



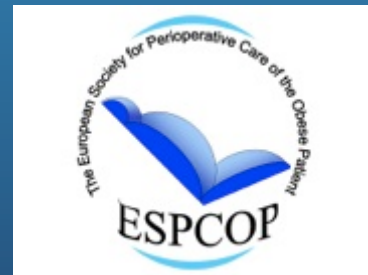
# Anaesthesia in the obese patient allowing fast-track, opioid free anaesthesia



B Dillemans  
Bariatric surgeon

Bariatric center  
Az Sint Jan Bruges Belgium  
> 1500 bariatric procedures / year

J P Mulier  
Bariatric anesthesiologist





# Non invasive ???

- Is Non invasive anesthesia possible?
  - Yes hypnosis: intensive concentration without loss of consciousness
  - but limited use: no relaxation, most patients can not be hypnotized, only short procedures, ..
- Can you do surgery without anesthesia ?
  - Yes local infiltration for non invasive surgery, but what sedation?
  - Locoregional anesthesia is even more invasive.
    - Hypnosis opened my eyes it means
      - being fully awake but having a **strong sympathetic** block
      - and not requiring analgesia
      - However Relaxation not possible, sedation is not possible and dangerous
- Can we achieve drug induced hypnosis effects ?
- Or can we induce strong sympathetic block avoiding opioids?
  - Yes and this is the paradigm shift today we started in two Belgium centers : OFA
    - Do we need this???

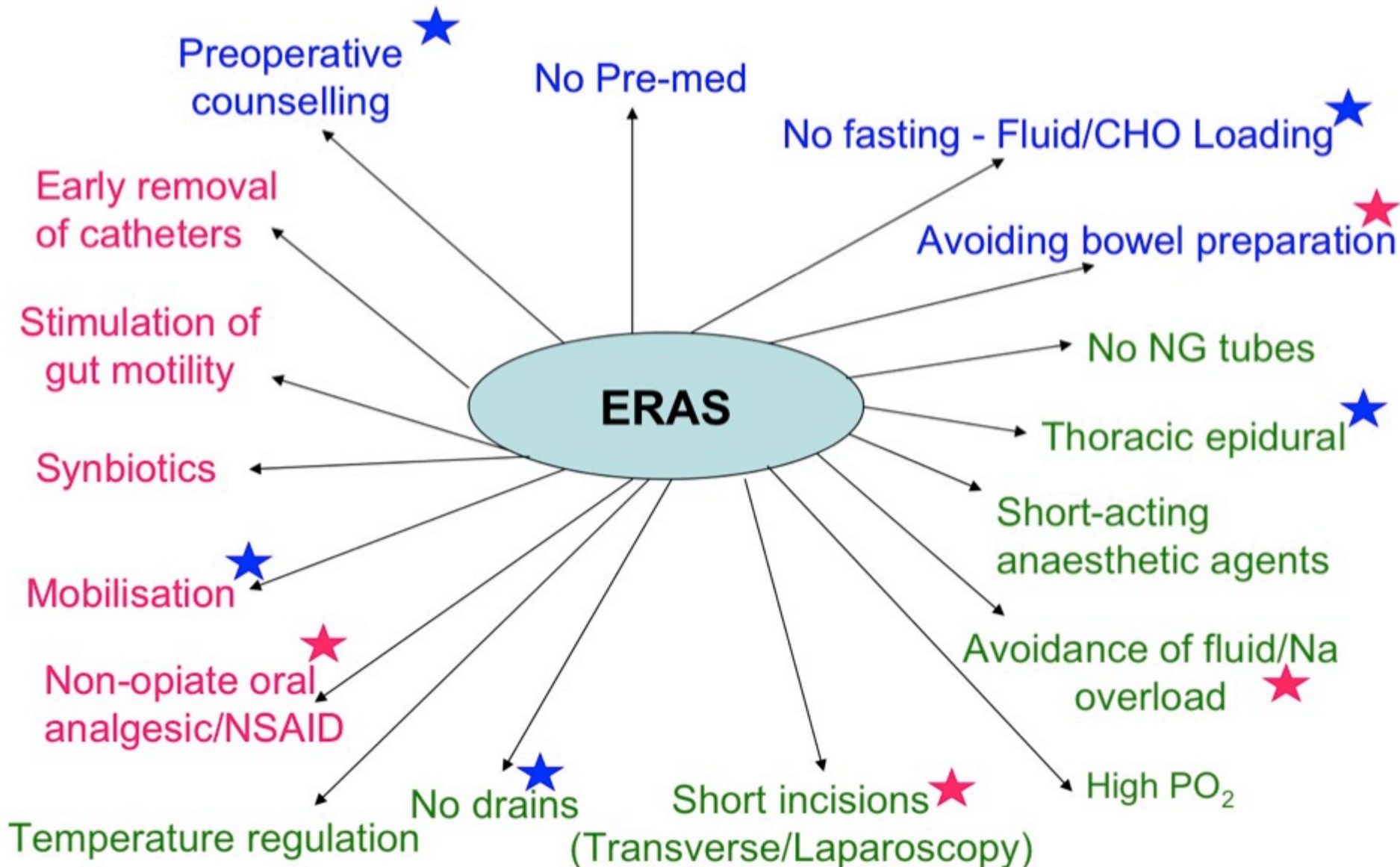
# From 'Fast Track to 'Enhanced Recovery'

