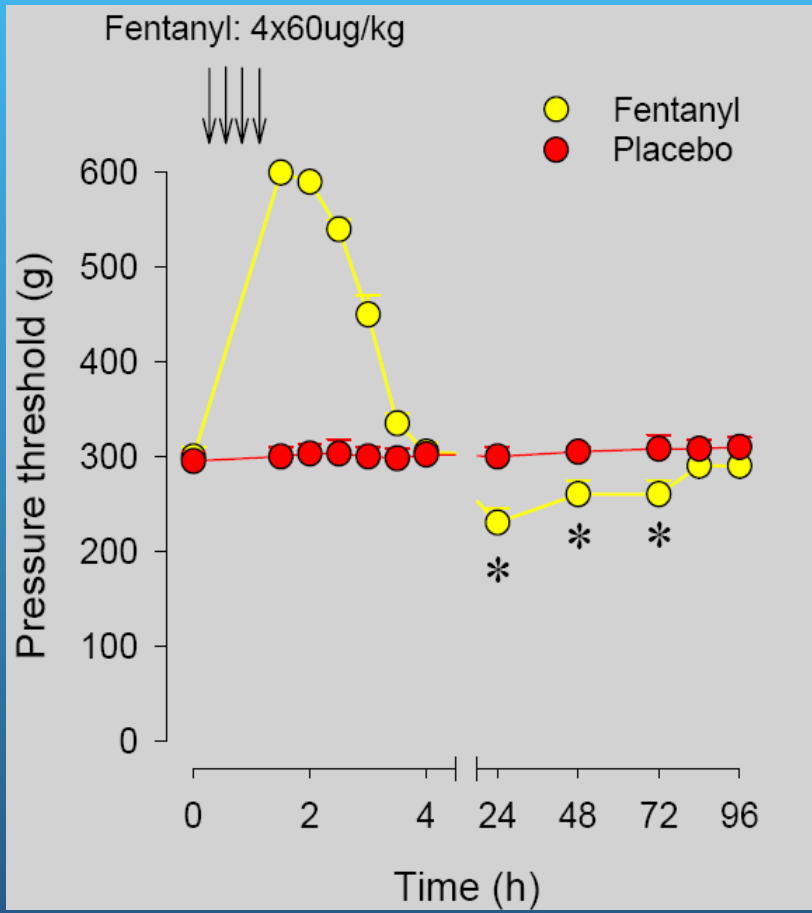
Celerier et al, Anes 2000

Angst (charts)

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What do we need, peri-op?

Per operatively we need:
- Hypnosis; hemodynamic stability; immobilisation
  - high dose **opioids were the simplest** method to reduce hypnotics; to keep **stable hemodynamics** and to block breathing
  - In very high dose no other drugs needed?
  - therefore we thought we needed **analgetics** and made them the third cornerstone of anesthesia

Post operative we need:
- Analgesia, no hypnosis, no muscle relaxation:
  - low dose opioids not always enough (due to high dose addiction per op)
    - Use PCIA PCEA … local, locoregional addition
  - avoid opioids side effects post operative: multimodal analgetics

How to avoid opioids?

- Direct sympathetic block central - peripheral
  - Clonidine, Dexmedetomidine, B blockers
- Indirect block of sympathetic effects
  - Nicardipine, lidocaine, Mg sulfate, inhalation vapor
- Multimodal analgetics (non opoids) loading up per operative to be active when waking up.
  - low dose ketamine, dexmedetomidine, lidocaine, diclofenac, paracetamol
- Epidural, plexus and local infiltration block
- Spinal anesthesia with higher sympathical nerve block. Epidural block.

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Case report 2005: Morbid obesity using dexmedetomidine without narcotics

- 433 kg morbidly obese patient with obstructive sleep apnea and pulmonary hypertension.

- 0.5 MAC inhalation. A continuous infusion of dexmedetomidine (0.7 ug/kg/h) per operative and a low infusion rate first postoperative day.

- 48 mg morphine by PCA first day with dex

- 148 mg morphine by PCA second day without dex.

Hofer R. Anesthesia for a patient with morbid obesity using dexmedetomidine without narcotics. Can J Anaesth. 2005; 52: 176-80.

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Effect of clonidine-dexmedetomidine on post-op opioid use

- Blaudszun G. Anesthesiology 2012 ; 116: 1312-22 Effect of systemic alpha2 agonists on post operative morphine consumption and pain intensity. Review and meta analysis.

