


Key Trends in Ambulatory Anesthesia

19th Annual Ambulatory Surgery Center
October 25, 2012

What's New?

Rebecca S. Twersky, MD, MPH
 SUNY Downstate Medical Center
 Professor of Anesthesiology
 Medical Director, ASU

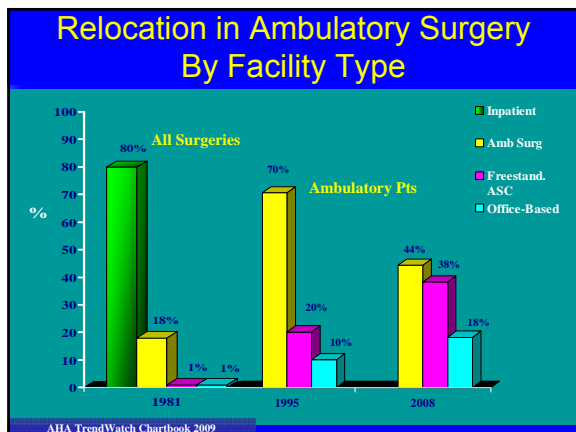


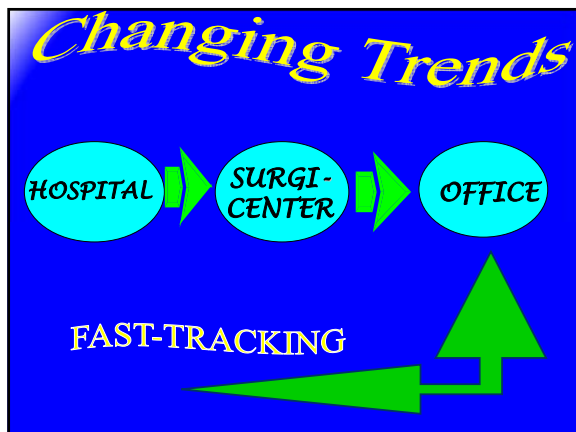
* No financial disclosures to make

Learning Objectives

To review current trends in ambulatory anesthesia and their impact on safety.

- 1) Closed Claims Data
- 2) Patient selection, OSA
- 3) Drug Shortages
- 4) Management of PONV and PDNV





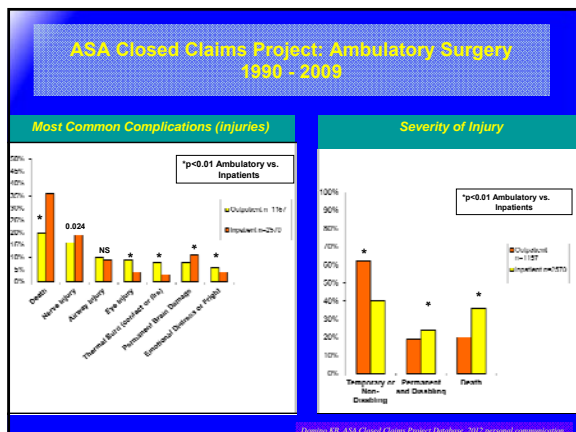


ASA Closed Claims Project: Ambulatory Surgery
1990 – 2009
n = 1157 (30%)

Outpatients were more commonly female, younger than inpatients, healthier (ASA 1-2), and having elective procedures under regional anesthesia or MAC.

EVENT	OUTPATIENTS n = 1157	INPATIENTS N = 2570
Respiratory	20%	23%
Block-related	14%	5%
Equipment	14%	14%
Cardiovascular	11%	19%
Medication-related	10%	6%
Surgical technique/patient condition	8%	11%

© Dominick RB, ASA Closed Claims Proj Database 2012 Personal Communication



ASA Closed Claims # 10014: Cautery fire during MAC

80 year old ASA 3 female underwent a right temporal artery biopsy under monitored anesthesia care (MAC)

PMH: HTN on lisinopril, atenolol, and nicardipine

Sedation: Midazolam 1mg, Fentanyl 50mcg, and a Propofol infusion (50mcg/kg/min).