- Multimodal recovery programme for elective bowel surgery.
  - Henri Kehlet Denmark 2001
  - Lassen K. ERAS Group recommendations. Arch surg 2009; 144: 961-969

Demonstrated that by limiting pain, promoting gut function and early mobilisation, length of hospital stay was reduced from 16 days to 2-3 days.

- Patients needed to be able to walk to the toilet, eat and hydrate themselves and be pain free

# Multimodal strategies to improve outcome



# Adapted ERAS protocol for **bariatric surgery**

- 1. Pre op elements
  - No premedication **no sedatives**, No prolonged fasting, drink 2 h before surgery
  - 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: permissive hypercapnia.**
  - Maintain normothermia **loading up with sufficient non opioid 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 and visualize ischemic zones**
  - **Strong leak test to avoid leaks**
- 3. Post op elements
  - **Full decurarisation to 90% and full awake before extubation.**
  - Non opioid oral analgesia/NSAIDs
  - Prevent PONV
  - No nasogastric tube and stimulation of gut mobility
  - Early removal catheters, mobilisation **legs and deep inspiration**, oral nutrition

# Non-opiate surgical anesthesia A Paradigm Shift?

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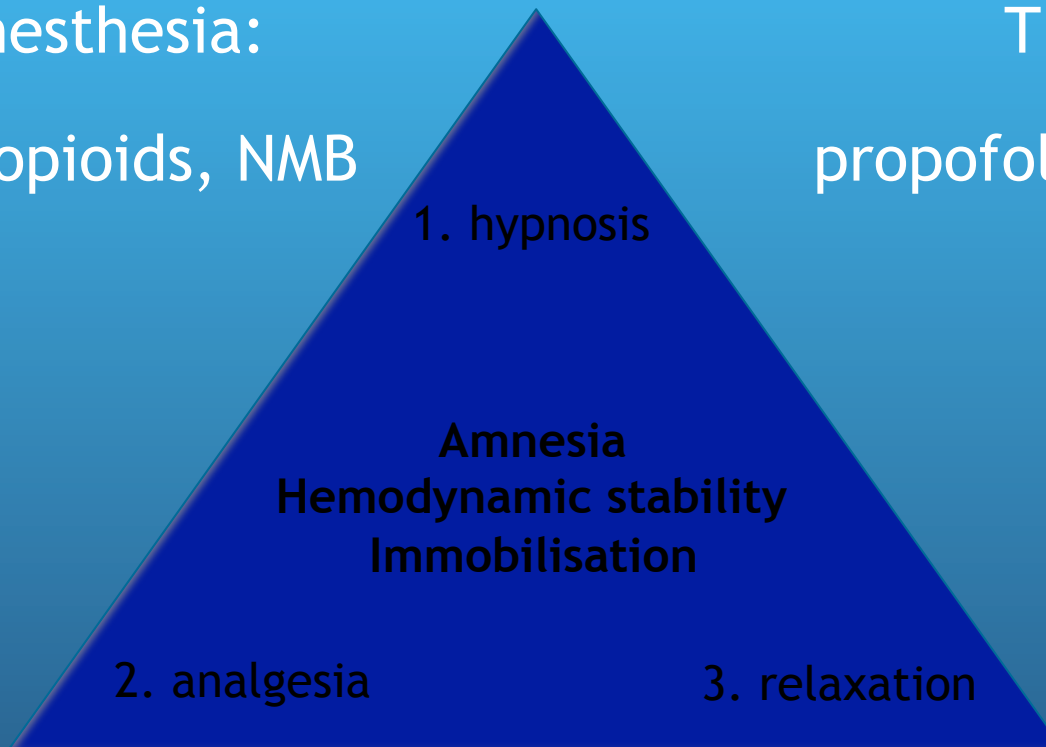
# We learned that we need 1. 2. 3.

