Anesthesia in FESS ,Rhinoplasty and ear surgery



MJ Van Boven

1 Janvier

Jour de l'An

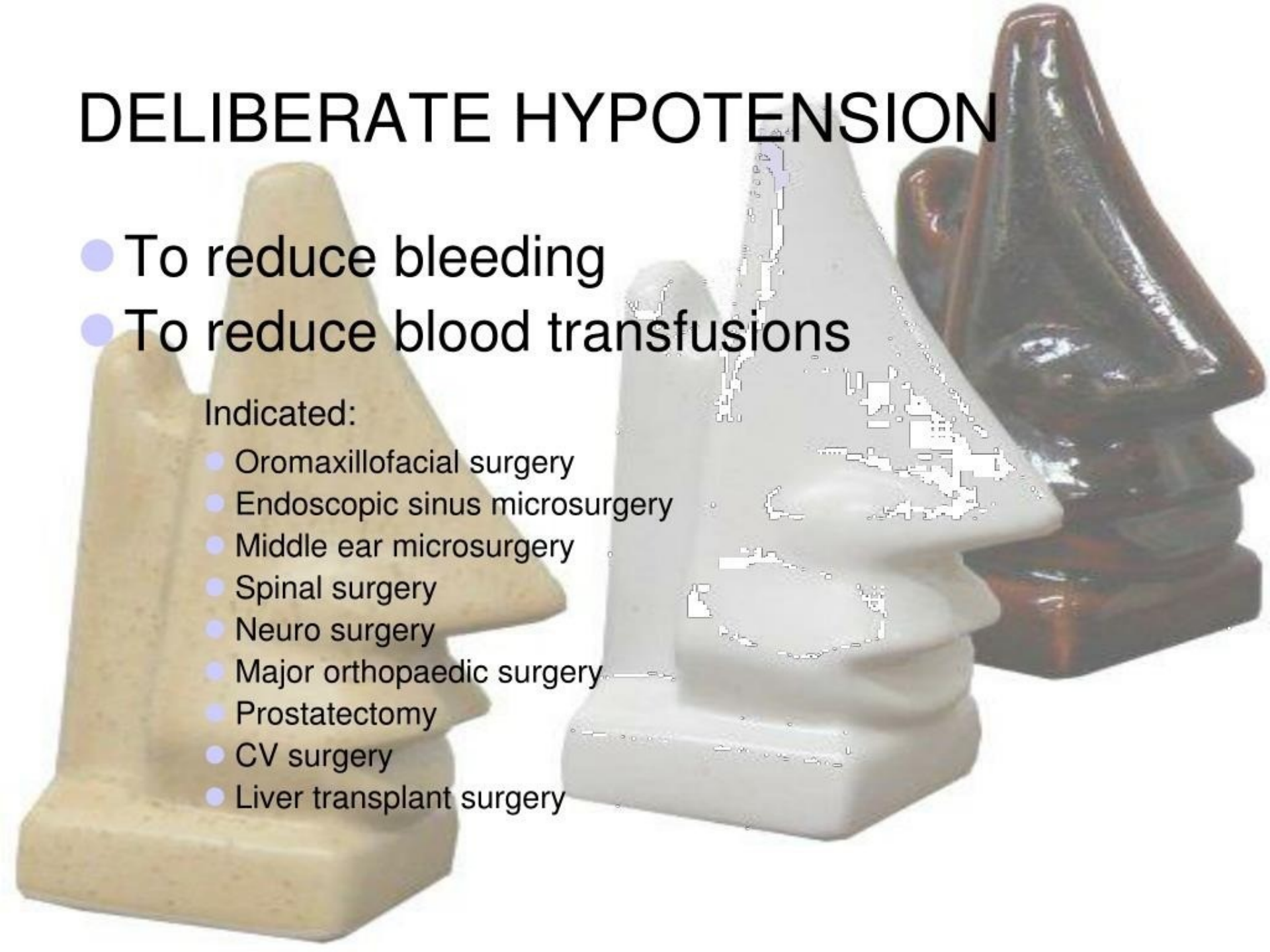


DELIBERATE HYPOTENSION

- To reduce bleeding
- To reduce blood transfusions

Indicated:

- Oromaxillofacial surgery
- Endoscopic sinus microsurgery
- Middle ear microsurgery
- Spinal surgery
- Neuro surgery
- Major orthopaedic surgery
- Prostatectomy
- CV surgery
- Liver transplant surgery



DELIBERATE HYPOTENSION

DEFINITION:

- Reduction of the systolic blood pressure to 80-90mmHg
- Reduction of mean arterial pressure (MAP) to 50-65 mmHg
- 30% reduction of baseline MAP

DRUG. 2007; 67 (7): 1053-76

“The” question: is there still a place For deliberate hypotension in ent Surgery?

RELATIVE CONTRA INDICATIONS TO INDUCED HYPOTENSION

- Ischemic cerebrovascular desease
- Coronary artery desease
- Hypovolemia
- Anemia
- Severe hypertension
- Extremes of age



COMPLICATIONS OF DELIBERATE HYPOTENSION

COMPLICATION	INCIDENCE(%)	COMMENT
Cerebral thrombosis	0,1 – 0,2	
Coronary artery thrombosis	0,3 – 0,7	
Renal failure	0 – 0,2	
Hepatic failure		
Postop pulmonary dysfunction		
Rebound hypertension		
Increased bleeding at operative site		Inadequate hemostasis (due to hypotension)

Cerebral complications following induced hypotension
Pash et al
Anesthesiology 1986; 3:299-312

mortalité d'origine vasculaire: 0.02-0.06%

Complications associated with the use of "controlled hypotension" in anesthesia
Hampton et al
Arch. Surg. 1953;67:549.

vertiges, retard de réveil, thrombose

Paramètres physiologiques du saignement:

-pression artérielle moyenne
-flux
-densité du réseau capillaire
-tonus veineux
-posture

La pression artérielle moyenne

-fonction du débit cardiaque

-contractilité

-fréquence cardiaque

-fonction des rvp

-vasodilatation périphérique*

-tonus vasoconstricteur sympathique

La vasodilatation périphérique diminue le débit tissulaire local en réduisant la pam

Reduction of bleeding : general means

Vasodilatation ↘ blood pressure

Fluid loading ↘ Heart rate

Opioids

Hyperventilation ↘ F_ECO_2 (3.5-4 %)

Deliberate hypotension

- Head and neck: 1/3 cardiac output
- Bleeding physiopathology:
  - Capillar
    - Précapillar sphincters
      - Inflammatory status, local tonus, pCO_2
  - venous
  - arteriolar
    - Vascular resistance
    - Cardiac output

L'hypotension contrôlee diminue la pression Artérielle en diminuant:

-le débit cardiaque

-et/ou les résistances vasculaires

La vasodilatation périphérique est modifiee

-par diminution du tonus vasoconstricteur

-action directe sur les muscles lisses

Reduction of bleeding : position

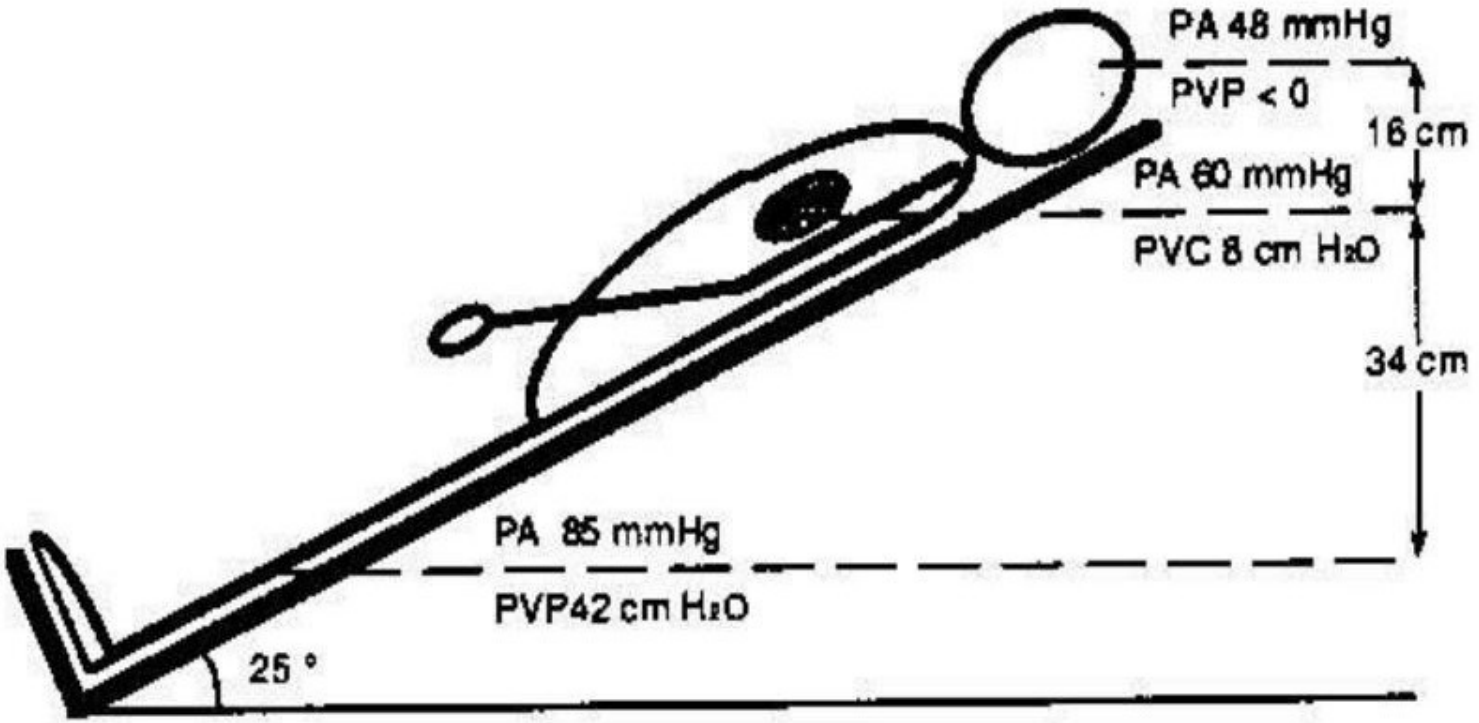
10-15° head up tilt position

Head position : head rest

rotation

- controlateral ear
- jugular vein
- bracchial plexus
- carotid artery

Position:



Artérial and venous pressure

DELIBERATE HYPOTENSION AGENTS

- USED ALONE:
  - Inhalation anaesthetics
  - Sodium nitroprusside
  - Nitroglycerin
  - Trimethaphan
  - Prostaglandine E1
  - Adenosine
  - Remifentanil
  - Agents for spinal anaesthesia
- ALONE OR COMBINED:
  - Calcium channel antagonists
  - Beta-Blockers
  - Fenoldopam
- COMBINED:
  - ACE inhibitors
  - Clonidine