Cautery ignited the drapes and the nasal prongs.

O2 was shut off and the patient was induced with propofol and succinylcholine and intubated.

An episode of profound bradycardia, treated with epinephrine

Transferred to a hospital where she was treated for burns and their complications.

Lack of communication between the surgeon and the anesthesiologist regarding the timing of cautery during the use of supplemental O2.

The staff was unaware of ASA recommendations concerning the prevention of OR fires, but was in-serviced after the event.

A lawsuit against the anesthesiologist was dropped.

CCDB 2005-2009


ASA Closed Claims # 9961 Wrong side surgery – despite time- out

A 22 y/o ASA 2 male presented for left knee arthroscopy under GA

- OR schedule listed RIGHT knee procedure; Patient informed that it was his LEFT knee. Consent taken for LEFT knee.
- The surgeon then verified and marked the LEFT knee; Anesthesiologist preop assessment verified LEFT knee.
- After induction, the surgeon, OR nurses, and team did a time out, but the anesthesiologist didn't look at the knee prepped.
- The OR team proceeded with RIGHT knee. In PACU the RN noted the wrong knee had been operated on.
- The surgeon got an okay from the hospital administrator to do the LEFT knee before the patient fully woke up.
- Payment by anesthesiologist –\$31,000.

- PRODUCTION PRESSURES?

CCDB 2005-2009



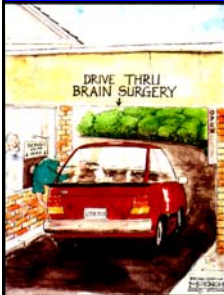
ASA Closed Claims # 9961
9961 Inadequate preoperative assessment

A 51 y/o ASA 3 obese male presented for sphincterotomy under GA in a free-standing ASC

- PMH: Atrial Fibrillation; EKG one year prior showed AF with a few PVC's; A treadmill stress test showed no ischemia, but EF of 30%.
- Meds: Furosemide & Coumadin Discontinued ???
- Pre-Op Exam: AF with ventricular rate of 130-140 beats/min; BP 141/80.
- Pre-Operative telephone interview: He had not seen a cardiologist for a year.
- Sedation: 1mg midazolam & 50mcg Fentanyl; 5mg Labetalol to control HR. Induction: 200mg propofol was given slowly followed by Desflurane to 8%.
- At the end of the 15-minute procedure, the patient had bradycardia and cardiac arrest and was resuscitated.
- Patient suffered permanent neurological damage.
- Anesthesiologist admitted he should have had a cardiac workup prior to surgery.
- A lawsuit against the anesthesiologist was settled for \$900,000

CCOB 2005-2009

Patient Selection for Ambulatory Surgery – When should we say “No” ?



Cardiovascular Disease
 Patients with stents
 Cardiac Implantable Electronic Devices

Morbid Obesity (MO)
Obstructive Sleep Apnea (OSA)

Predictors of Death within 7 days after Outpatient Surgery (1994-1999)
 n=564,267

Predictors	OR (95% CI)
◆ More advanced age (>85 yrs)	2.30 (1.41–2.97)
◆ Surgery initially performed in an outpatient hospital	1.47 (1.00-2.16)
◆ Prior inpatient hospital admission within 6 months	1.44 (1.29-1.61)
◆ Female	0.69 (0.51– 0.93)

Fleisher L.A, et al. Arch Surg 2004;139(1):67-72

Obstructive Sleep Apnea (OSA)- #1 Sleep Disorder

- Repetitive partial or complete obstruction of upper airway and collapse of pharyngeal soft tissue
- Cessation of airflow for > 10 sec despite continuing ventilatory effort, 5 or more times per hr of sleep
- Nocturnal Oxygen desaturation of > 4%
- 1 in 4 in males,
1 in 10 in females
- Undiagnosed - estimated 60-70% of pts



Risk Assessment of Obstructive Sleep Apnea in a Population of Patients Undergoing Ambulatory Surgery n= 2139

Tracey L. Stener, M.D.¹; Christopher Wright, B.S., R.N.¹; Anu George, B.S.¹; Richard E. Thompson, Ph.D.²; Christopher L. Wu, M.D.¹; Nancy Collop, M.D.¹

↑ Risks of serious perioperative events and pulmonary complications in patients with high propensity for OSA:

- Difficult intubation
- Hemodynamic interventions requiring pressors.
- Postop respiratory desaturation

Requires more intense perioperative management-

Is this feasible in your ASC?