Balanced anesthesia:

Inhalation, opioids, NMB

TIVA:

propofol, opioids, NMB



Do we need analgesia to achieve hemodyn stability?



Dr Paul Janssens, 1926 - 2003

*A second paradigm took place, also 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 collapse or histamine release.
- High doses possible having hypnotic effects, relaxant effects?
  - Neurolept anesthesia; stress free anesthesia; sedation; locoregional ..



# Why a new Paradigm today?

## 1. Immuno suppression by opioids?

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.

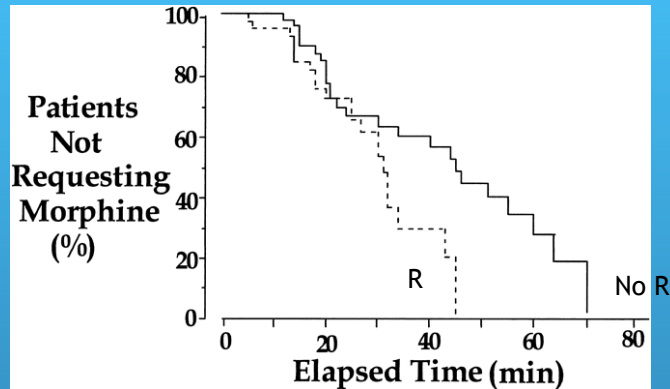
# Why a new Paradigm today?

**2. Opioids induced hyperalgesia?:** Patients receiving opioids become *more sensitive to pain*.

**3. *Crying in recovery from pain even in small procedures!***

- 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

# Hyperalgesia to opioids....



## Intraoperative Remifentanyl Increases Postoperative Pain and Morphine Requirements

(Guignard, Chauvin: Anesthesiology 2002)

Table 5. Independent Predictive Factors of Severe Postoperative Pain in the Postanesthesia Care Unit

	Odds ratio	95% Confidence interval	P
High sufentanil dose <sup>a</sup>	2.68	[1.68–4.29]	<0.001
General anesthesia (vs regional)	3.96	[1.14–13.81]	0.03
Preoperative analgesics	1.91	[1.15–3.18]	0.01

<sup>a</sup> High dose sufentanil = dose >0.6 µg/kg.

## 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.

# Why opioid free in bariatric surgery?

- Being full awake, pain free and without respiratory depression is very important in morbid obese patients.

## Recommendations from OSAS

1. Avoid opioids post operative in OSAS **to avoid obstructive breathing** (Opioids induce upper airway collapse and exacerbate OSAS)

## Recommendations from ERAS

2. Avoid opioids post operative **to improve bowel function and enhance recovery after surgery**
  3. **Obesity** is a chronic pro-inflammatory disease that exposes to chronic post surgical pain.
  4. **Avoid immunosuppression** (= no opioids): improve healing
- Isono S. Obesity and obstructive sleep apnoea: mechanisms for increased collapsibility of the passive pharyngeal airway. *Respirology*. 2012;17:32-42.

# What do we need, peri-op?

Per operative 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?