Morphine post OP   VAS post OP
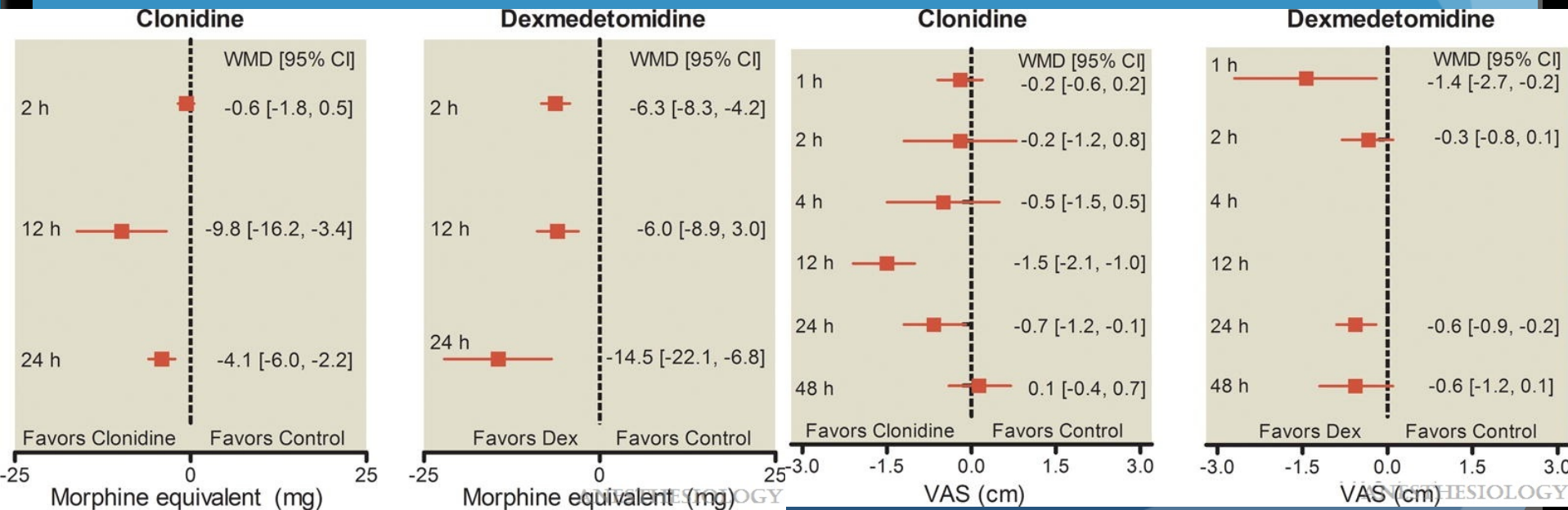
Effect of ketamine on post-operative opioid use

- Bell RF Perioperative Ketamine for acute post operative pain. the cochrane library 2010; 11

Cumulative postoperative patient-controlled analgesia (PCA) morphine consumption.
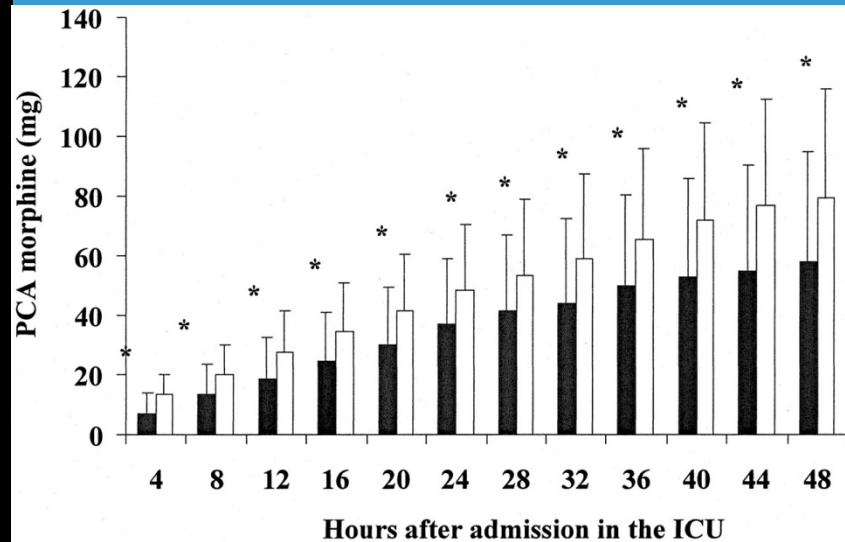
Visual analog scale score at mobilization during the 48-h study.
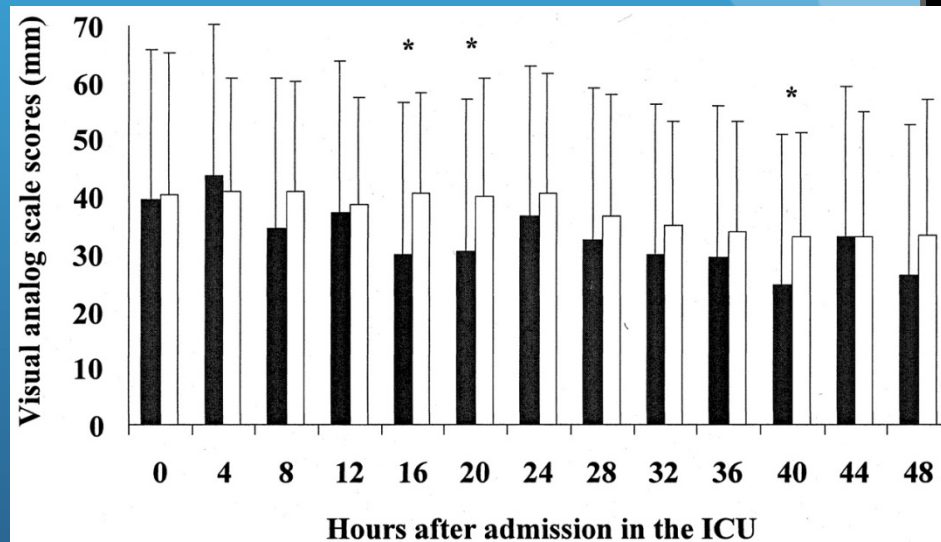
■ Ketamine per op
□ Placebo per op