J Clin Sleep Med 2010; 6(5): 467-472.

OSA Preop Assessment

Table 1 Comorbidities associated with OSA			Seet, E, Chung F. <i>Anesthesiology Clin</i> 2010;28: 199-215
Category	Condition	Prevalence (%)	
Cardiac	Treatment-resistant hypertension	63-83	→
	Congestive heart failure	76	→
	Ischemic heart disease	38	→
	Atrial fibrillation	49	→
	Dysrhythmias	58	→
Respiratory	Asthma	18	→
	Pulmonary hypertension	77	→
Neurologic	First-ever stroke	71-90	→
Metabolic	Type II diabetes mellitus	36	→
	Metabolic syndrome	50	→
	Hypothyroidism	45	→
	Morbid obesity	50-90	→
Surgical	Bariatric surgery	71	→
	Intracranial tumor surgery	64	→
	Epilepsy surgery	33	→
Others	Gastroesophageal reflux disease	60	→
	Nocturia	48	→
	Alcoholism	17	→
	Primary open-angle glaucoma	20	→
	Head and neck cancer	76	→

STOP Questionnaire
A Tool to Screen Patients for Obstructive Sleep Apnea
Frances Chung, F.R.C.P.C.*; Balaji Yegneswaran, M.B.B.S.;† Pu Liao, M.D.;‡ Sharon A. Chung, Ph.D.;§
 Santhya Vairavanathan, M.B.B.S.;|| Saeedul Islam, M.Sc.;|| Ali Khajendei, M.D.;† Colin M. Shapiro, F.R.C.P.C.¶

<p>S Snoring Do you snore loudly (loud enough to be heard through closed doors)?</p> <p>T Tired Do you often feel tired, fatigued, or sleepy during daytime?</p> <p>O Observed Has anyone observed you stop breathing during your sleep?</p> <p>B Blood Pressure Do you have or are you being treated for high blood pressure?</p> <p>High risk of OSA: YES to three or more items Low risk of OSA: YES to less than three items</p>	<p>B BMI BMI more than 35 kg/m²?</p> <p>A Age Age over 50 yr old?</p> <p>N Neck circumference Neck circumference greater than 40 cm (15.7in)?</p> <p>G Gender Gender male?</p> <p>High risk of OSA: YES to three or more items Low risk of OSA: YES to less than three items</p>
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Anesthesiology 2008;108:812.

Practice Guidelines for the Perioperative Management of Patients with Obstructive Sleep Apnea
A Report by the American Society of Anesthesiologists Task Force on Perioperative Management of Patients with Obstructive Sleep Apnea

Ambulatory Surgery and OSA

- Superficial surgeries, minor ortho using local or unsupplemented regional, lithotripsy OK
- Consider types of anesthesia, surgery, age, treated, severity of OSA, use of postop opioids, level of home care
- Moderate to severe OSA high risk following GA
- Facility should be able to manage OSA problems (difficult airway, postop respiratory) and transfer arrangements.

