An Update on Ambulatory anesthesia

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Awake Craniotomy for Removal of Intracranial Tumor: Considerations for Early Discharge

- 241 pts
- 76 pts (31%) 23 h stay
- 15 pts (6%) day surgery

Blanshard HJ, Anesth Analg 2001; 92:89-94

Outpt thyroid surgery: should pts be discharged on same day?

- 232 outpt thyroidectomy
- Hospital admission rate 0.4%
- 4 pts readmitted within 1 wk of surgery
- 2 hypocalcemia
- 1 wound infection
- 1 pain
- Can J Surg 2009;52:182-6

Ambulatory Surgery

- 1/16 (6%) readmitted after a seizure
- 1/16 (6%) admitted with nausea & headache

23 hr stay

- 3/76 (4%) readmitted
  allergy to phenytoin
  ↑ hemi paresis secondary to edema
  subdural hygroma

Blanshard HJ, Anesth & Analg 2001; 92:89-94

Newer anesthetic and rehab. Protocols enable outp hip replacement in selected pts

- 150 pts
- Preop teaching, epidural anesthesia till 4h postop
- Preop Celebrex 400mg, Oxycontin 10mg
- Intraop propofol infusion
- Postop, Celebrex 200mg, Oxycontin 20mg, OxyIR for breakthrough pain

R A Berger et al Clin Ortho Relat Res 2009 467:1424-30

Ambulatory Anesthesia: An update

- Preoperative preparation
- Selection of patients, preop testing
- Ambulatory anesthesia new literature
- Safe discharge

Adult Outpatients - Unsuitable
- Unstable ASA III or IV
- MH
- MAO inhibitor
- Morbid obesity +
- Acute substance abuse

Non-Medical (Psychosocial)
- Unwilling to participate
- Unable to participate

Ambulatory Patient Selection Criteria

1337 anesthesiologists interviewed
Agreement among anesthesiologists NOT To PROCEED with surgery AS DAY SURGERY PATIENTS

Presented condition	%
Prior MI (1-6 months)	83
CHF III	82
CHF IV	98

Z Friedman & F Chung C J Anesth 2004;51:437-43

Pt Selection: Exclusion Criteria

- Unstable ASA physical status 3 and 4
- Complex morbid obesity/complex sleep apnea
- Acute substance abuse
- Sickle cell disease

Toronto Western Hospital
University of Toronto

Ambulatory Patient Selection Criteria with anesthesiologists (n= 1337) agreement NOT to PROCEED with surgery

Presented condition	%
Sleep apnea-GA narcotics post-op	84
Morbid obesity (BMI 35-45) with CVS or resp cx	82
Morbid obesity (BMI>45 kg/m^2) with CVS or resp cx	95
No escort	88

Z Friedman & F Chung et al, Can J Anesth 2004;51:437-43

Pt Selection

- Elderly pt
- Coronary ht disease
- Obstructive sleep apnea
- Asthma
- Upper resp. infection
- DM
- Morbid obesity
- Pediatric pt
- Malignant hyperthermia
- Monoamine oxidase inhibitor

Bryson G & F Chung et al. Can J Anesth 2004; 51:768-81,782-94

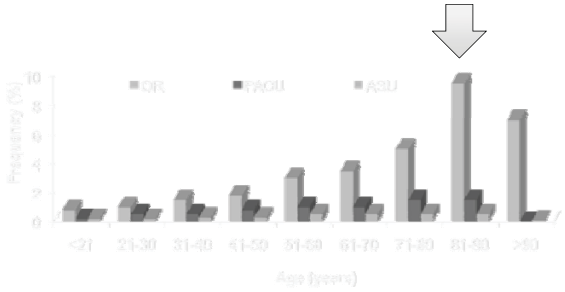
Elderly vs.. Younger Pts Intraop Adverse Events

	Odds Ratio	*P value*
Any event	1.4*	0.003
Cardiovascular	2.0*	0.0001
Respiratory	0.3*	0.004
Intubation related	0.9	0.78

F Chung, CJA 46:309-21, 1999

Frequency of CVS events by age

F Chung, CJA 46:309-21, 1999



A Novel Index of Elevated Risk of Inpt Hospital Admission following Outpt Surgery

Outpt surgery admission index

≥ 65 yr	1	+ve HIV	1
Cardiac Dx	1	OR > 120m	1
PVD	1	Regional	1
CVD	1	GA	2
Malignancy	1		

Pts with scores ≥ 4 vs. 0-1
Odds ratio of admission 32 x

LA Fleisher et al, Arch Surg 2007; 142:263-8

- The risks reported do not constitute a contraindication for elderly pts – day surgery
- Require more careful intraop CVS Mx

F Chung et al, Can J Anesth 46:309-21, 1999

Pts with Pre-existing Medical Diseases

- What are the risks having outpt surgery?
- What happens if pts have pre-existing medical diseases?