Guillou N et al. Anesth Analg 2003;97:843-847

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Ketamine reduces opioid induced hyperalgesia

- <u>Boo Hwi Hong </u>Effects of intraoperative low dose ketamine on remifentanil-induced hyperalgesia in gynecologic surgery with sevoflurane anesthesia. Korean J Anesthesiol. 2011; 61: 238.
- Same dose of remifentanyl with ketamine 25 mg vs without ketamine
- Ketamine 0,3 mg/kg followed by 3 ug/kg/min
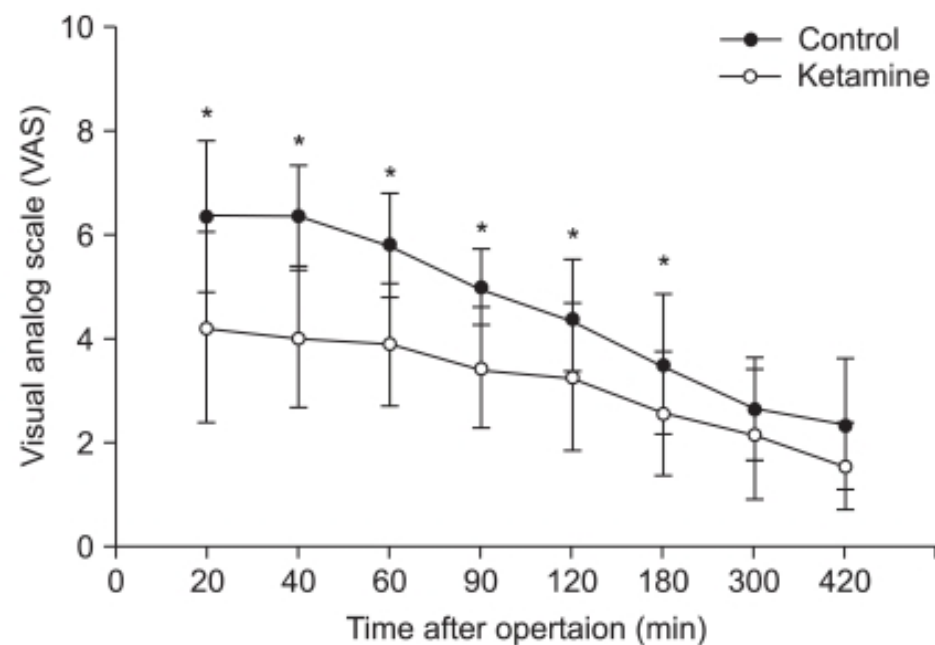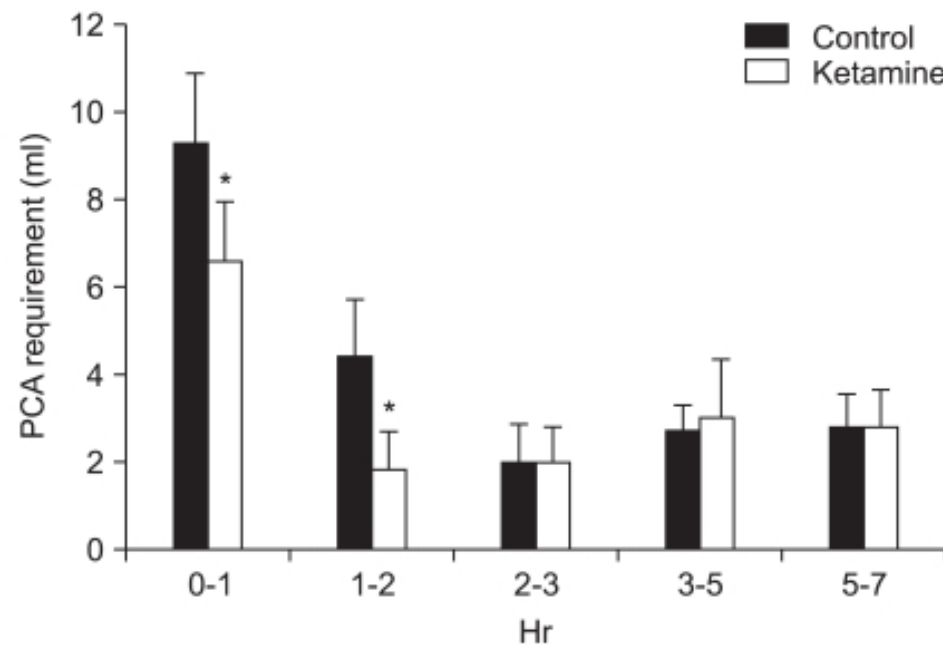
Effect of Mgsulfate on per-op opioids