Anesthesiology 2006; 104:1081-93

Society for Ambulatory Anesthesia Consensus Statement on Preoperative Selection of Adult Patients with Obstructive Sleep Apnea Scheduled for Ambulatory Surgery
Girish P. Joshi, MBBS, MD, FFAIRSC;† Saravanan P. Arunkanthy, MD, DA, MBA;† Tong, J. Gao, MD, MBS, FRCA;† and Frances Chung, MBBS, FRCP;†
 Anesth Analg 2012 Aug 10. [Epub ahead of print]

Decision making in preoperative selection of a patient with OSA scheduled for ambulatory surgery

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graph TD
    PE[Preoperative Evaluation] --> PKO[Patient With Known OSA]
    PE --> PPD[Patient With Presumptive Diagnosis of OSA]
    PKO --> OCO1[Optimized Comorbid Conditions AND Able to use CPAP after discharge]
    PKO --> PNO[Patients With Non-optimized Comorbid Conditions]
    OCO1 --> PSAS1[Proceed With Ambulatory Surgery]
    PNO --> NSAS1[Not Suitable For Ambulatory Surgery, may benefit from diagnosis and treatment]
    PPD --> OCO2[Optimized Co-morbid Conditions AND Postoperative pain can be managed predominantly by using non-opioid analgesic techniques]
    PPD --> NSAS2[Not Suitable For Ambulatory Surgery, may benefit from diagnosis and treatment]
    OCO2 --> PSAS2[Proceed With Ambulatory Surgery]
  
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SPECIAL ARTICLE

Society for Ambulatory Anesthesia Consensus Statement on Preoperative Selection of Adult Patients with Obstructive Sleep Apnea Scheduled for Ambulatory Surgery

Garish P. Joshi, MBBS, MD, FFARSCI,* Saravanan P. Arakichetty, MD, DA, MBA,†
Tong J. Gan, MD, MHS, FRCA,† and Frances Chung, MBBS, FRSPC†
Anesth Analg 2012 Aug 10. [Epub ahead of print]

1. OSA + optimized co-morbidities OK for Amb Surg IF can use CPAP postop
2. Use STOP-Bang criteria for screening
3. OSA + optimized co-morbidities OK for Amb Surg IF postop pain can be managed predominantly with nonopioid analgesic techniques.
4. OSA patients with non optimized co-morbid medical conditions NOT good candidates for Amb Surg.


Management of sleep apnea in adults - functional algorithms for the perioperative period: Continuing Professional Development

Edwin Seet, MBBS • Frances Chung, MD Can J Anaesth 2010; 57: 849-64.

When can discharge from Ambulatory Surgery?

- Monitoring > 3 hr longer than non OSA patients after GA
- No recurrent PACU respiratory events
- No apnea, bradypnea, desaturatoin
- No need for strong opioids
- Responsible home care
- OSA patients may have more profound ↑ in AHI after surgery- peak on night #3, return to baseline night #7.

Inappropriate Patients




- Unstable ASA 3; ASA 4 or greater
- Morbid obesity + significant co-morbidities
- Moderate to severe OSA for GA
- Patient's medical condition exceeds capacity of facility to manage

Learning Objectives

To review current trends in ambulatory anesthesia and their impact on safety.

- 1) Closed Claims Data
- 2) Patient selection, OSA
- 3) Drug Shortages**
- 4) To discuss the management of PONV and PDNV

Food and Drug Administration Safety and Innovation Act S.3187



- On May 24, 2012, by a vote of 96-1, the U.S. Senate passed Food and Drug Administration Safety and Innovation Act".
- On May 30, 2012, the U.S. House of Representatives passed the Prescription Drug User Fee Act (PDUFA) Reauthorization, a legislative package of important Food and Drug Administration (FDA) provisions including one to prevent and mitigate national drug shortages.
- On July 9, President Barack Obama signed into S.187, the "Food and Drug Administration Safety and Innovation Act" law, which contains important provisions to address drug shortages.

Summary of the Food and Drug Administration Safety and Innovation Act S.3187 Title X: Drug Shortages July 9, 2012

1. Modify existing reporting requirements for manufacturers of drugs.
2. Establish task force to enhance response to shortages.
3. FDA maintain drug shortage list.
4. DEA provide timely approvals or denials of ↑ in quotas of controlled substances.
5. DEA report annually on their efforts on drugs shortages
6. Hospitals within the same health system allowed to repack drugs into smaller units
7. Authorize Government Accountability Office (GAO) to conduct study to examine the causes of drug shortages.