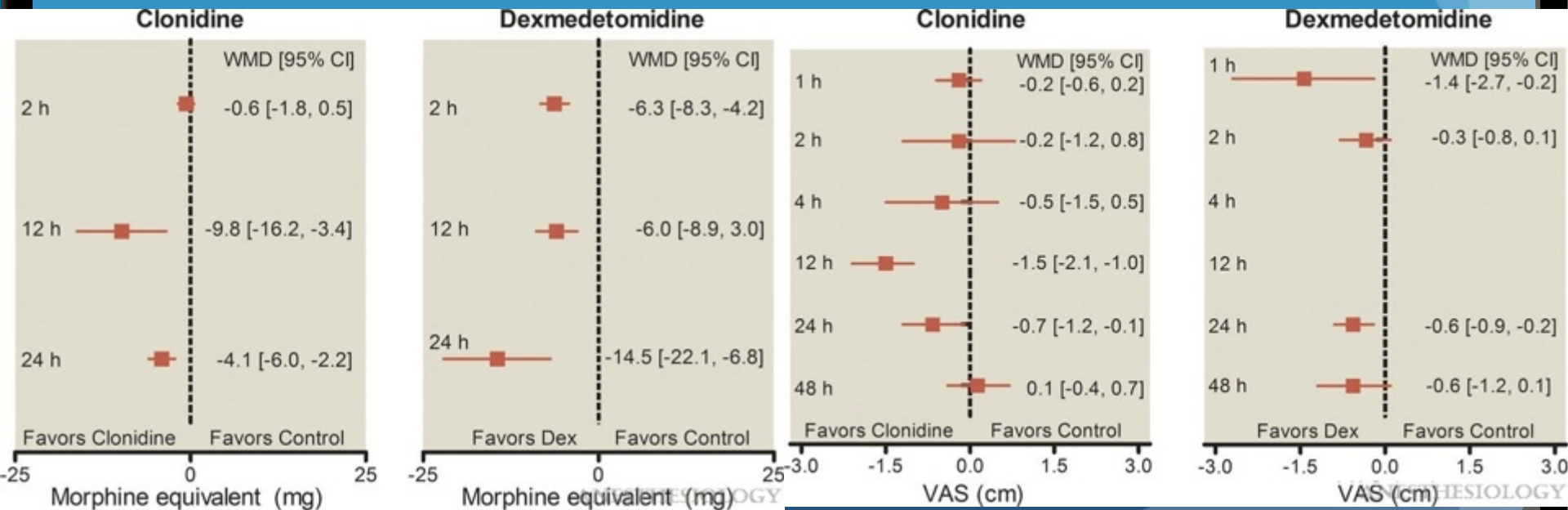
- Direct **sympathetic block** central - peripheral
  - Clonidine, Dexmedetomidine, B blockers
- Indirect block of sympathetic effects
  - Nicardipine, lidocaine, Mg sulfate, inhalation vapor
- **Multimodal analgetics** (non opioids) loading up pre operative to be active when waking up.
  - low dose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