- Kogler The analgesic effect of magnesium sulfate in patients undergoing thoracotomyJ Acta Clin Croat. 2009;48:19-26.

Thoracotomy patients received Fentanyl as required and 30-50 mg/kg MgSO4 followed by continuous infusion of 500 mg/h or placebo.

Fentanyl consumption during the operation was significantly lower in the Mg treated group versus placebo.

Effect of lidocaine on post-op opioid use

- McCarthy G. Drugs. 2010;70:1149-63. **Impact of intravenous lidocaine infusion on postoperative analgesia and recovery from surgery: a systematic review of randomized controlled trials.**

- 33% reduction vs placebo in opioid consumption postoperative.
  - when the lidocaine infusion was maintained for 1 hour

- 83% reduction vs placebo in opioid consumption postoperative.
  - when the lidocaine infusion was maintained for 24 hours.

- earlier return of bowel function, allowing for earlier rehabilitation and shorter duration of hospital stay. Duration of hospital stay was reduced by an average of 1.1 days in the lidocaine-treated patients.

- intravenous lidocaine did not result in toxicity or clinically adverse events.

Conclusion

- Many studies show a reduction in opioid use per operative and post operative if a non opioid additive is added.

If these drugs are combined in a multimodal approach is it possible to avoid all opioids per operative???

- Prof Marc de Kock (UCL Belgium) achieved this already several years before Dexmedetomidine became available in Europe using high dose clonidine –low dose ketamine and esmolol.

How should you start OFA?

1. Stop remifentanyl infusions, use only 10 ug sufentanil at induction. Measure anesthesia depth, blood pressure, HR; give low dose opioids before extubation.
2. add an alpha agonist (central direct sympathetic block)
   - Clonidine, 150 - 300 ug at induction dexmedetomidine infusion 0,5 – 1 ug/kg/h after induction,
3. keep peripheral B blocker as escape if tachycard
4. Indirect block of sympathetic effects
   - lidocaine bolus before induction,
   - increase to 1,5 MAC inhalation vapor,
   - Keep Nicardipine or other vasodilator as escape
5. start non opioid analgetics per operative
   - Low dose ketamine 10 – 20 mg,
   - Diclofenac, keterolac or parecoxib
   - Paracetamol, dexamethasone, droperidol (PONV?).
6. Epidural, plexus and local infiltration block of pain nerves

How to monitor anesthesia depth during opioid free anesthesia?

- Ketamine given at a hypnotic dosis of 1,5 mg/kg rises the BIS value. (we give ketamine in OFA dosis of 0,25 mg/kg IBW far below an hypnotic dosis.)

  - Wu CC. EEG-bispectral index changes with ketamine versus thiamylal induction of anesthesia. Acta Anaesthesiol Sin. 2001;39:11-5.

- BIS values are elevated by a bolus dose of isoproterenol, ketamine, neostigmine or sugammadex above 60 % while patients have no recall.

  - Dahaba AA. Effect of sugammadex or neostigmine neuromuscular block reversal on bispectral index monitoring of propofol/remifentanil anaesthesia. Br J Anaesth. 2012 Apr;108(4):602-6

  - Matthews R. Isoproterenol induced elevated bispectral indexes while undergoing radiofrequency ablation. AANA J. 2006;74:193-5

  No risk for awareness if you keep BIS below 60% during OFA.