BLEEDING FACTORS IN FESS

- Local metabolic mechanisms
- Hormonal mechanisms
- Neuronal mechanisms
- Myogenic mechanisms

Regulating:

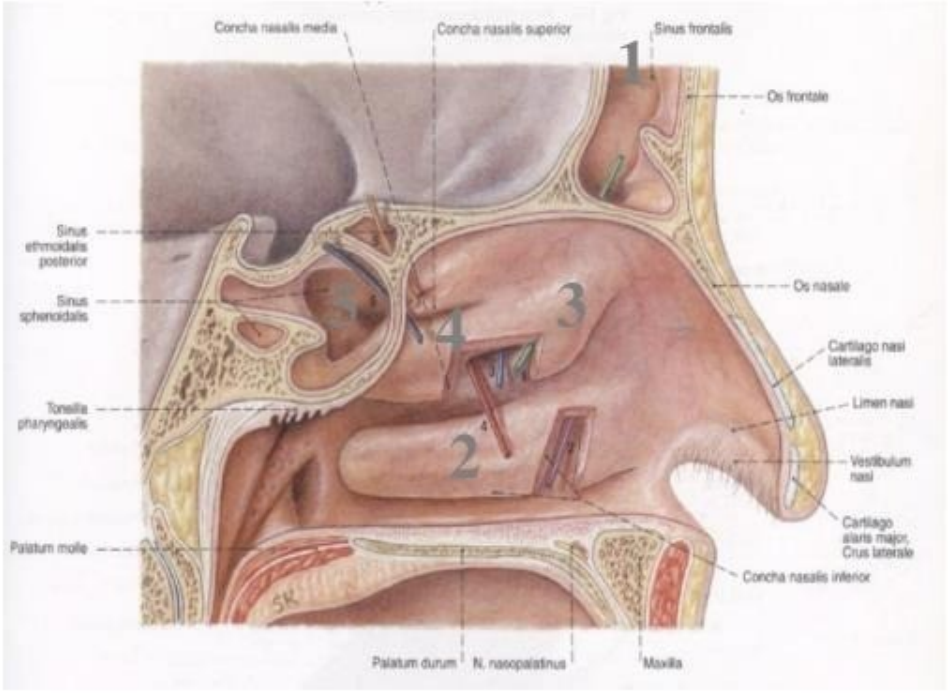
- Functional capillary density
- Local venous pressure



J. Physiol.1986; 373:261-75

AM J. Resp. Crit. Care Med.2000; 161:133-6

Anatomie & physiologie



1. Sinus frontal
2. Sinus maxillaire
3. Cellules ethmoïdales antérieures

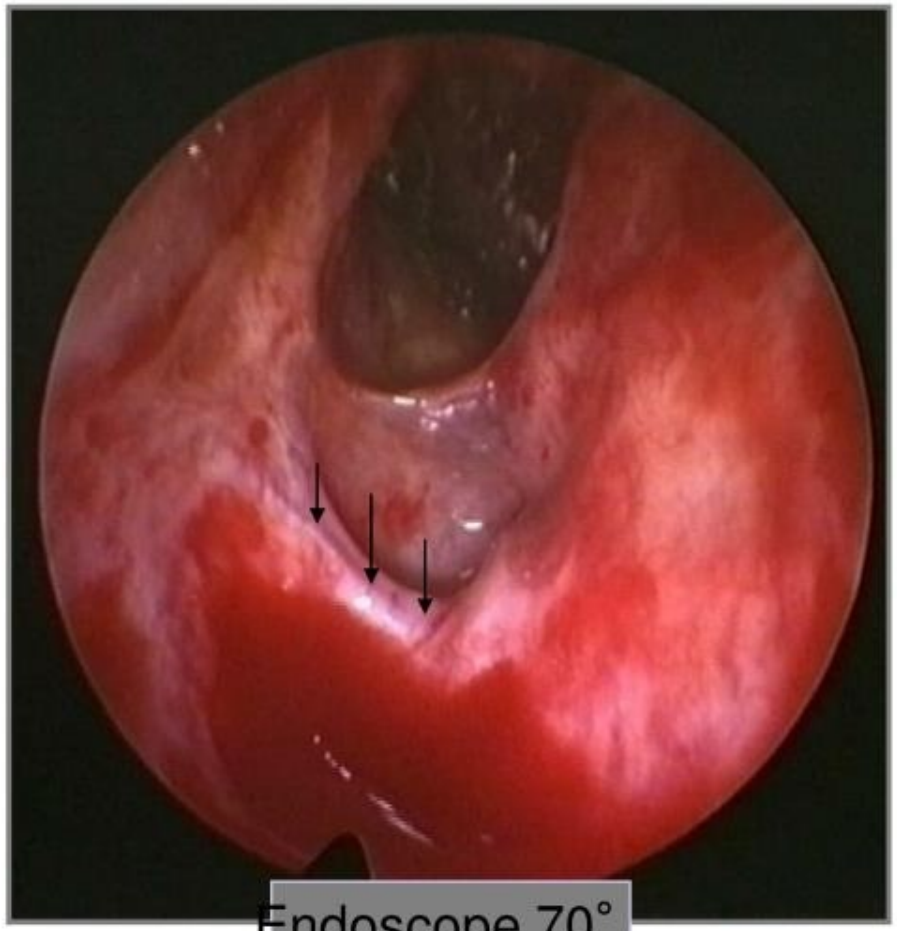
Méat moyen

4. Cellules ethmoïdales postérieures

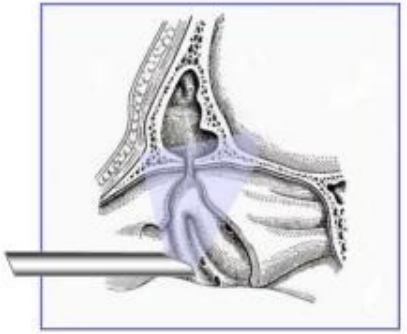
Méat supérieur

5. Sinus phénoïde

L'artère ethmoïdale antérieure



Endoscope 70°



PREDICTION OF BLOOD LOSS DURING FESS

- Severity of pre-existing sinus desease
- Duration of surgery

No effect of : - Low MAP

Can J. Anaesth. 1995; 42:373-6
Laryngoscope 2004; 144:1042-6

- Deliberate hypocapnia

Anesth. Analg. 2007 nov; 105 (5): 1404-9

DELIBERATE HYPOTENSION: NEW TECHNIQUES

- Use the natural hypotensive effects of anaesthetic drugs with regard to the definition of the ideal hypotensive agent:
  - Easy to administer
  - Short onset time
  - Disappears quickly when stopped
  - Rapid elimination
  - No toxic metabolites
  - Negligible effect on vital organs
  - Predictable effect
  - Dose dependent effect

Remifentanil Key Concepts

- Remifentanil is an OPIOID
- Pure μ agonist
  - little binding at κ, σ, and δ receptors
- The effects of remifentanil are identical with other commonly used opioids
  - fentanyl
  - alfentanil
  - sufentanil

DELIBERATE HYPOTENSION: NEW TECHNIQUES

- Epidural anaesthesia

- Remifentanil: - Propofol
- Remifentanil: - Isoflurane
  - Desflurane
  - Sevoflurane

Epinephrine and inhalation anesthetics
5.4 mcg/kg with isoflurane
10 mcg/kg with sevoflurane
10 mcg/kg with desflurane

BJA 2008 Jan; 100(1): 50-4
Rhinology 2007 mar; 45 (1): 72-8
Eur J. Anaesthesiol 2007 may; 24 (5): 441-6
AM J. Rhinol 2005 sept-oct; 19 (5): 514-20
Laryngoscopie 2003 aug; 113 (8): 1369-73

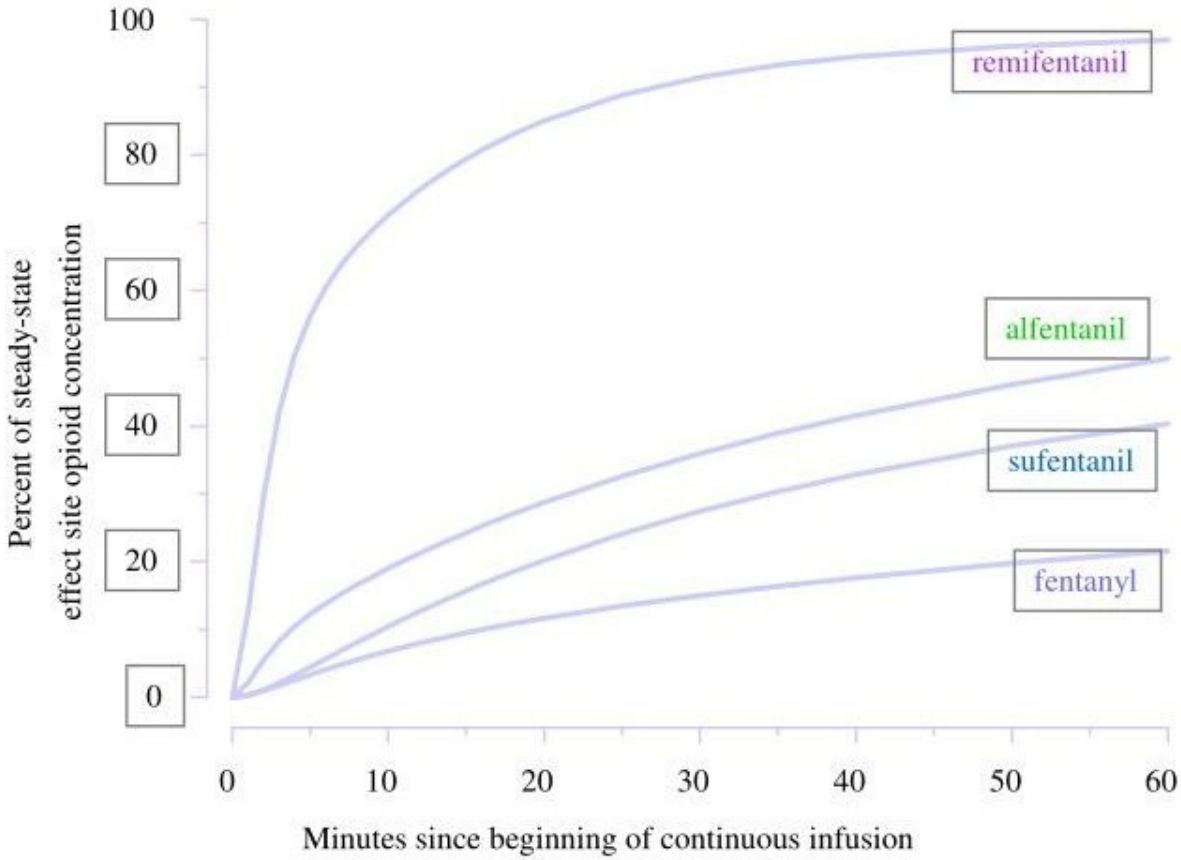


General anaesthesia

	Induction	Maintenance	
Propofol $\mu g.ml^{-1}$	2.5 $mg.kg^{-1}$	200 $\mu g.kg^{-1}.min^{-1}$	3-6
		TIVA TCI	
Remifentanil $ng.ml^{-1}$	1 $\mu g.kg^{-1}.min^{-1}$	0.05-2 $\mu g.kg^{-1}.min^{-1}$	4
		Inhalational balanced anaesthesia	
Desflurane or Sevoflurane	2-2.5 % CAM	0.7-1.2 % CAM	