Drug Shortages and Ambulatory Anesthesia

- Sterile injectables have experienced more severe and frequent shortages in recent years
 - 35% of all shortages in 2009, 46% in 2010
- Anesthesia-related shortages include: ephedrine, epinephrine, etomidate, ketamine, metoclopramide, neuromuscular blocking agents, prochlorperazine, propofol, thiopental.

A Shortage of Everything Except Errors: Harm Associated With Drug Shortages
Posted: 07/17/2012; ISMP Medication Safety Alert © 2012 Institute for Safe Medication Practices

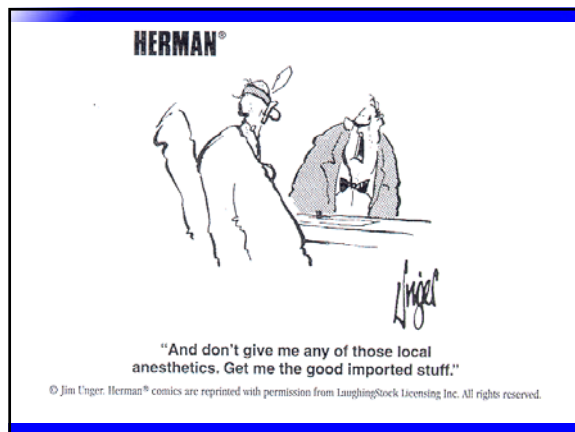
Abstract and Introduction

Prolonged duration or progression of disease
Behavioral/mental status changes
Inability to work
Medication overdoses
Respiratory depression and excessive sedation
Treatment with rescue agents
Debilitating and life-threatening side effects from alternative drug (e.g. ileus, gastrointestinal toxicity, myelosuppression, malabsorption, seizures)
Prolonged hospitalization/critical care therapy
Infections and cross contamination
Severe hypotension and hypertension
Severe electrolyte and acid/base imbalances
Repeated surgical procedures
Transient and permanent neurological harm
Permanent vascular and integumentary harm
Untreated pain
Death

Medications most commonly involved in reports of patient harm:

Opioids 17%
Morphine 5
Fentanyl 4



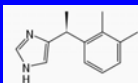


Drug Shortages and Ambulatory Anesthesia

- Propofol has most impact on ambulatory anesthesia
- FDA imported Fresenius Propoven 1% to alleviate impact of shortage of propofol
 - Contains combination of long-chain and medium-chain triglycerides (LCT/MCT)
 - Does not contain anti-microbial retardant
 - Contraindicated in pts with soy or peanut allergy

Drug Shortages: Alternatives for Ambulatory Anesthesia

- Dexmedetomidine, α -2 agonist, used as a premedicant; adjuvant for regional anesthesia and sedative-hypnotic.
- Minimal respiratory effect
- Sympatholytic effect decreases mean arterial BP and HR
- Reduces anesthetic and opioid analgesic requirements perioperatively
- Short half life of 2 hours;
- \$67/vial

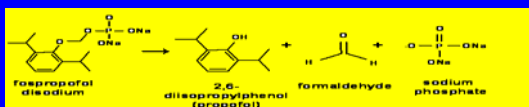




Fospropofol (Lusedra®)



- Water Soluble pro-drug of Propofol
- Smooth, predictable rise in plasma propofol concentration with sustained effect.
- Converted by tissue alkaline phosphatases to propofol within few min of IV injection
- Extended elimination half-life
- Optimum sedation dose 6.5 mg/kg adjusted 25% for elderly and medically compromised patients.
- Less pain at injection site
- Most common side effect: self-limiting perineal tingling, itching, or burning
- FDA approved (12/08) for MAC Sedation and scheduled as a controlled substance



Safety evaluation of fospropofol for sedation during minor surgical procedures[☆] Gan, T.J, et al. n=123