# 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

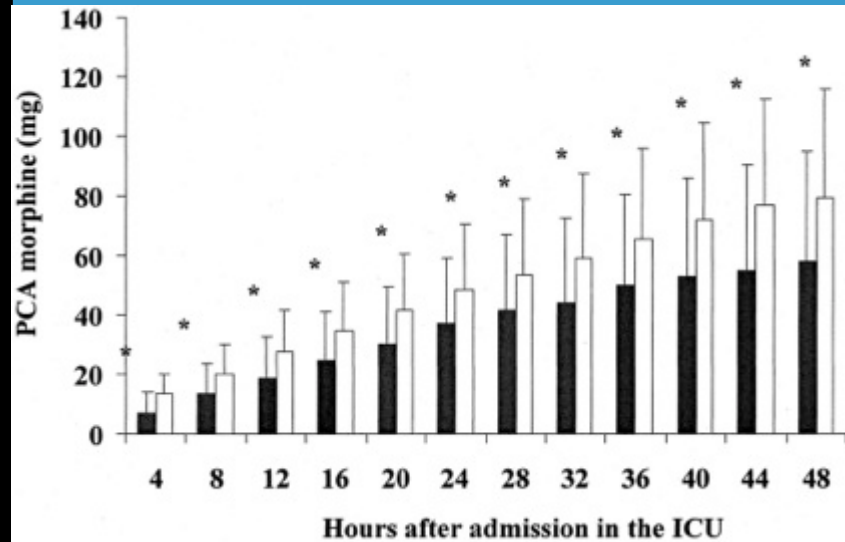
VAS post OP



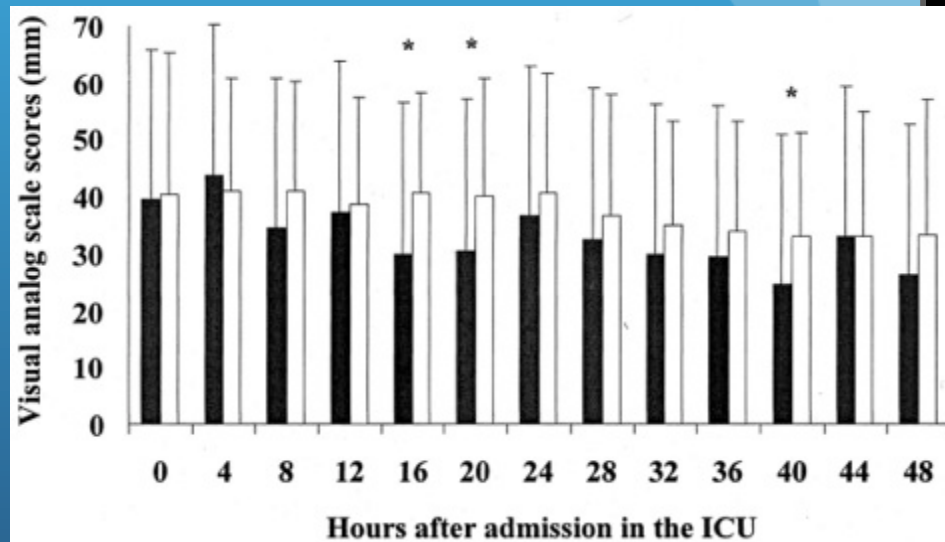
# Effect of ketamine on post-operative opioid use

- 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.