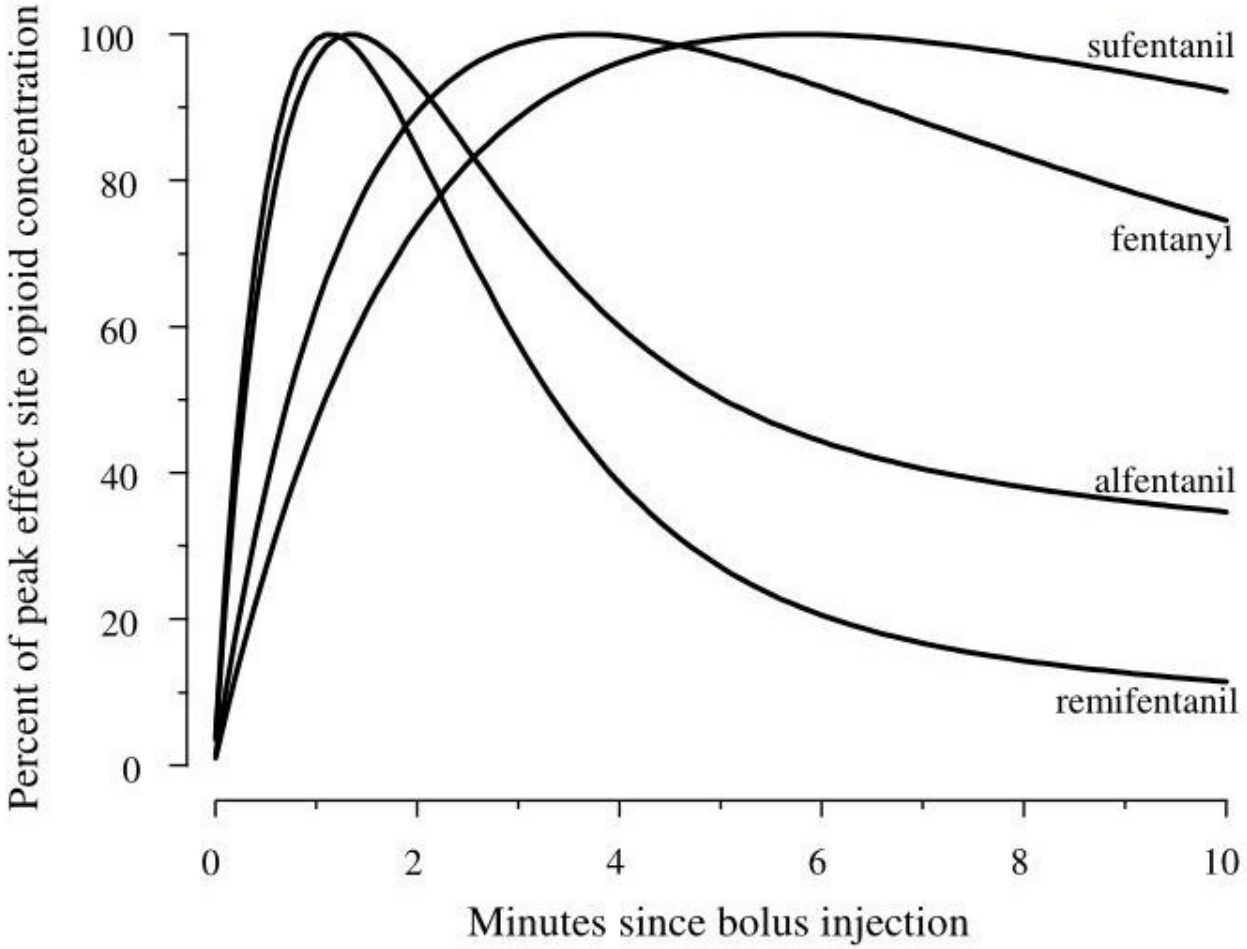
Rapid rise to steady state

- Continuous downward titration in infusion rate is not necessary for remifentanil
  - Unlike fentanyl, alfentanil, and sufentanil



Shafer SL, ASA Refresher Course, Chapter 19, 1996

Remifentanil vs. other opioids

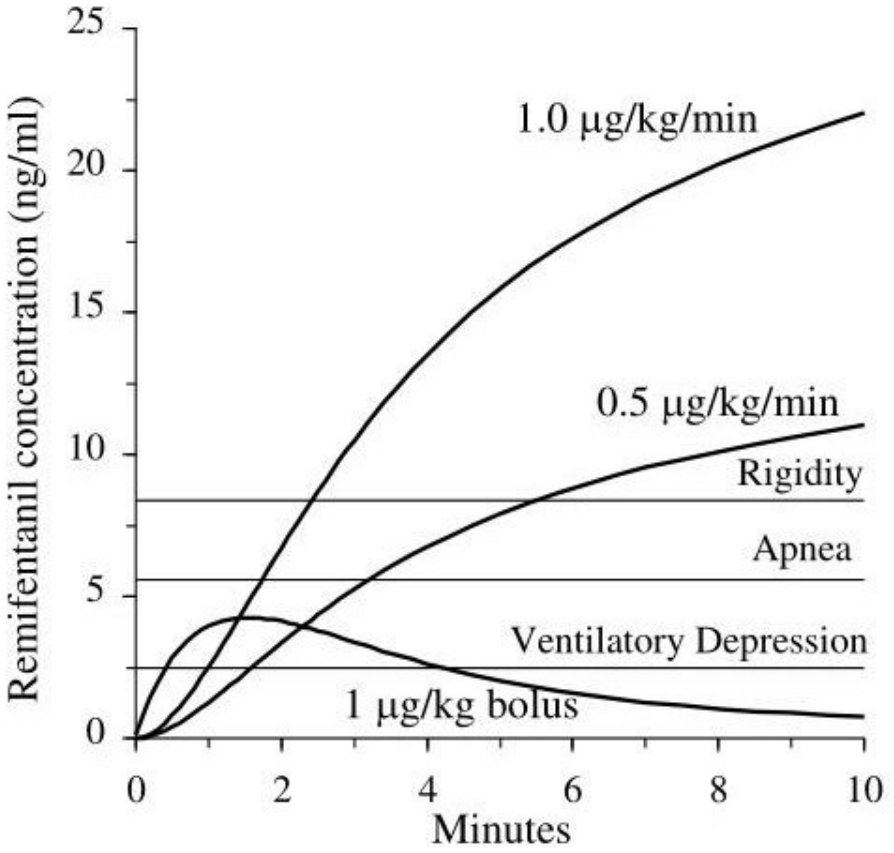


Anesthesiology 1997;86:10-23

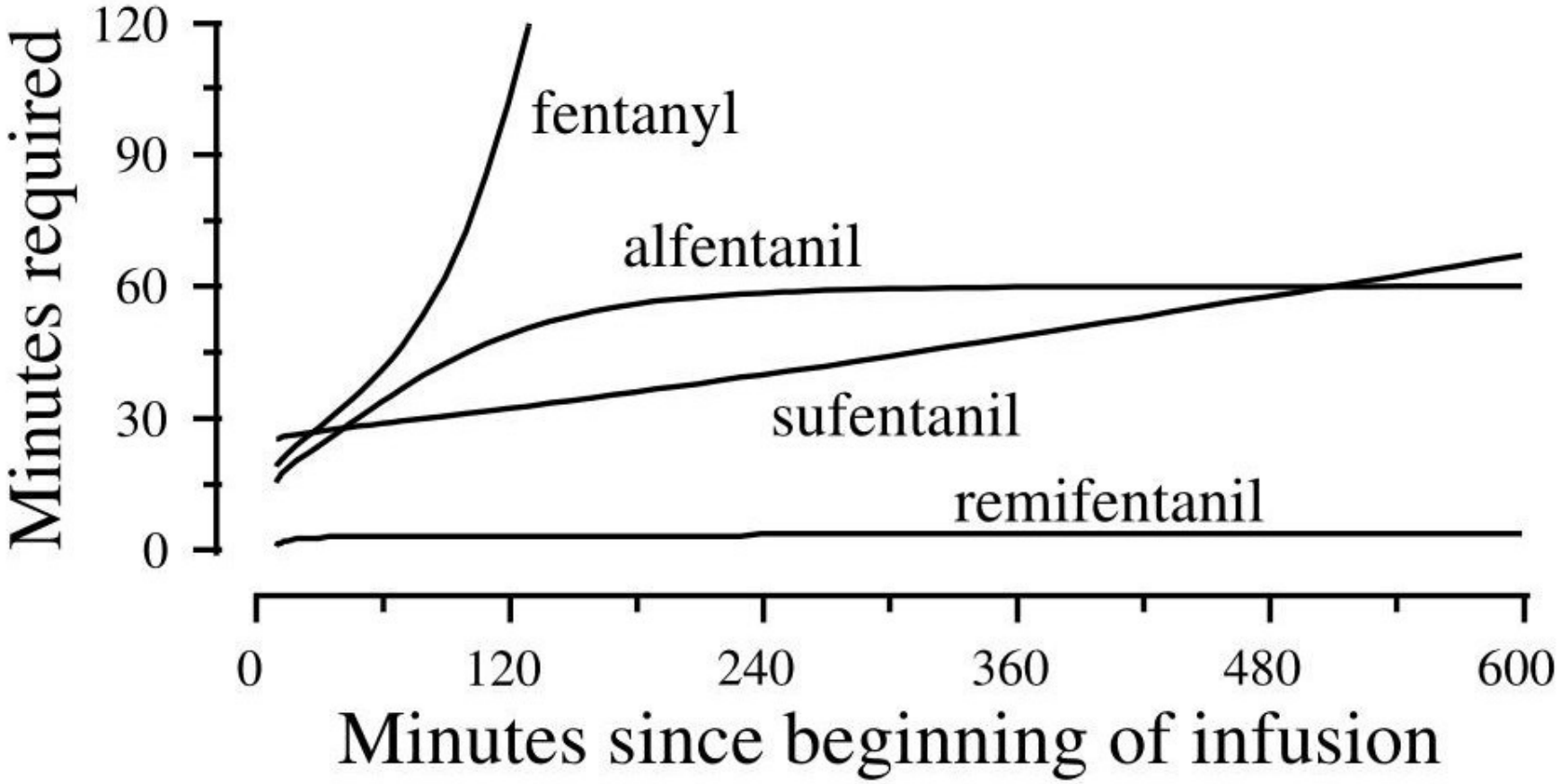
Induction: Bolus vs Infusion

Concentrations rapidly rise during infusions. With infusions, expect apnea and rigidity within 2-3 minutes.