- ASA I-IV pts undergoing minor ambulatory procedures
- Pretreated w/ fentanyl 50µg before fospropofol 6.5 mg/kg
- Could receive up to 5 additional doses (1.63mg/kg)
- Mean=2.4 supplemental doses
- Alternative sedation administered in 6/123 (4.9%) pts
- Most common AE's: paresthesias (62.6%) and pruritus (27.6%)
- Conclusion: Fospropofol is easily titrated to target level of sedation for brief diagnostic and therapeutic procedures
- Standard dose = 6.5mg/kg w/ supp doses 1.6mg/kg

Journal of Clinical Anesthesia (2010) 22, 260-267

Target-Controlled Infusion (TCI)



- Designed to achieve steady-state drug concentration based on pharmacokinetic-guided models
- Limitations due to variations in pharmacokinetics
- Not approved for use in U.S.

SEDASYS Device
Ethicon Endo-Surgery



- Continually monitors and records pulse ox, ECG, capnography, non-invasive blood pressure and patient responsiveness.- closed feedback loop
- Aimed at achieving "moderate" sedation rather than "deep" sedation
- Still under review by FDA

Comparative Anesthesia Techniques

The ideal ambulatory anesthetic:

- ✓Rapid onset
- ✓Smooth intraoperative course
- ✓Fast track recovery
- ✓Resumption of activities that are patient centric

Ideal Ambulatory GA

- GA “multimodal” anesthetic technique (regional anesthesia, nonsteroidal antiinflammatory drugs, local anesthetic wound infiltration, antiemetic prophylaxis, and cerebral state monitoring)
- Benefits of inhaled agents lost when patients receive other drugs (i.e. midazolam, opioids, neuromuscular blockers) that tend to equalize differences between anesthetics

A glowing lightbulb with a white banner across it that reads "SO WHAT'S NEXT?". The lightbulb is set against a warm, orange-yellow background.



A problem we still have to deal with!

PONV

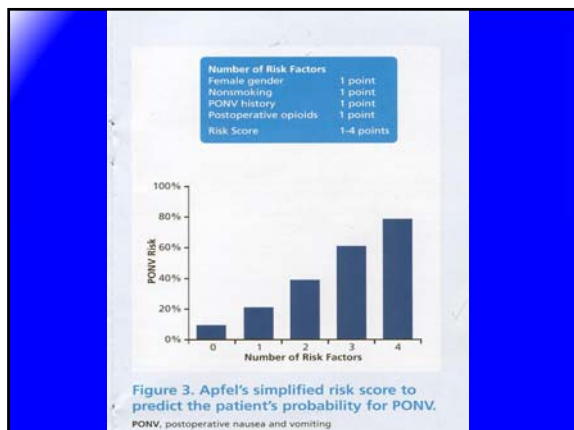
- Incidence following GA 25-30%
- Estimated incidence of PONV prolongs PACU stay about 25 min and costs ~ \$0.25-1.5 million per year
- May jeopardize hemostasis, impair cerebral perfusion, cause wound dehiscence, dehydration and electrolyte imbalance

Habib AS, et al. Anesth Analg 2010 Nov 16. [Epub ahead of print].
Le TP, Gan TJ. Anesthes Clin 2010; 28: 225-249.


Most Updated PONV Consensus

	Risk Factors	Controversial
Patient Specific	• Female gender	• Menstruation
	• Non-smoking status	• Obesity
	• History of PONV or motion sickness	
Anesthesia Specific	• GA w/ volatile anesthetics • N ₂ O • Intra- and Post-op opioid use	• Supplemental O ₂ • Periop hydration
Surgery Specific	• Duration of surgery ≥ 30 mins	• Type of surgery
Ineffective: Metoclopramide Ginger root, cannabinoids Hypnosis		