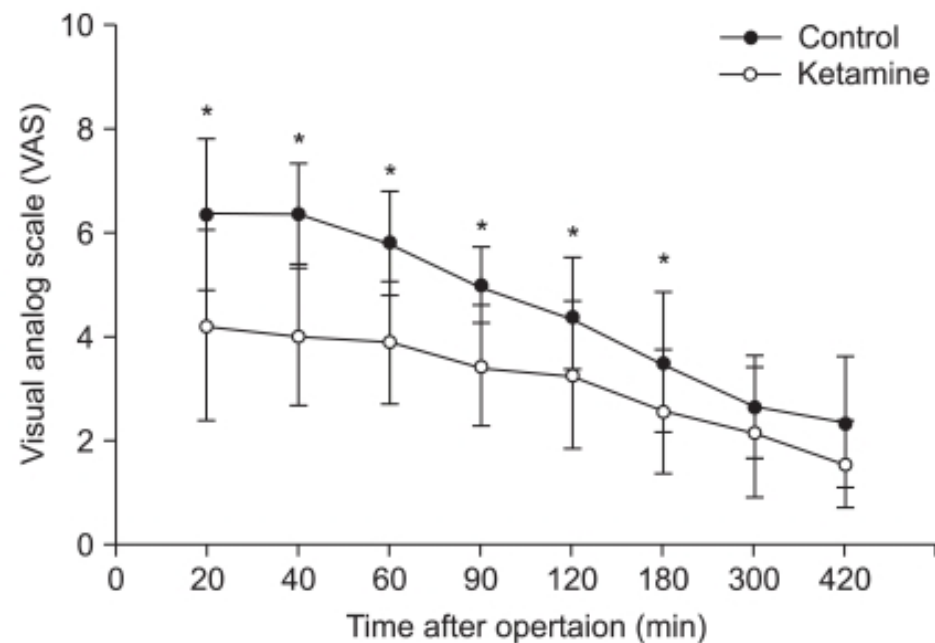
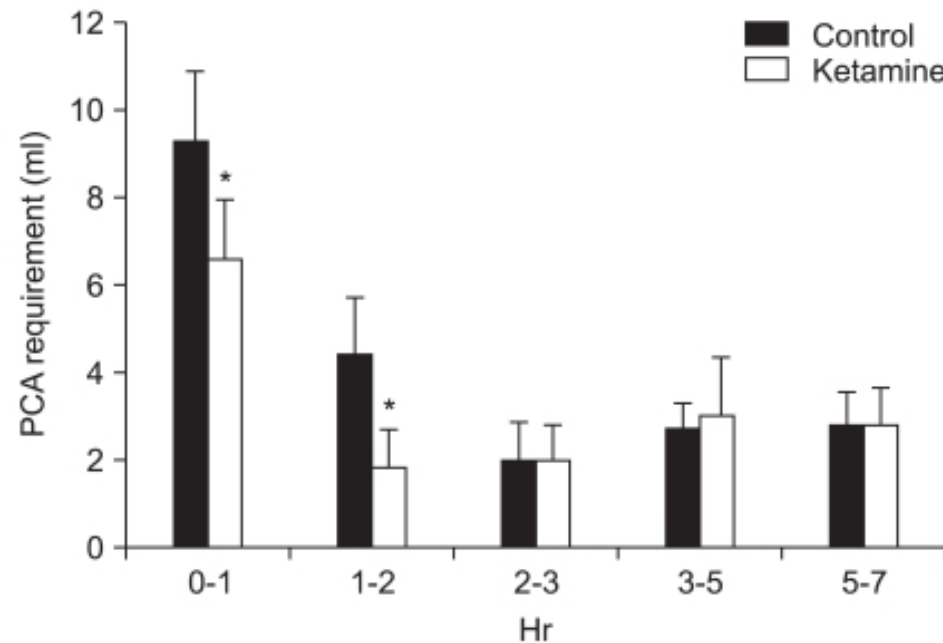
■ Ketamine per op  
□ Placebo per op

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



# Ketamine reduces opioid induced hyperalgesia

- Boo Hwi Hong Effects of intraoperative low dose ketamine on remifentanyl-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 thoracotomy J Acta Clin Croat. 2009;48:19-26.

Thoracotomy patients received Fentanyl as required and 30-50 mg/kg MgSO<sub>4</sub> 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???

## Natural hypnosis?

- 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.



No analgesia  
is not  
vivisection!

# OFA Protocol Sint Jan Brugge with Dex

- Three drugs ( Dex 200ug, Ket 50 mg, Lid 300 mg, add H2O 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 around 40%.
- Rocuronium 0,6 - 1 mg/kg IBW followed by infusion 1 mg/kg IBW/h and based on TOF PTC (if NMB is needed).

# 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
  - Continue with clonidine 2 x 75 ug/day or give low dose morphine
  - 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 Bruges

- 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.
  - 50 % of bariatric aneshtesia's were OFA
- 2012 Dexmedetomidine, ketamine, lidocaine 1,5 -3 mg/kg, Mg Sulfate, bolus and infusion with 0,7 MAC inhalation.
  - 90 % of bariatric anesthesia's were OFA
- 2013: 90 % of all my anesthetics are OFA, including trepanation, cardiac surgery, orthopedics, emergencies,...



# Why OFA today ?

- Surgeons don't see the difference during laparoscopy
  - Deep NMB is a must
  - Short turn over times remains possible
- Patients love it
  - Less pain, can take a kip in the recovery and have a good first night sleep.
- Nurses in the recovery room love
  - Patients transfer themselves in bed (hoovermat only for > 200 kg)
  - Never a patient crying from pain or difficult to handle
  - No mayo canules for obstructive breathing, better saturation
  - Bradycardia, hypotension but less bleeding
- Nurses on the ward love it
  - Less calls, less pain, no nausea, no itching, calm and happy, not feeling high, no PCEA pumps needed
  - But Patients want to get out of bed same day
- Anesthesiologist don't believe it until they visit Bruges
  - But changing a habit is so difficult even if it is proven to be better
  - "I have always done it my way and I never had a problem"