Especially at a rate of 1.0 mcg /kg/min



50% effect site decrement curves



Shafer SL, ASA Refresher Course, Chapter 19, 1996

Remifentanil-induced postoperative hyperalgesia and its prevention with small-dose ketamine.
Joly V et al
Anesthesiology. 2005 Jul; 103 (1): 147-155

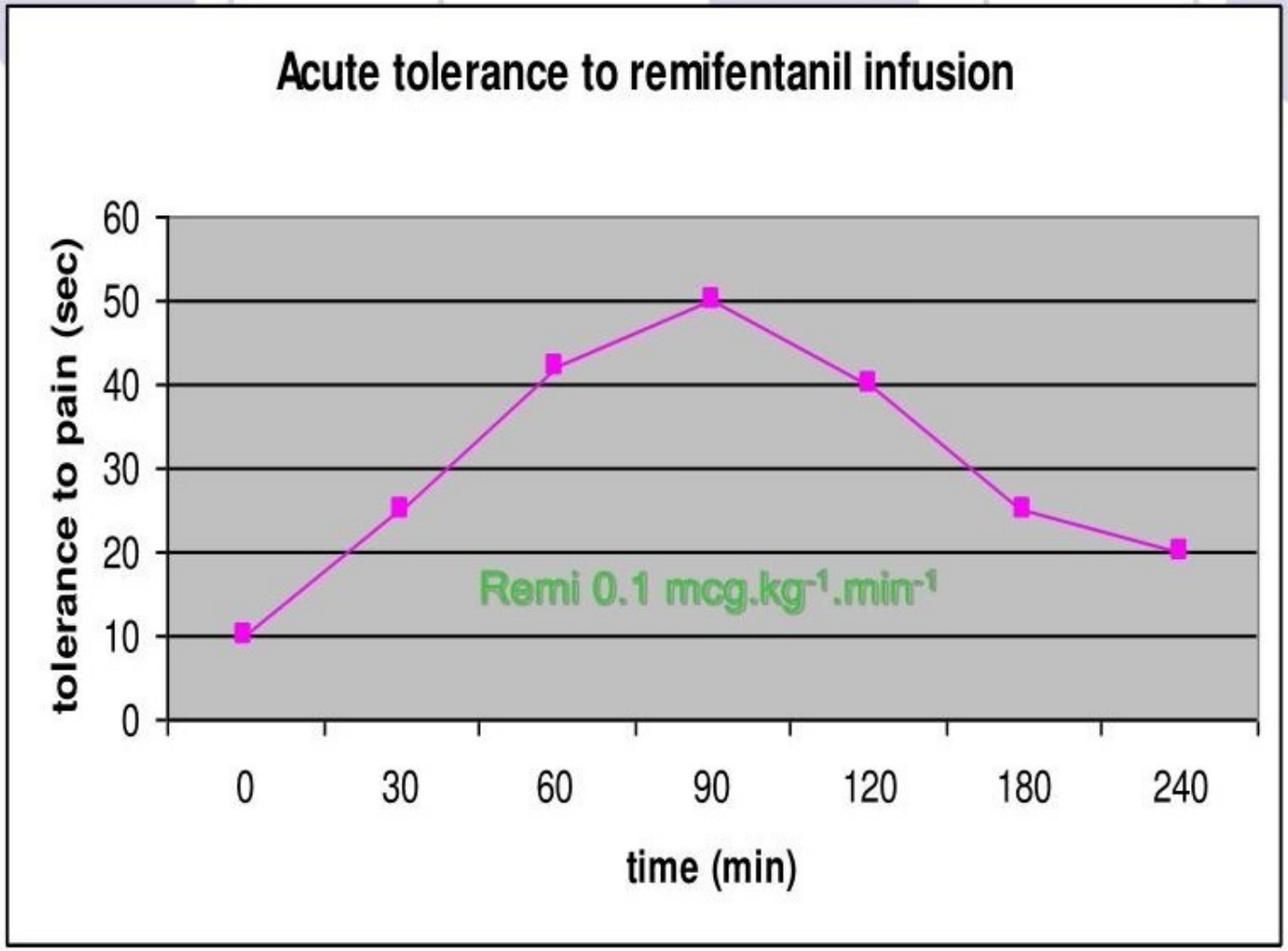
Opioid anesthetics (sufentanil and remifentanil) in neuroanesthesia
Vivian X and Garnier F
Ann Fr Anesth Reanim. 2004 Apr; 23(4): 383-388

Short-term infusion of the mu-opioid agonist remifentanil in human causes hyperalgesia during withdrawal.
Angst et al
Pain. 2003 Nov; 106 (1-2):49-57

Intravenous remifentanil produces withdrawal hyperalgesia in volunteers with capsaicin-induced hyperalgesia.
Hood DD et al
Anesth Analg 2003 Sep; 97 (3): 810-5

Acute opioid tolerance: intraoperative remifentanil increases postoperative Pain and morphine requirement.
Guignard B et al
Anesthesiology. 2000 Aug; 93(2): 409-17.

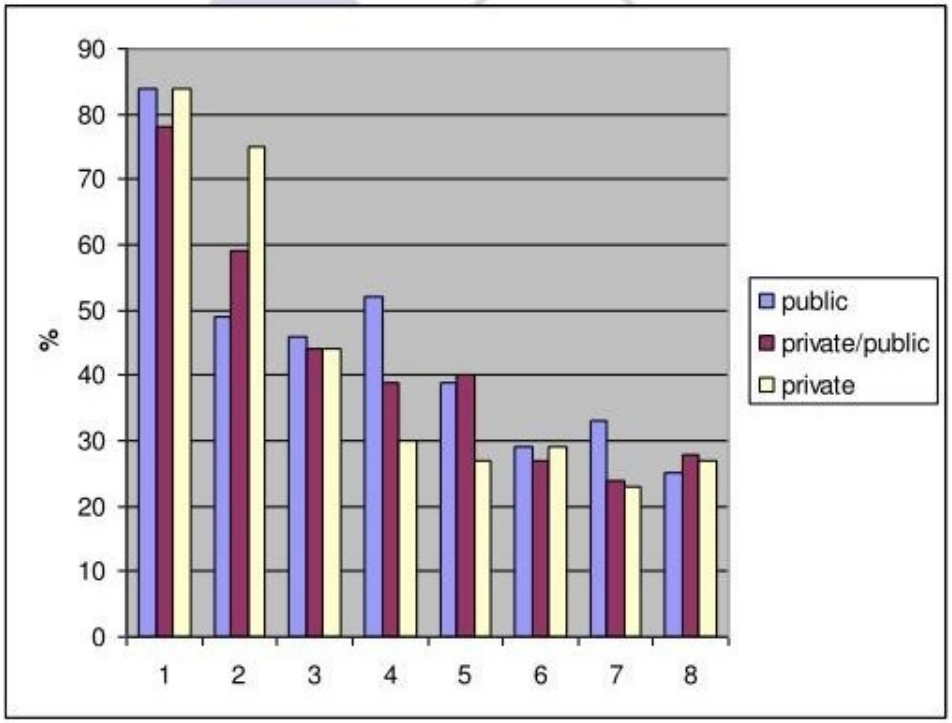




Vinik and Kissin Anesth Analg 1998 ; 86 : 1307-11.

TABLEAU 1. APR-DRG retenus pour la fixation des séjours hospitaliers classiques inappropriés.

025 Interventions sur le système nerveux pour affections des nerfs périphériques
071 Interventions intraocculaires excepté cristallin
072 Interventions extraocculaires excepté sur l'orbite
073 Interventions sur le cristallin avec ou sans vitrectomie
093 Interventions sur sinus et mastoïde
094 Interventions sur la bouche
097 Adénoïdectomie et amygdalectomie
098 Autres interventions sur oreille, nez, bouche, gorge
114 Pathologies dentaires et orales
115 Autres diagnostics d'oreille, nez, bouche, gorge
179 Ligature de veine et stripping
226 Interventions sur anus et orifices de sortie artificiels
313 Interventions des memb.inf. et genoux excepté pied
314 Interventions du pied
315 Interventions épaule, coude et avant-bras
316 Interventions majeures main, poignet
317 Interventions des tissus mous
318 Enlèvement matériel de fixation interne
319 Enlèvement matériel du système musculosquelletique
320 Autres interventions du système musculosquelletique et tissu conjonctif
361 Greffe cutanée et/ou debridement excepté ulcere et cellulite
364 Autres interventions sur les seins, la peau et le tissu sous-cutané
446 Interventions urétrales et transurétrales
483 Interventions sur les testicules
484 Autres interventions sur le système génital masculin
501 Autres diagnostics à propos des organes génitaux masculins
513 Interventions sur utérus/annexes, pour carcinome in situ et aff. bénignes
515 Interventions sur vagin, col et vulve
516 Ligature tubaire par voie laparoscopie
517 Dilatation, curetage, conisation
544 Avortement, avec dilation, aspiration, curetage ou hystérectomie
850 Interventions avec des diagnostics d'autre contact



1: patient's confort
2: costs
3: « image »
4: work organisation (medic and paramedic)
5: better link with gp
6: less complications
7: customers increase
8 :patient's responsabilisation

French national survey 2001
5181questionnaires
4712 answers

Patient satisfaction

Outpatient: > 90% satisfied
88 % ok in the future

Inpatient: 22-58 % would have refused

Why are patients suspicious?
-anesthesia
-security
-age
-« be alone »
-Pain

Isolation-complication

In the US, patients are more satisfied with ASC (98%).