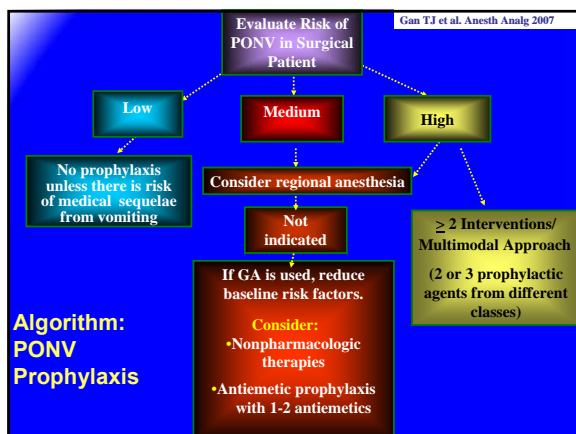
Gan TJ. Anesth Analg 2007;105:1615-28



Optimal Antiemetic Therapy



- **Prophylaxis:**
For Whom?...
Which
Drug??...
- **Treatment:**
Which Drug??...



Droperidol

NK-1 antagonists

- High affinity for Substance P & Neurokinin 1 Receptors in brainstem
- 1st Central mechanism; Crosses BBB
- Not effective for established PONV

Treatment of nausea and vomiting is related to blockade of the 5-HT₃ receptors

Dexamethasone:

- Exact mechanism of antiemetic action not fully understood
- May involve inhibition of prostaglandin synthesis; and/or
- ↑ Endorphin release, resulting in mood ↑, sense of well being, appetite stimulation.
- Unclear of effect on pts risk of adrenocortical suppression

Dopaminergic


ANTIEMETIC	EXAMPLE	MECHANISM	TIME OF TREATMENT	SIDE EFFECT
5HT ₃ RA	Palonosetron, Ondansetron	Inhibiting serotonin binding to the 5-HT ₃ receptors	End of surgery	Constipation, diarrhea, headache, drowsiness
NK-1 antagonist	Aprepitant	Inhibits Substance P	1-3 hrs before induction	Asthenia and/or fatigue, dizziness, hypoesthesia, nausea, anorexia
Glucocorticoid	Dexamethasone	Blockage of corticoreceptors, controls endorphin release	Start of case	headache, dizziness, drowsiness
Anticholinergic agent	Transdermal scopolamine patch	antagonist at muscarinic acetylcholine receptors	During first 24 hrs after anesthesia	Visual disturbances, dry mouth
Acupressure	Acuband, Seaband	May activate A-β and A-δ fibers to influence neurotransmission in spinal cord	30-60 min before induction	Redness, itching, blistering, swollen wrists, drowsiness, headache, dizziness

Comparison of Prophylactic Antiemetics Adults			
Drug	Dose	Timing	Cost (\$)
Ondansetron	4 mg IV	End of surg	\$16.10
Dolasetron	12.5 mg IV	End of surg	\$13.00
Granisetron	0.35-1.5mg IV	End of surg	\$82.38
Palonosetron	0.025 mg IV	Before induct	\$406
Dexamethasone	4-8 mg IV	At Induction	\$0.90
Droperidol	0.625-1.25 mg IV	End of surg	\$1.60
Aprepitant (Emend®)	40 mg PO	Within 3h of Induct	\$50.00
Scopolamine	Transdermal patch	Prior evening or 4-h before end surg	\$4.46

Antiemetic Treatment for PONV	
Initial therapy:	Treatment of PONV:
* No prophylaxis	→ * Administer low dose 5-HT ₃ antagonist*
* Failed prophylaxis	→ * Use drug from different class †
* For persistent PONV	→ * Readminister antiemetic only if >6h elapsed; may get some benefit from redosing with 5HT ₃ antagonist or butyrophenone
	→ * DO NOT readminister Dexamethasone or Scopolamine
* Patients treated with Opioids for Postop Pain	→ * Consider adding Drop 2.5 mg/ 100 mg Morphine in PCA
	→ * Ondansetron more effective than Metoclopramide for controlling PONV.
*Ondansetron 1 mg; Dolasetron 12.5 mg; Granisetron 0.1 mg;	
† Alternate Rx for rescue: Droperidol 0.625 mg IV; Haloperidol 0.5-2.0 mg IV;	
Dexamethasone (4-5 mg IV); Promethazine 6.25 -12.5 mg IV; Propofol 20 mg in PACU	