**If you don't look you can not see what happen.**



## Example of a live case<sup>26</sup> lap RNY man BMI 48 Rome feb 2013

- Anesthesia induction Ketamine: 35 mg; Lidocaine: 210 mg; Dexmedetomidine: 140 ug; Rocuronium: 158,1 mg; desflurane 0,8 MAC; paracetamol 3 gr. Ctu infusion started.
- 10:00 incision: insufflation of abdomen and APVR calculation.
- 11:16 start Lap Roux and Y gastric bypass procedure. TOF 0
- 10:55 TOF 0 last stitch: stop infusion. Sugammadex 400 mg
- 11:01 TOF = 100 %
- 11:06 patient awake when called, extubation.
- 11:08 patient full awake, no pain, feels happy to hear that operation is finished and had sufficient force to move himself painfree in bed at 11:14.
- 11: 18 incision next lap RNY.

# Awakening after OFA

02%, BIS, TOF, PTC, airw pres

# Peak airway pressures in mmHg

# Bed transfer: 4 -> 2 p now 1 p with OFA

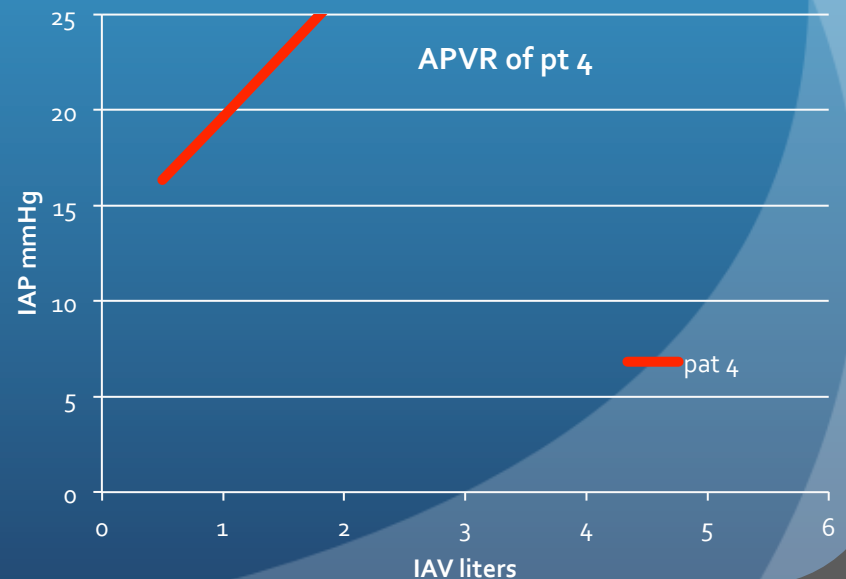
Patients transfer  
themselves in bed.