-convenient scheduling
-cost-effective
-less stressful
-highly regulated (85% Medicare certified)

Federated Ambulatory Surgery Association

Factors affecting unanticipated hospital admission following otolaryngologic day surgery

Tewfik MA et al

J Otolaryngol, 2006 aug; 35 (4): 235-41

-1106 patients included (2000-2004)
- 74 (6.7%) required admission
- procedures involved: open neck biopsy (27%)
  FESS (20.3%)
  panendoscopy (20.3 %)

Reasons for admission:

airway monitoring (37.7%)
postoperative bleeding (28.6%)
inadequate pain management (19.5%)
anesthetic complications (5.2%)
cardiovascular complications (3.9%)
clerical error (3.9%)
suspicion of cerebrospinal fluid leak (1.3%)

Day-case septoplasty and unexpected re-admissions at a dedicated day-case unit: a 4-year audit

C Georgalas et al

Ann R Coll Surg Engl 2006;88:202-206

-nasal surgery controversal for day-surgery

-high readmission rate of septoplasty-procedures (13.4%)(previous study GB)

-4 years period (1998-2002), 432 cases of septal surgery

-38 unexpected readmissions (8.8%)

-bleeding (p=22,58 %)

-medical reasons (p=9,24%)

-patients request, dvt prophylaxis (p=7,18%)

Factors associated with re-admission:

-use of intranasal splints

-revision surgery

-submucous resection

-additional procedures (ESS)

-preoperative use of Diclofenac

Standards (Royal College of Surgeons): 3% readmission

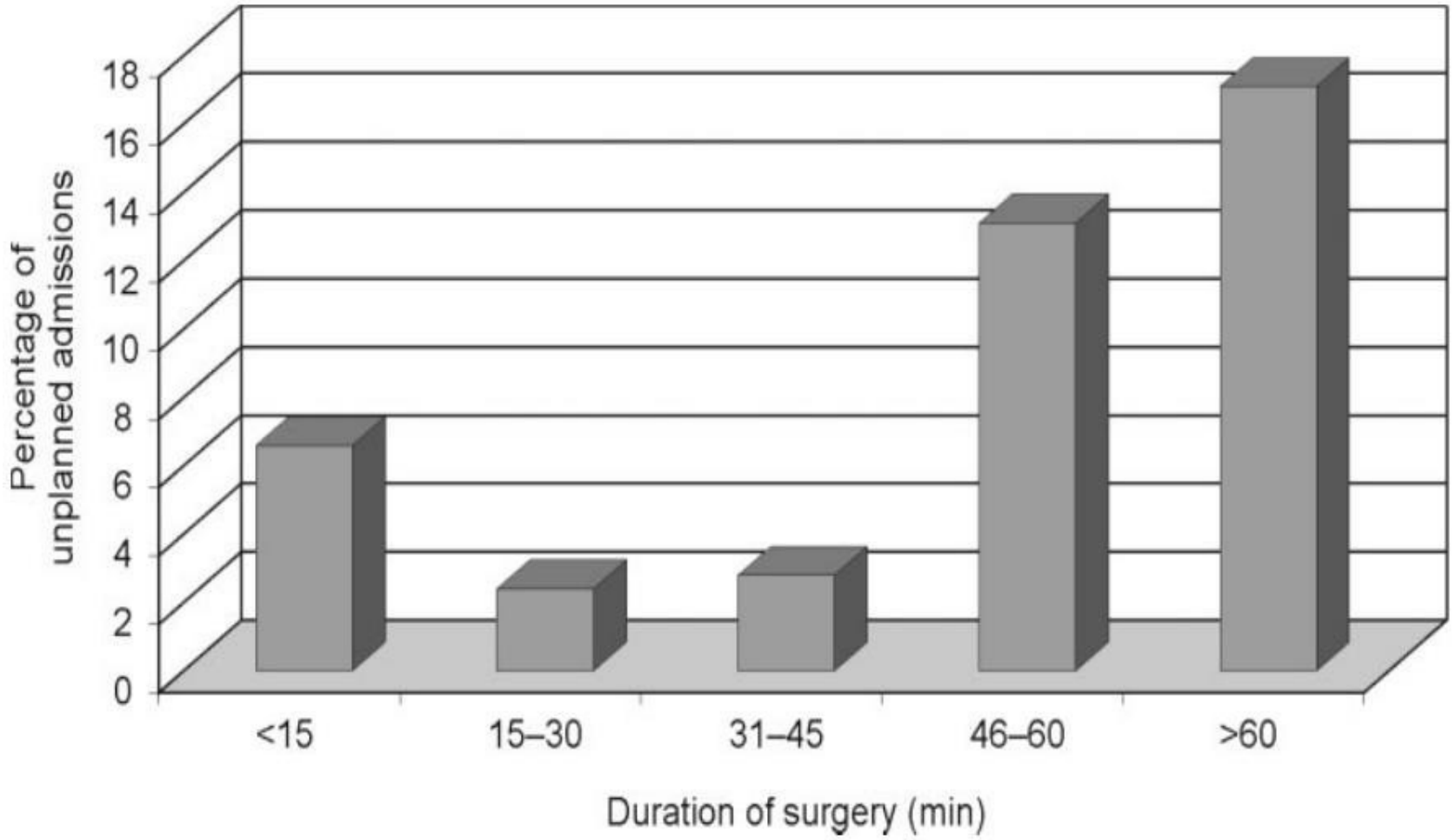
Nasal splints revisited J Laryngol Otol 1999, 113:725-727

The morbidity from nasal splints in 105 patients Otolaryngology 1992; 17:528-530

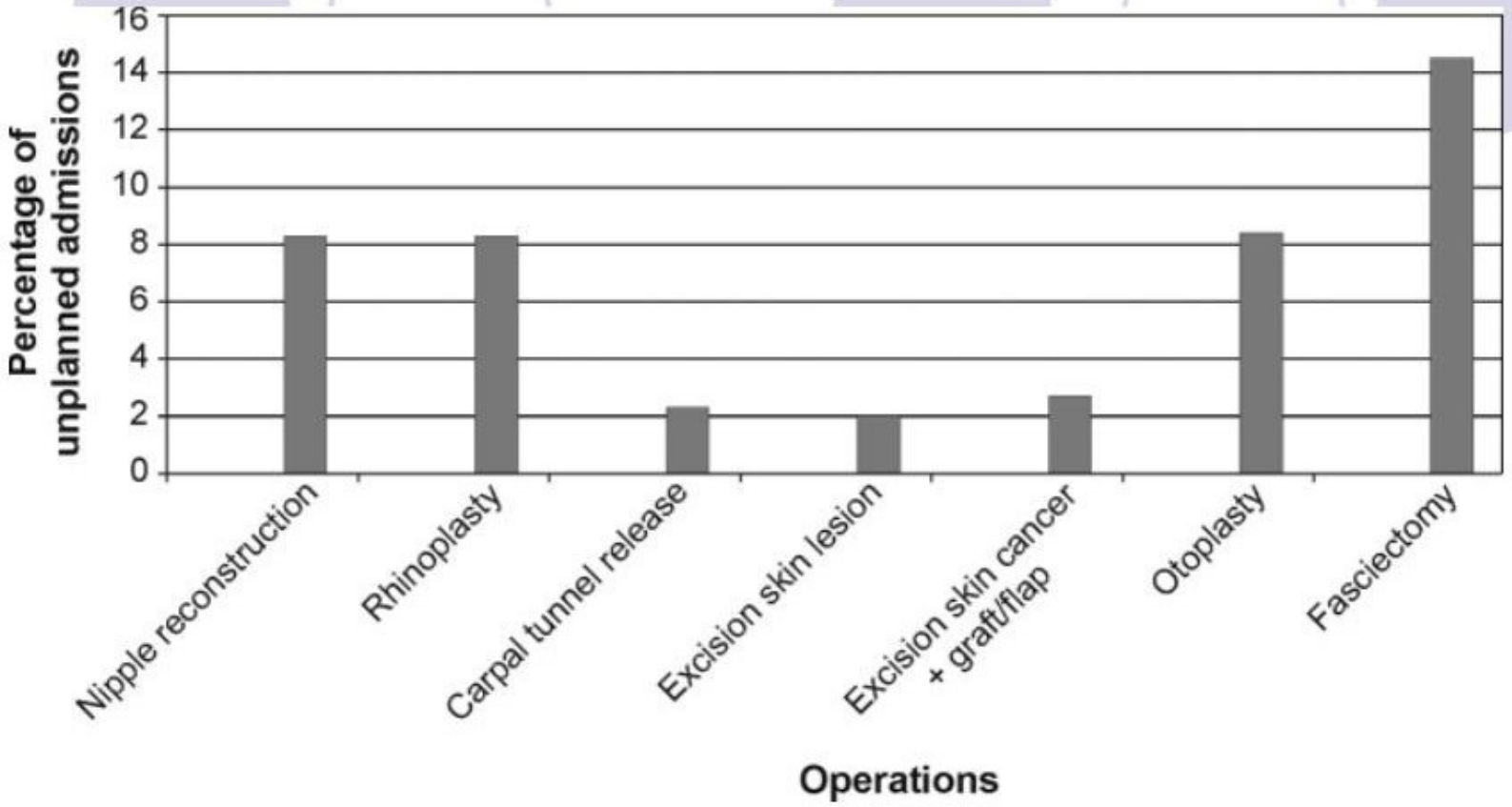
Unplanned admissions following ambulatory plastic surgery -a retrospective study