Different OFA protocols used in Bruges

- OFA poor with low dose suf
  - Stop remifentanyl use
  - Use 10 ug suf at induction and 5 ug at end operation
  - Add additives peri operartive to learn its pharmacodynamic effects

- OFA 1 with Clonidine
  - If you do not have dexmedetomidine available
    - Post op morphine needed, start before extubation with 5 mg

- OFA 2 with Dexmedetomidine per op
  - Focus on per op avoiding opioids
  - Post op 50 % need morphine after 1 hour
  - Laparotomy, thoracotomy epid ormorphine needed

- OFA 3 with Dex per op and lA and low dose Dex post op
  - no opioids needed after laparoscopic surgery
  - Less mophine or epidural need post operative

OPA Opioid poor anesthesia

- Stop Remifentanyl use
- Use 10 ug suf at induction and 5 ug at end operation
- Add additives peri operartive to learn its pharmacodynamic effects

- Add 25 mg Ketamine (ketalar 0,5 cc)
  - More gives hallucinations

- Add 2,5 gr Mg sulf (MgSulf 5 cc) 40 mg/kg IBW
  - Hypotension and warm feeling if given awake

- Add Lidocaine 1,5 mg/kg IBW (80 kg: 6 cc Linisol 2%)
  - Ideal to block intubation stress

- Add Clonidine 150 ug (Catapressan 1 amp= 1 ml 150 ug)
  - Avoid if bradycardia (<45) and hypotension (SAP < 70)

OFA 1 with Clonidine

- If you do not have dexmedetomidine available
  - Post op morphine needed, start before extubation with 5 mg

- Three drugs (Clonidine 300ug, Ket 50 mg, Lid 300 mg, add H20 to 20 ml) given at 1 ml/10 kg IBW and followed by 0,5 - 1 ml/10 kg IBW/h adapt to HR/MAP BIS
  - Clonidine 0,75 to 1,5 ug/kg IBW followed by 0,75 to 1,5 ug/kg IBW/h
  - Ketamine 0,125 to 0,25 mg/kg followed by 0,125 to 0,25 mg/kg IBW/h
  - Lidocaine 1,5 mg/kg IBW followed by 1,5 to 3 mg/kg IBW/h

- MgSulfate 40 mg/kg IBW followed by 10 mg/kg IBW/h

- Propofol is given at 2,5 mg/kg IBW followed by inhalation anesthesia at 1,0 – 1,5 MAC with BIS between 40% and 60%

- Rocuronium if needed but less by potentiation by Mgsulf

- Have metoprolate and nicardipine available when tachycard or hypertensive. (DHB 0,6 mg remains to prevent PONV)

- Wound infiltration with local anesthetics, reduce total dose.

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OFA 2 with Dexmedetomidine per-op

- Focus on avoiding opioids per op
- 50 % need morphine after 1 hour post op
- Laparotomy, thoracotomy: epidural or morphine needed
- Three drugs (Dex 200ug, Ket 50 mg, Lid 300 mg, add H20 to 20 ml) given at 1 ml/10 kg IBW and followed by 1 ml/10 kg IBW/h adapt to HR/MAP
  - Dexmedetomidine 0,5 to 1 ug/kg IBW followed by 0,5 to 1 ug/kg IBW/h
  - Ketamine 0,125 to 0,25 mg/kg followed by 0,125 to 0,25 mg/kg IBW/h
  - Lidocaine 1,5 mg/kg IBW followed by 1,5 to 3 mg/kg IBW/h
- MgSulfate 40 mg/kg IBW followed by 10 mg/kg IBW/h
- Propofol is given at 2,5 mg/kg IBW followed by inhalation anesthesia at 0,6 – 0,8 MAC with BIS between 40% 60%.
- Rocuronium 0,6 – 1 mg/kg IBW followed by infusion 1 mg/kg IBW/h and based on TOF PTC (if NMB is needed).

You do not need every component at maximum dose.
Reduce dex, Mg, lido in elderly.

OFA 3 with Dex per- and post-op

- no opioids needed after laparoscopic surgery
- Less mophine or epidural need post operative
- **Procaine** 0,1 % max 3 mg/kg IBW/h 80 kg: 240 ml/h loading 100 ml
  - Post operative 1 to 3 mg/kg IBW/h. 80 ml/h
- Ketamine 25 mg bolus before induction; add 25 mg to procaine bag
- MgSulfate 40 mg/kg IBW followed by 10 mg/kg IBW/h
- **Droperidol** 1,25 mg at induction.
- **Dexdor** 0,5 tot 1 ug/kg (200 ug/50ml: 10 to 20 cc) slow bolus followed by Infusion 0,5 to 1 ug/kg/h.
  - Post operative 0,1 to 0,2 ug/kg/h.
- Propofol is given at 2,5 mg/kg IBW followed by inhalation anesthesia at 0,6 – 0,8 MAC with BIS around 40%.
- Rocuronium 0,6 – 1 mg/kg IBW followed by infusion 0,25 mg/kg IBW/h and based on NMT.

You do not need every component at maximum dose. Reduce dex, Mg, lido in elderly.