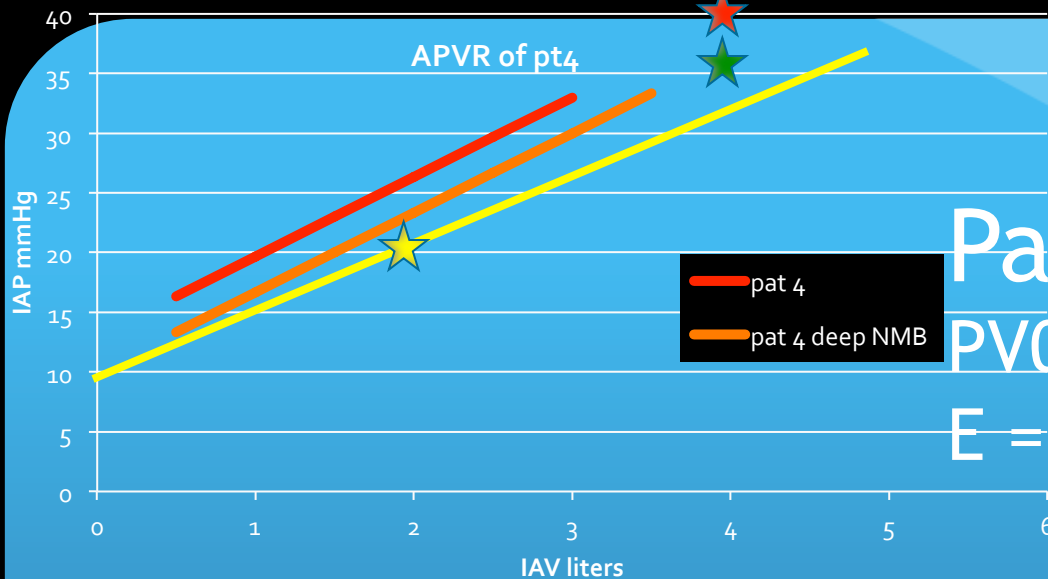
No lifting,  
no turning,  
no noise

## But sometimes workspace problems Patient 4

- 58 Years old man of 178 cm and 154 kg TBW.
  - intra abdominal obesity (WHR = 1,06),
  - He did a lot of sports 10 years ago but became inactive and gained weight. His BMI is now 48,6.
  - No abdominal operation in the past.
- The measured abdominal compliance is 0,15 liter/mmHg and the PV0 is +13 mmHg.

- What would you do?
  - High PV0; non compliant abd





## Patient 4

PV0 = 13

E = 0.15 L/mmHg

- To get a volume of 4 liters we need an IAP of  $13 + 4/0,15 = 40$  mmHg.
- Deep NMB drops the PV0 to 10 but the IAP to achieve 4 liters is still 36 mmHg.
- The surgeon might be able to work in a small workspace ? At 20 mmHg, 1,5 l.
- Peep, anti trendelenburg reduce the space, but less peep is not an option.
- permissive hypercapnia with smaller tidal volumes but this has a limited value.
- Hip flexing rises the compliance to 0,2 and gives 500 ml at IAP of 20 mmHg.
- Switch to an open laparotomy, cancel the case and request the patient to loose at least 10kg body weight or request to increase shortly the IAP above 20 mmHg.



Instead of high IAP we ventilate the abdomen with CO<sub>2</sub> between 2 Pressures

# Problems Perioperative with OFA

- 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 too strong
  - Bradycardia, hypotension
  - R/ Ephedrine
- Not enough vasoconstriction
  - Bloody surgical field
  - R/ beta blocker

# 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 dexmedetomidine
  - Did you add keterolac or diclofenac?
  - Are all multimodal elements given sufficient?
- Bradycardia, hypotension
  - No problem, accept HR 45 and SAP 90.
  - Ephedrine extra

# Good indications for OFA

- Obese patients and patients with OSAS
- Asthma, COPD and other pulmonary diseases.
- Acute and chronic opioid addiction.
  - Sufficient analgesia, preferential with non-opioids is essential also in long-term abstinence to avoid relapses.
    - If heroine addict: substitution
    - If alcohol: use clonidine/benzo
    - If cocaine, amphetamines: avoid stress and craving
- Allergy, anaphylaxis for opioids? Histamine release.
  - Fentanyl-associated anaphylaxis (Baldo B Anaesth Intensive Care 2012; 40: 216)
- Hyperalgesia problems. Is frequent but you have to ask.
- Complex regional pain syndromes (CRPS)
  - Suddeck's atrophy, Raynaud syndrome and reflex sympathetic dystrophy.
- Oncologic surgery?
  - Being pain free and stress free more important than immunosuppression by morphine? Pro -contra opioids.
    - Imani B Morphine use in cancer surgery Front pharmacol 2011; 2: 46

# Contra indications for OFA

- Absolute CI
  - Allergy to one of the drugs.?, heart block, shock, extreme bradycardia
- Relative CI
  - Acute Ischemic problems due to coronary stenosis?
    - Add nicardipine to give 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
  - Sympathetic dysfunctional syndromes with orthostatic hypotension.
    - Use less dexmedetomidine
  - Very old patients

More research is needed before becoming evidence based. Try it slowly and listen to your patients.

More info

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