A.Mandal et al

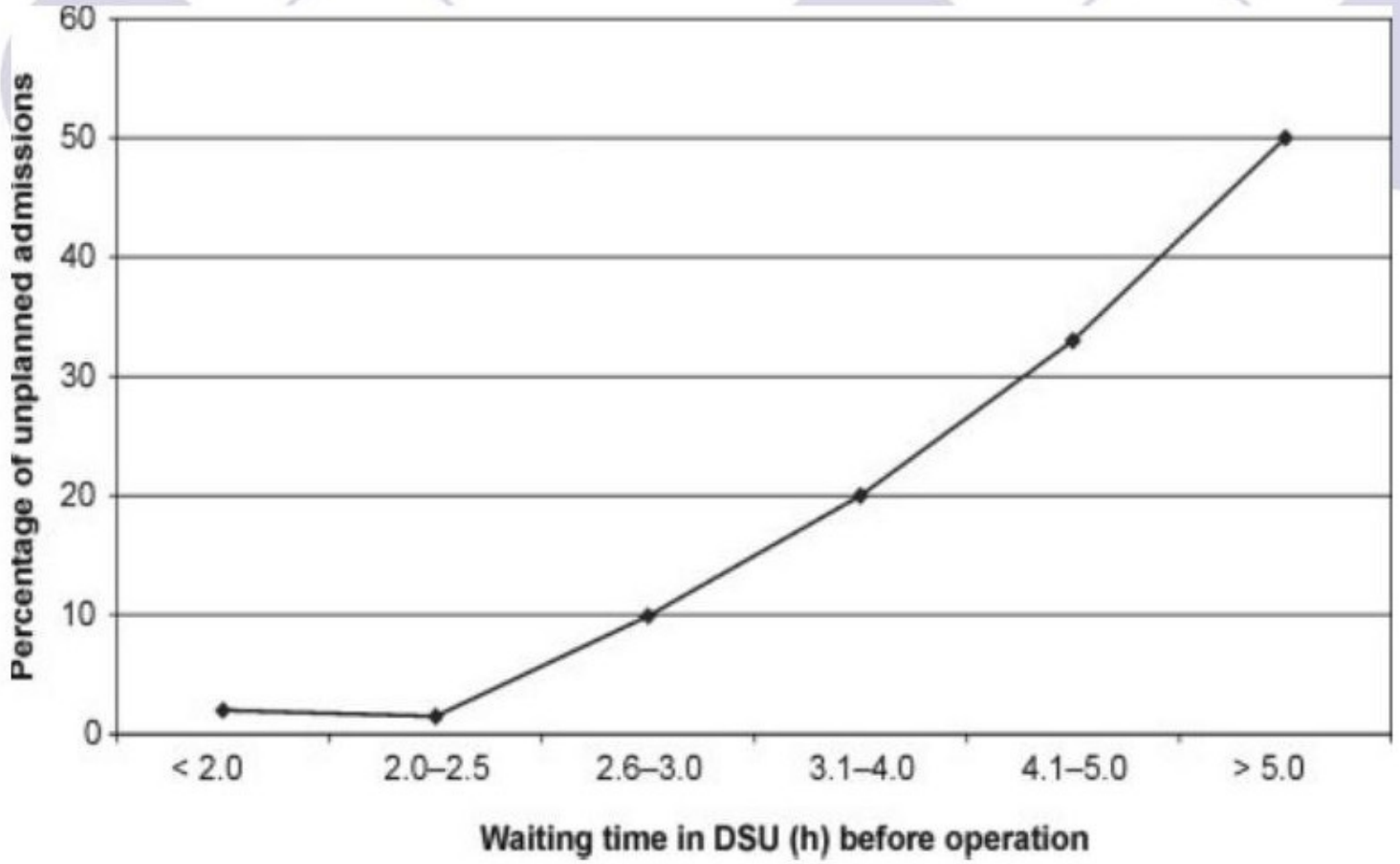
Ann R Coll Surg Engl 2005;87:466-468



Relationship between overstay and duration of surgery p=787, 6 months period

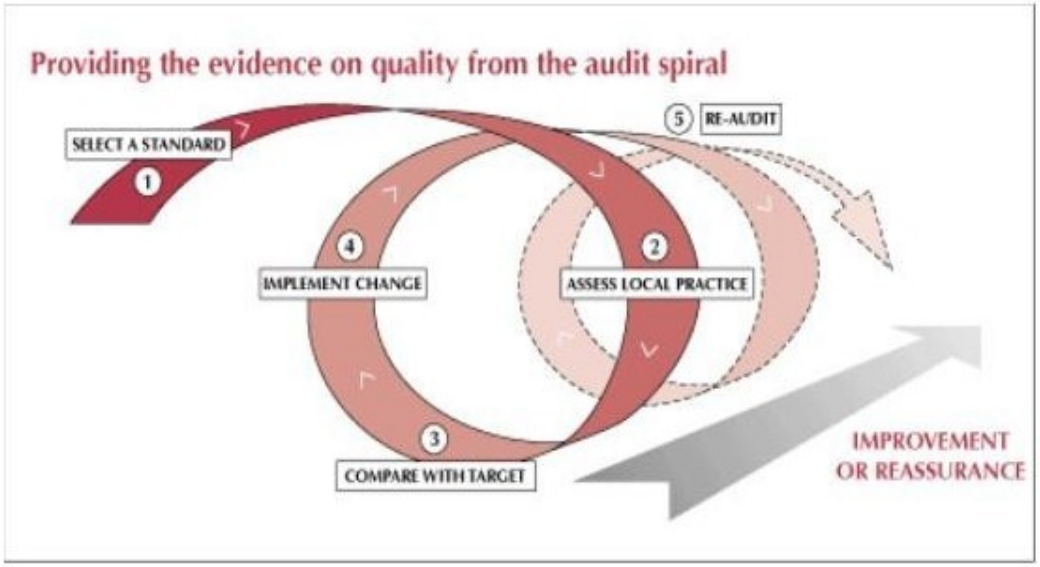


Procedures resulting in unplanned admissions



Relationship between overstay and waiting time in the day case unit

Quality: what can we do?



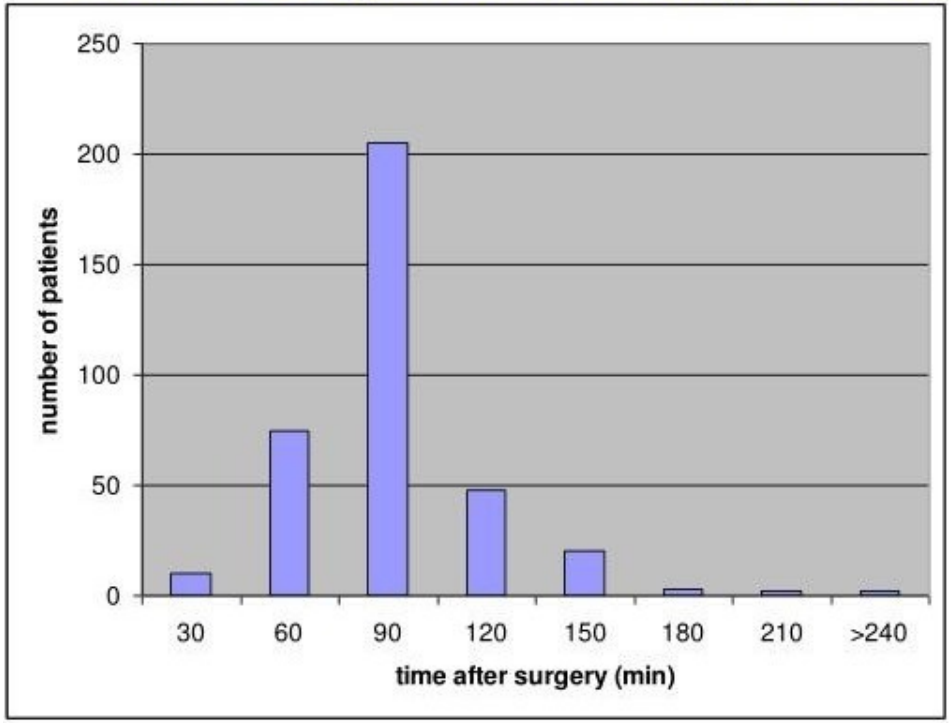
- Develop tools for measuring and reporting quality
- Undertake a variety of audits
- Make recommandations

Minimal criteria for leaving the day-surgery unit

Patient alert and oriented
Vital signs stable within acceptable limits
Patient has met specified criteria (PADSS)
Presence of a responsible adult
Written instructions (diet, medications, activities, emergency phone number)

No urination requirements (only for selected patients)
No ability requirement to drink and retain clear fluids

A mandatory minimum stay should not be required



Anesthesiology,96,3,742-752,2002
J Clin Anesth 7:500-506,1995

Early recovery (ER): eyes opening
obeying commands

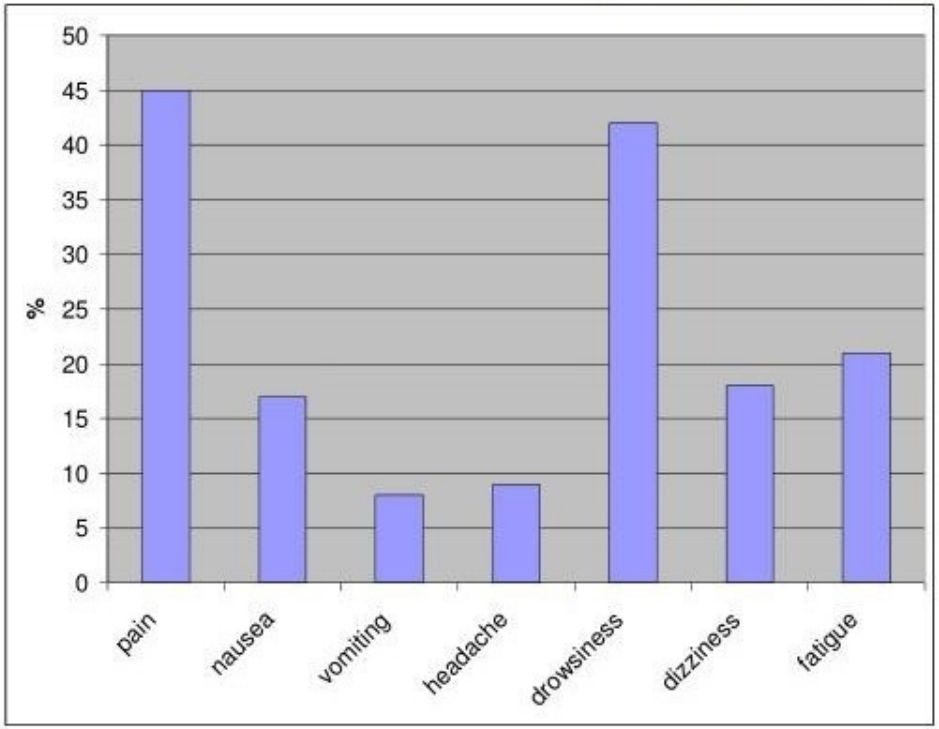
Home readiness (HR): determined by PADSS
(intermediate recovery)

Home discharge (HD): actual time the patient leaves
non-medical factors
(no Doctor available)

Postdischarge symptoms in ambulatory surgery

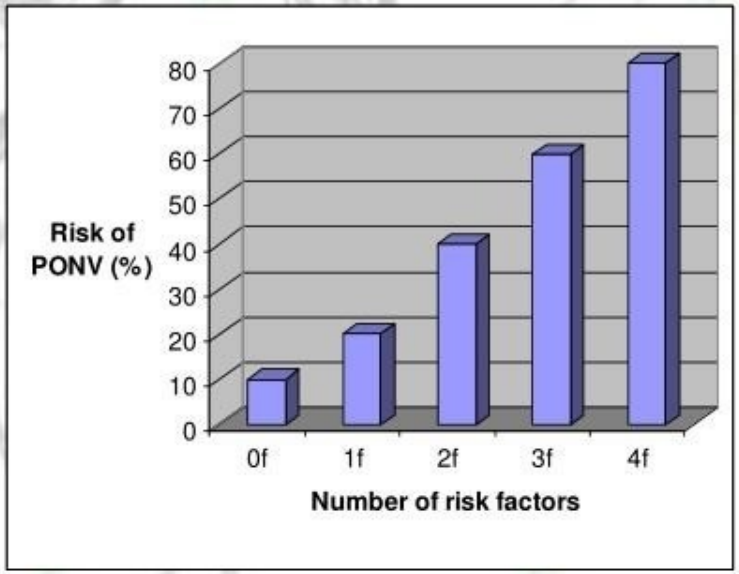
-No NV before discharge in 36%
-high interference in activities of daily living

Assessment of postdischarge symptoms must be
An indicator of quality of Care



Can J anesth,51:6,R1-R5,2004
Anesthesiology,96:994-1003,2002

Risk factors	Points
Female gender	1
Nonsmoking status	1
History of PONV and/or Motion sickness	1
Postoperative opioids	1
Number of risk factors	4