Pharmacology, pharmacogenetics, and clinical efficacy of 5-hydroxytryptamine type 3 receptor antagonists for postoperative nausea and vomiting
Kok-Yuen Ho and Tong J. Gan

- Genetic factors influence an individual's response to a drug. Variations in the biotransformation of 5-HT₃ RA and differences in 5-HT₃ receptor affinity are a result of genetic polymorphism.
- Individuals may be classified as ultrarapid, extensive (normal), intermediate or poor metabolizers
- Most pts are extensive metabolizers
- Up to 10% of Caucasians have the phenotype associated with poor metabolizers, < 2% of Asians were found to be poor metabolizers




Curr Opin Anaesthesiol 2006;19:606-611

PERIOPERATIVE MEDICINE

Who Is at Risk for Postdischarge Nausea and Vomiting after Ambulatory Surgery?

Christian C. Apfel, M.D., Ph.D.,¹ Beverly K. Philip, M.D.,¹ Odim S. Cakmakcaya, M.D.,¹ Ashley Shilling, M.D.,⁵ Yun-Ying Shi, M.D.,¹ John B. Leslie, M.D.,⁶ Martin Allard, M.D.,^{1*} Alperen Turan, M.D.,^{1†} Pamela Winkle, M.S.,¹ R.N.,¹ C.P.A.N.,¹ F.A.A.N.,^{1‡} Jan Odum-Fornes, Ph.D.,¹ R.N.,¹ C.P.A.N.,¹ F.A.A.N.,^{1§} Valerie D. Hooper, Ph.D.,¹ R.N.,¹ C.P.A.N.,¹ F.A.A.N.,¹ Oliver G. Radde, M.D.,¹ Ph.D.,¹ D.E.A.A.,^{1¶} Joseph Ruiz, M.D.,¹ Anthony Kovac, M.D.^{1||}



"Up to 50% of patients have nausea and vomiting after they leave the ambulatory surgery center."

A Postanesthesia Care Unit
all patients n=170
nausea 13.5%
vomiting 3.5%
nausea and vomiting 17.0%

B Postdischarge
all patients n=2725
nausea 26.6%
vomiting 11.8%
nausea and vomiting 38.4%

Apfel et al. Anesthesiology 2012; 117:475-86

Is Antiemetic Prophylaxis Sufficient?

Postanesthesia Care Unit	Day Postsurgery	Postoperative Day 1	Postoperative Day 2	Nausea	Vomiting	Nausea and/or Vomiting
PACU				19.9	3.9	20.7
	DPS			28.8	8.5	28.8
		POD1		18.3	3.9	18.4
			POD2	12.4	2.1	12.5
	Day of Surgery			38.0	10.8	38.7
		Postoperative period until POD1		42.1	13.1	42.8
		Postoperative period until POD2		44.1	14.2	44.8
		Postdischarge until POD1		34.1	10.8	34.4
		Postdischarge until POD2		36.6	11.9	37.1

Long acting prophylactic antiemetics: dexamethasone, aprepitant, palonosetron, transderm scop.

Apfel et al. Anesth 2012; 117:475-86

PONV After Discharge (PDNV)

- PDNV reported to occur in 20-50% of ambulatory surgery pts
- 13% severe PDN, 12% PDV, 5% severe PDV
- Predictive factors: ♀, <50 y/o, history of PONV, opioid admin in PACU, nausea in PACU
- Pharmacologic Options: Long acting prophylactic antiemetics; ODT; P6 Acupoint Stimulation; Transdermal Scopolamine

Apfel et al. Anesth 2012; 117: 475-86
Mattiila K, et al. Anesth Analg 2005;101:1643-50
Le TP, Gan TJ. Anesth Clin 2010; 26: 225-249


IN SUMMARY:

 **What's New?**

Key Trends in Ambulatory Anesthesia

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For further information:

Rebecca Twersky MD, MPH

Professor of Anesthesiology
Medical Director, ASU
SUNY Downstate

Rebecca.Twersky@downstate.edu