Post operative analgesia

- non steroidal anti-inflammatory agents
  - Paracetamol 2 gr loading 1 gr/6h
  - Diclofenac 150 mg loading, 2x75 mg/day
  - Or Keterolac 40 mg loading, 3 x 10 mg/day

- Local wound infiltration (calculate toxic dose!)

- and choice between
  - give low dose morphine or
  - keep infusion of sympathicolytica (ket dex lido Mg) at low dose without deep sedation
    - Ketamine 0,05 mg/kg/h
    - Lidocaine 1 mg/kg/h
    - Mgsulfate 10 mg/kg/h
    - Dexmedetomidine 0,1 – 0,2 ug/kg/h

Personal experience

- 2008 (self) Hypnosis without any medication.
  - Perfect sympathetic block without pain is possible

- 2010 Clonidine 300 ug, ketamine 25 mg, metoprolaat 5 mg added to 10 ug Sufentanyl.

- 2011 Clonidine 150 ug, ket 12 mg, lidocaine 1 mg/kg, esmolol infusion and no sufentanyl, 1,5 MAC inhalation.

- 2012 Dexmedetomidine, ketamine, lidocaine 1,5 -3 mg/kg, Mg Sulfate, bolus and infusion with 0,7 MAC inhalation.

- 2013 Dex, ket, procaine, Mg sulf, continue post op
  - 90 % of my anesthesias are OFA

HR, Sat, NIBP, etCO2

MAP drop at induction and at insufflation pneumoperitoneum
No hypertension after Dex

02%, BIS, TOF, PTC, airw pres

BIS drop at induction and remained stable for rest around 40
TOF 0 and PTC below 5
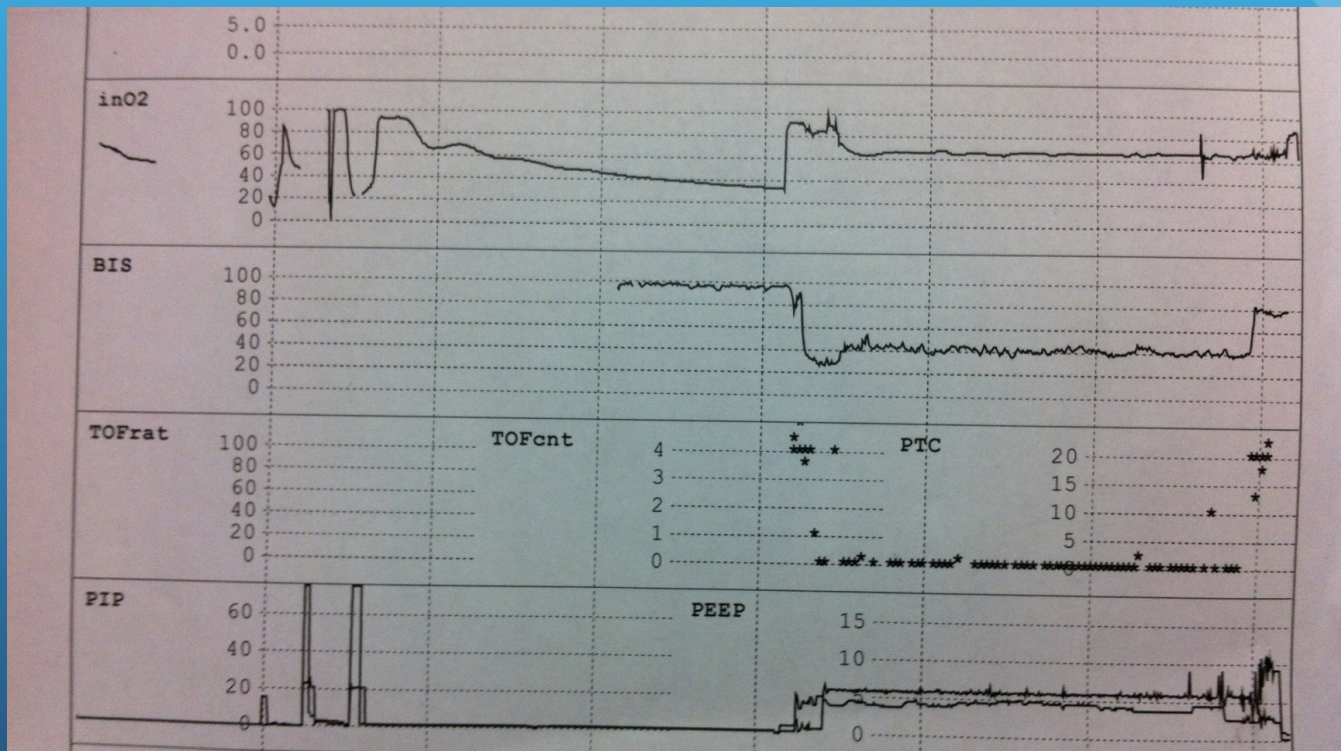
Peak airway pressures in mmHg