Acta Anaesth Scand 2002:46:921-928

A factorial trial of six interventions for the prevention of postoperative nausea and vomiting

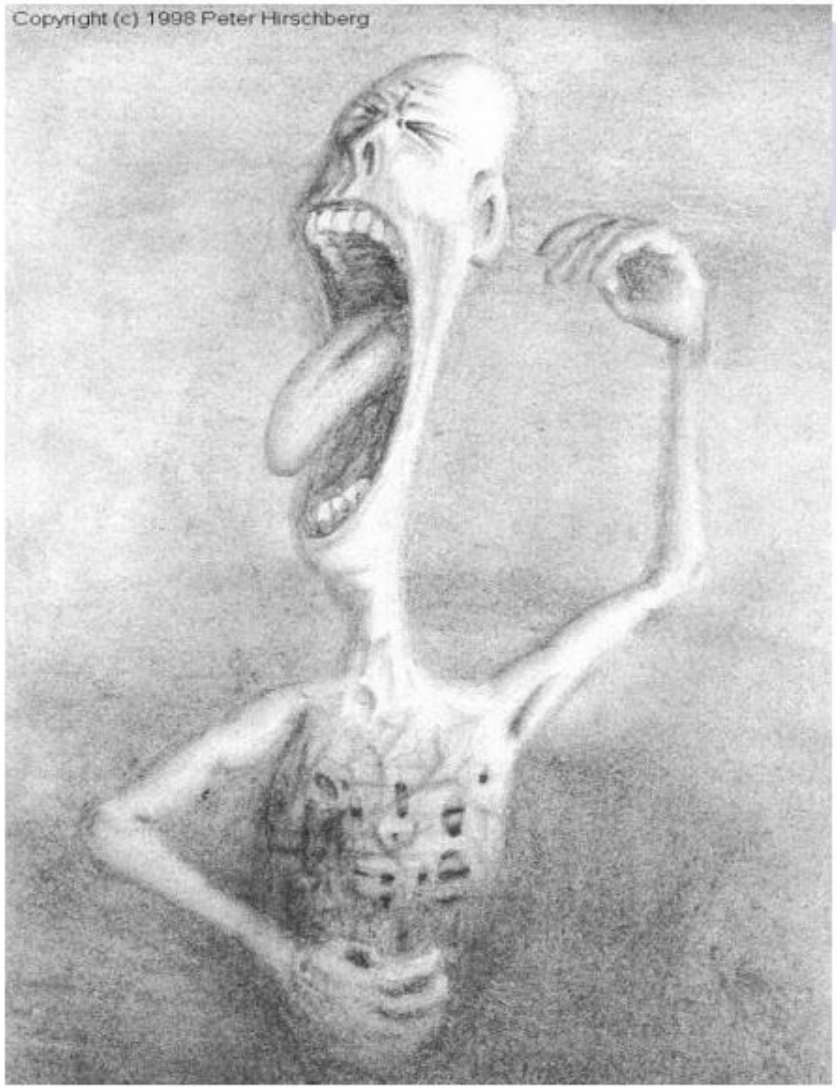
C.Apfel et al. N Engl J Med. 2004 Jun 10;350 (24): 2441-51

-5199patients at risk for PONV
-randomized trial
-4123 randomly assigned to 1 of 64 possible combination of 6prophylactic interventions
4 mg ondansetron or not
4 mg dexamethasone or not
1.25 mg droperidol or not
propofol or volatile anesthetic
nitrogen or nitrous oxide
remifentanil or fentanyl

-antiemetics similarly effective (dhb less effective in men)
dexamethasone is the first line prophyllactic agent
-propofol vs volatile anesthetic:PONV risk reduced by 19%
-nitrogen vs nitrous oxide: PONV risk reduced by 12 %
-remifentanil vs fentanyl: no advantage
-the initial intervention provides the best risk reduction
use the least expensive or safest intervention first
use multiple interventions for high risk patients for PONV
-all types of surgery are equal(except hysterectomy and cholecystectomy)!!!
-prophylaxis is better to treatment of establishe PONV

First line: TIVA and dexamethasone
Rescue medication: serotonin antagonists





Conférence d'actualisation 2002
Analgésie pour chirurgie ambulatoire
SFAR

Weakest link: postoperative care

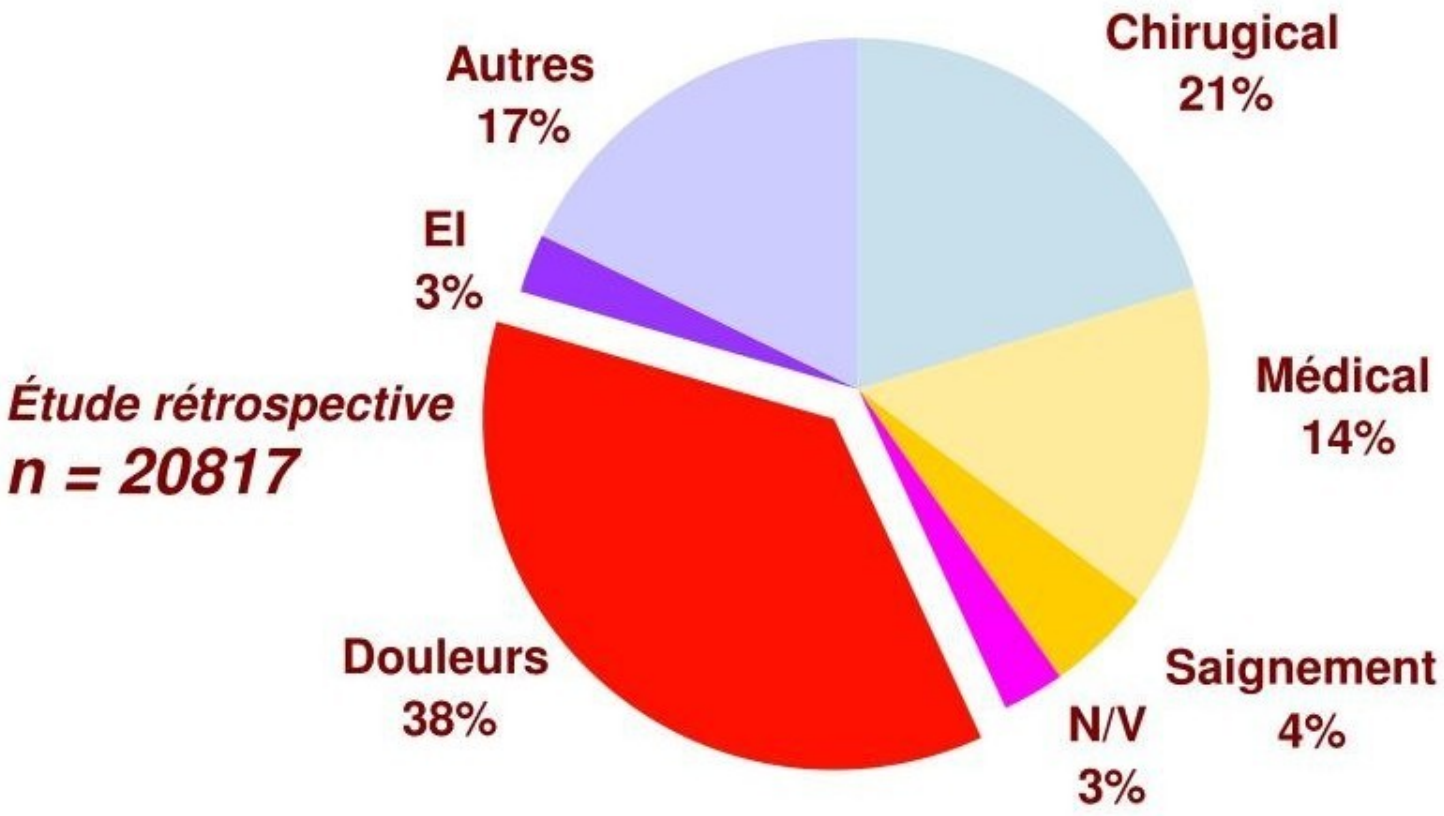
-underestimated!

-planning and education
-before and after the procedure
    appropriate anaesthesia technique
    appropriate postoperative analgesia
-role of the gp?
-professional home nursing
-medical motels
-freestanding surgical recovery centers?



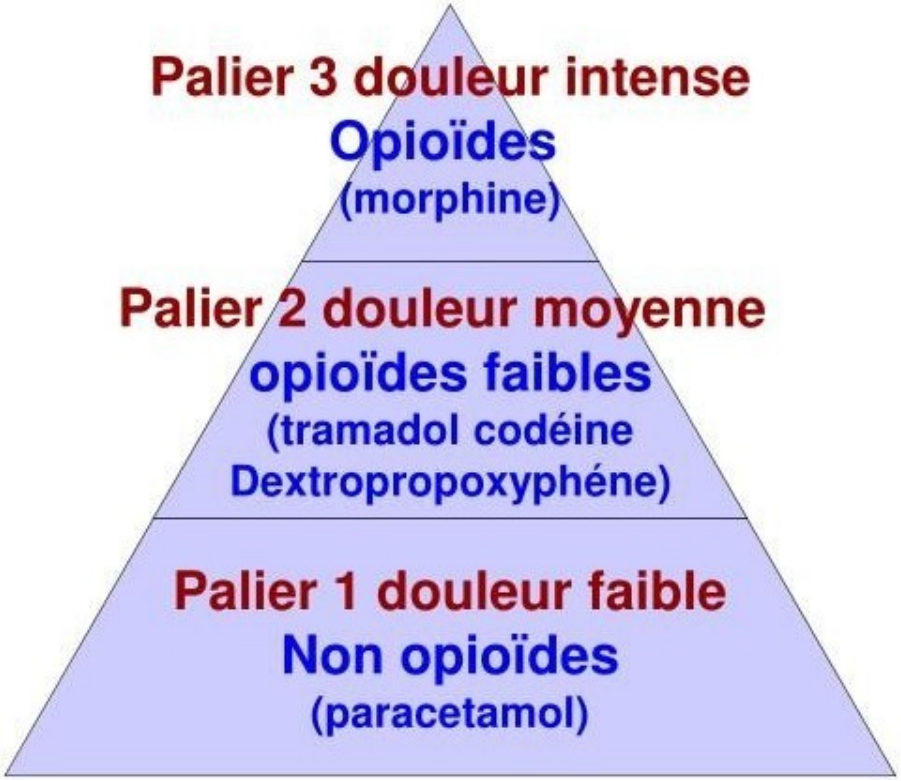
SFAR 2002, 31-65, onférence d'actualisation

Réadmissions:



EI = effet indésirable; N/V = nausées/vomissements.

Coley KC et al. J Clin Anesth. 2002;14:349-353


Palier 3 douleur intense
Opioïdes
(morphine)
Palier 2 douleur moyenne
opioïdes faibles
(tramadol codéine
Dextropropoxyphéne)
Palier 1 douleur faible
Non opioïdes
(paracetamol)

Incidence et conséquence de la douleur post op:

-douleur modérée à sévère: 30-40% (adulte, 24 h)

-Can J Anaesth 43,1121-7,1996
-Anesth Analg 85, 808-16, 1997
-Acta Anaesth Scand 41, 1017-22,1997.
-Anesth Analg 92,347-51,2001
-Anaesthesia 57, 266-83, 2002

- Consultation extra-hospitalière (4,3-38 %)
- Consultation d'une infirmière (1,4 %)
- Echec de la chirurgie ambulatoire(0,3-2,6 %)

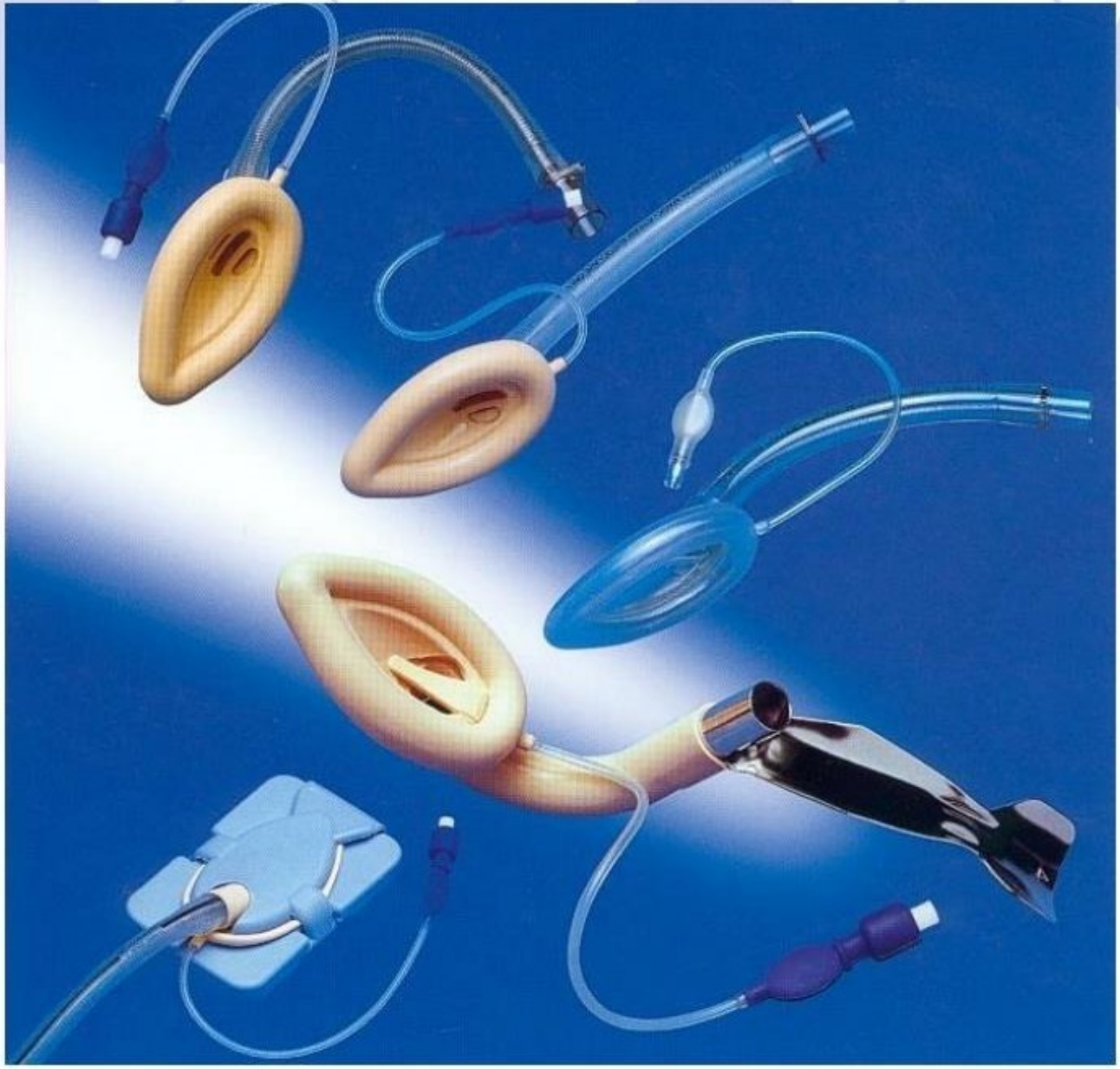
LE RETOUR A DOMICILE PRIME
SUR LA QUALITE DE L'ANALGESIE !

Données épidémiologiques

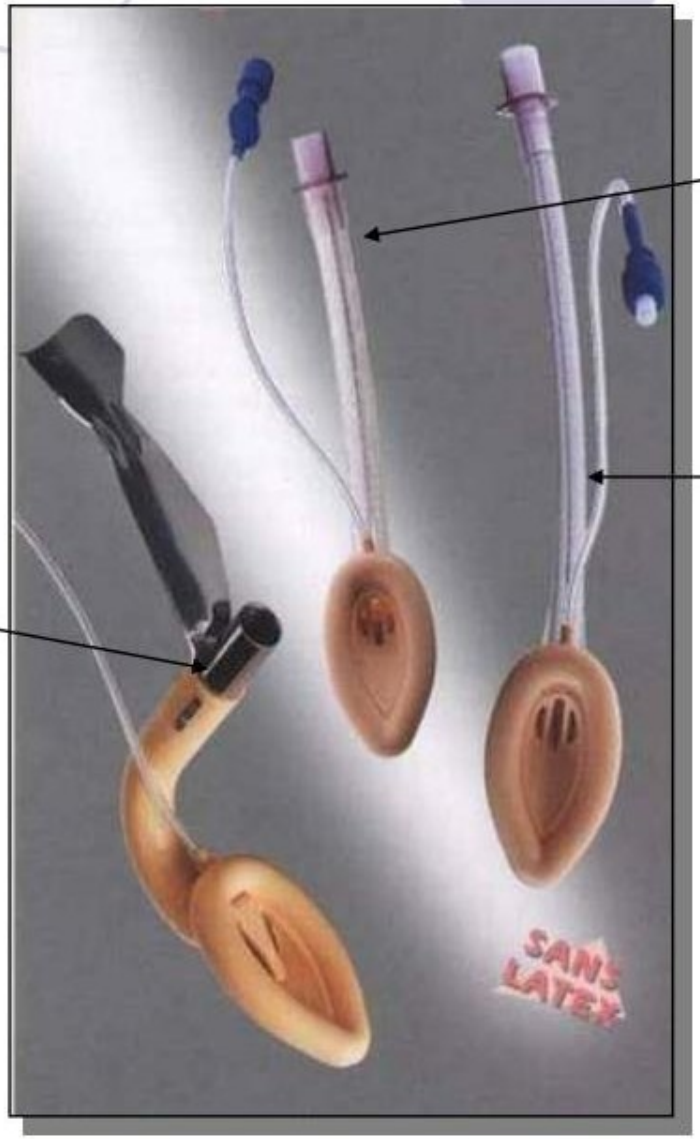
Incidence (%) de symptômes d'intensité moyenne/modérée à sévère après sortie de l'unité ambulatoire chez 2144 adultes

	% tot	J0	J1	J3	J7
Douleur	57	25/21	27/18	19/6	9/2
Somnol.	52	28/20	23/7	6/2	2/0.2
Raucicité	43	28/12	18/3	5/0.7	1/0.2
Saignt.	43	27/9	21/3	12/2	7/1
Maux gorge	36	20/13	17/5	5/1	1/0.5
Céph.	27	13/5	9/3	6/2	2/0.7
Vertiges	24	16/5	8/2	3/0.4	1/0.1
Nausées	21	10/7	5/2	2/0.3	0.3/0.1
Lombal.	17	6/3	7/3	5/2	2/0.9
Diff.uriner	11	6/3	4/2	2/1	0.7/0.3
Temp>37° C	9	4/0.6	4/0.5	2/0.4	0.9/0.2
Vomissements	6	2/3	0.4/0.5	0.1/<.1	0/<0.1

Mattila K et al. Anesth Analg 2005; 101:1643-1650



Laryngeal masks



Standard

armed

Fastrach

LM and ENT surgery

-Nasal intubation
-Trismus
-Movements
-Controlled ventilation:
    -Ventilation pressure restricted
    -Leaks
    -Gastric over-pressure
    -Inhalation

LM in ENT surgery

- Tonsillectomy-adenoidectomy
- Pharyngoplasty
- Ear surgery
- Rhinoplasty
- Fess
- Thyroidectomy
- Fibroscopy
- Difficult intubation



Airway control with flexible LMA

Rotation of the head → no change in ventilatory parameters

Assisted ventilation → no neuromuscular blocking agent

reduced bleeding

Smooth recovery → protection of ossicular mountage

of grafts

Anesthesia for Intranasal Surgery: A comparison Between Tracheal Intubation And the Flexible Reinforced Laryngeal Mask Airway

Anthony C.Webster et al

Anesth Analg 1999;88:421-5

-respiratory response reduced
-cardiovascular reflex reduced
-coughing reduced at emergence- bleeding reduced
-time to patient fitness reduced

-placement must be easy
-position must be stable
-airway must be protected (blood in the pharynx)

Better than ETT ??

Survey of Laryngeal Mask Airway Usage in 11910 Patients: Safety and Efficacy for Conventional and non Conventional Usage

Verghese C and Brimacombe J.R

Anesth Analg. 1996; 82:129-133

-failure rate 0,19% (inadequate seal)
-spontaneous ventilation in 6674 (56 %)
-Positive Pressure ventilation in 5236 (44%)
-critical incidents (0,37%)
-regurgitation 0,03%
-Vomiting 0,017%
-aspiration 0,009%

rare complications:

-tongue cyanosis
-vocal cord paralysis
-hypoglossal nerve palsy
-parotid swelling
-dental trauma

Miscellaneous:

Cécité monoculaire transitoire définitive par compression oculaire accidentelle Au cours d'une anesthésie générale.
Morin Y et al.
J Fr Ophtalmol 1993; 16:680-4

Eyes injuries after monocular surgery . A study of 60965 anesthetics from 1988 to 1992.
Roth et al
Anesthesiology 1996; 85:1020-7

Eye injuries associated with anesthesia. A close claims analysis.
Gild et al
Anesthesiology 1992; 76:204-208

Corneal abrasions during general anesthesia.
Batra et al
Anesth Analg 1977; 56:363-365