anaesthesie — 7 feb 13 11:07:04

:30 feb | 9:00 7 feb | 9:30 7 feb | 10:00 7 feb | 10:30 7 feb
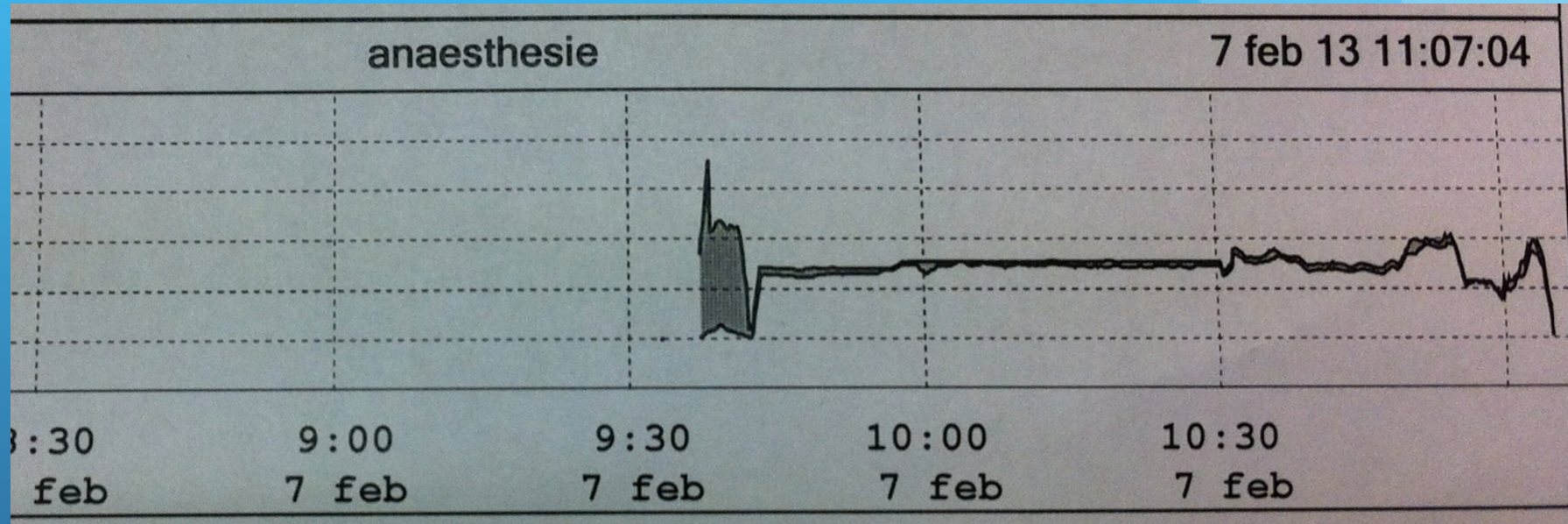
Note: Spont breathing   VCV with no variation   PSV with variation
awakening and CPAP

OFA Problems Peroperative

- Vasoconstriction during induction (dex loading)
  - Pale, white, hypertension, bradycardia
  - R/ nicardipine 1 mg , wait till prop/inhal is effective

- Insufficient sympathetic block
  - Tachycardia, hypertension
  - Betablocker, more inhalation, dex, lid extra

- Sympathetic block to strong
  - Bradycardia, hypotension
  - R/ Ephedrine

- Not enough vasoconstriction
  - Bloody surgical field
  - R/ beta blocker

OFA Problems Postoperative

- Not waking up post operative
  - Lower dose clonidine / stop-reduce dex pump earlier
  - Stimulate patient who will suddenly open his eyes and want to go asleep again.
  - Wait 15 minutes (Dex) or several hours (Clonidine)

- Pain when wakening up
  - Add morphine 5 mg iv at end surgery
  - Switch from clonidine to dexmedetiomidine
  - Did you add keterolac or diclofenac?
  - Are all multimodal elements given sufficient?

- Bradycardia, hypotension
  - No problem, accept HR 45 and SAP 90.
  - Ephedrine extra

OFA Good indications

- Obesitas and obstructive sleep apnea syndrome (OSAS)
- Asthma, COPD and other pulmonary diseases.
- Acute and chronic opioid addiction.
  - Analgesia with non-opioids to be painfree and to avoid relapses.
  - Huxtable 2011, Bryson 2010, Rundshagen 2010, Jage 2006, Stromer 2013
    - If heroine addict: substitution needed
    - If alcohol: add clonidine/benzo
    - If cocaine, amphetamines: avoid stress and craving
- Allergy, anaphylaxis for opioids? History of Histamine release.
  - Fentanyl-associated anaphylaxis (Fukuda 1986, Fischer 1991, Cummings 2007, Baldo B Anaesth Intensive Care 2012; 40: 216)
- Hyperalgesia problems. Are frequent but you have to ask.
- Complex regional pain syndromes (CRPS)
  - Causalgia, Suddeck's atrophy, Raynaud syndrome and reflex sympathetic dystrophy.
- Chronic Fatigue and Immune Dysfunction Syndrome?
  - Avoid histamine release, ponv prevention, Mg and K extra,
- Oncologic surgery?
  - Being pain free and stress free > immunosupression by morphine? Imani B Morphine use in cancer surgery Front pharmacol 2011; 2: 46

OFA Contra indications

- ## Absolute CI
  - Allergy to one of the drugs.? heart block, shock, extreme bradycardia

- ## Relative CI
  - Acute Ischemic problems due to coronary stenosis?
    - Add nicardipine for Coronary vasodilation
    - Slower loading of dexmedetomidine to avoid hypertension and vasoconstriction.
  - Controlled hypotension with need for dry surgical field by a low cardiac output.
    - Add more beta blockers, Mgsulfate at max dose,
  - Sympathetic dysfunctional syndromes with orthostatic hypotension.
    - Use less dexmedetomidine
  - Very old patients
    - Use lower dose dex

OFA a paradigm shift Today?

OFA: Inhalation/propofol   and non opioid
analgetics,

local anesthetics iv,   alpha agonists,

B blockers
          ketamine

1. hypnosis

**Amnesia
Hemodynamic stability
Immobilisation**

2. Sympathetic blockade   3. relaxation
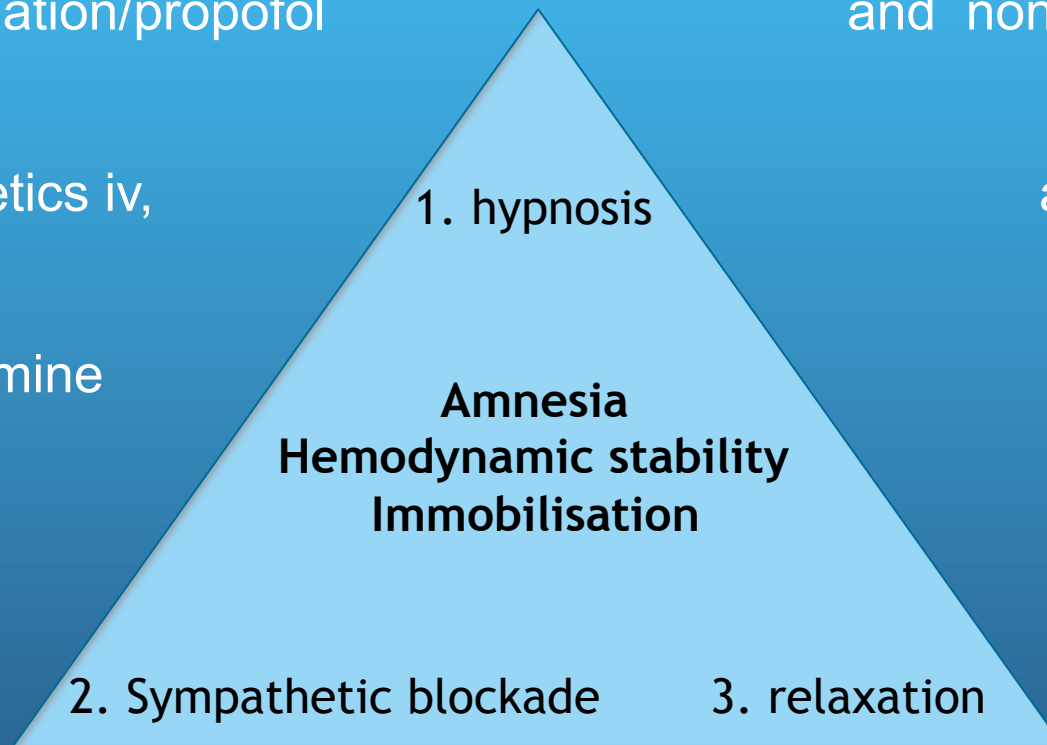
No analgesia needed during anesthesia
We need sympathetic stability to avoid organ dysfunction or damage

CAPE 2013

OFA

- Is possible.

- Is an alternative for opioid anesthesia!

- Is better for a selective group of patients!

- Might be usefull for most patients?

- When you know OFA, you will more often work with a low dose opioids.

- Be carefull: Do not start without agreement of your supervisor.

More research is needed before becoming evidence based.
Try it slowly and listen to your patients.
Working with less opioids by using additives and reduce its negative effects will be important too.

More info

More info

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Every ASO in anesthesia will learn to give OFA as well as opioid anesthesia in Bruges

az sint-jan
brugge - oostende av

Thanks !

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