Risk factors for inpt hospitalization within 7 days of outpt surgery

Risk Factors	Odds Ratio
Age 70-74	1.12
75-79	1.30
80-84	1.51
≥ 85	1.89

LA Fleisher et al, Arch Surg 2004; 139:67-72

Preexisting Med. Condition

CHF
Hypertension
Asthma
Smoking
GE reflux
Obesity

F Chung, Br J Anaesth 1999

Med Condition	Adverse Event
CHF	↑ 12% prolonged stay
Hypertension	2 x ↑ intraop CV events
Asthma	5 x ↑ postop resp. events

F Chung, Br J Anaesth 1999

The Value of Routine Preop Testing Before Cataract Surgery

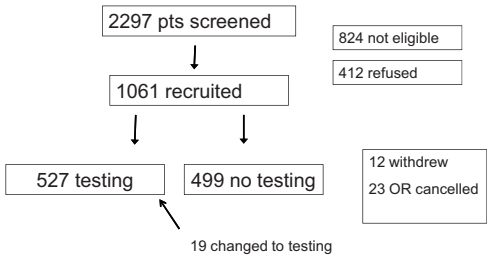
- Multicentre RCT
- 9000 testing vs. 9000 no testing
- No difference in postop adverse events or deaths 3.1 per 100 operations

OD Schein, et al, NEJM 2000; 342:168-75

Med Condition	Adverse Event
Smoking	4 x ↑ postop resp. events
Obesity	4 x ↑ intraop/postop resp. events
GE reflux	8 x ↑ intubation events

F Chung, Br J Anaesth 1999

Enrollment of Pts and Randomized Assignment to Testing Group and No Testing Group



F Chung, Anesthesia and Analgesia 2009

Practice Advisory for Preanesthesia Evaluation: A Report by ASA Task Force on Preanesthesia Evaluation

- **'Routine' preop testing: no valuable contribution**
- **'Indicated' testing: help in decision making**

Anesthesiology 2002; 96:485-96

Elimination of Preop Testing in Ambulatory Surgery

- No significant differences in the rates of perioperative adverse events
- Nor the rates of adverse events within 30 days after surgery

F Chung, Anesthesia & Analgesia 2009

Costs of Preop Testing

Tests	No Test Gp No. of tests ordered and cancelled*	Test Gp No. of tests ordered and done
CBC	382	405
Electrolytes	297	301
Creatinine/Urea	252	246
Blood Glucose	170	176
ECG	421	423
X-ray	77	81
Total	1,599	1,632
Saving/costs	$18,938	$19,470

F Chung, Anesthesia & Analgesia 2009

Ambulatory Anesthesia: An update

- Preoperative preparation
- Selection of patients, preop testing
- Ambulatory anesthesia new literature
  LMA, pain, PONV
- Safe discharge

Preop lab testing in pts undergoing elective, low risk amb surgery (Hernia Repair) Annals of Surg 2012

- 73,596 pts from National Surgical Quality Improvement Program (NSQIP) database (5 yr)
- 64% (46,977) pts underwent testing
- 61.6% with 1 abnormal test
- In 25,149 pts with no co morbidities and no clear indication for testing, 54% received at least 1 test.

Predictors and clinical outcomes from failed LMA: a study of 15,795 pts Ramachandran S K Anesthesiology 2012;116: 1217-26

- LMA failure: An airway event requiring LMA removal and tracheal intubation.
- 170 (1.1%) experienced LMA failure.
- 60% of pts experienced significant hypoxia, hypercapnia, or airway obstruction
- 42% presented with inadequate ventilation related to leak.

Preop lab testing in pts undergoing elective, low-risk amb surgery Benarroch-Gampel J et a; Annals of Surg 2012 256;518-28

- Major Cx (reintubation, PE, stroke, renal failure, coma, cardiac arrest, MI, septic shock, bleeding, or death) occurred in 0.3% of pts.
- After adjusting for pt and procedure characteristics, neither testing nor abnormal results were associated with postop Cxs

Predictors and clinical outcomes from failed LMA: a study of 15,795 pts Ramachandran S K Anesthesiology 2012; 116: 1217-26

4 independent risk factors for failed LMA :

- Surgical table rotation, male sex, poor dentition, and increased BMI.
- A 3-X increased incidence of difficult mask ventilation
- 13.7% had unplanned hospital admission, 5.6% needed ICU for persistent hypoxemia.

Use of Manometry for Laryngeal Mask Airway Reduces Postoperative Pharyngolaryngeal Adverse Events

A Prospective, Randomized Trial

Edwin Seet, M.B.B.S., M.Med.,* Farhanah Yousaf, M.B.B.S.,† Smita Gupta, M.D.,† Rajeev Subramanyam, M.D., D.N.B., M.N.A.M.S.,* David T. Wong, M.D.,‡ Frances Chung, M.D., F.R.C.P.C.§

ABSTRACT

Background: Adverse events such as pharyngolaryngeal complications are indicators of quality patient care. Use of manometry to limit the laryngeal mask airway (LMA) intracuff pressure is not currently a routine practice. This double-blind randomized trial compared pharyngolaryngeal complications in patients managed with manometers to limit the LMA intracuff pressure (<44 mmHg) with patients under routine care.

E Seet, et al Anesthesiology 2010; 112:652-7

Periop lidocaine infusion for postop pain control: a meta-analysis L Vigneault et al Can J Anesth 2011 58:22–37

- 29 studies: 1,754 pts
- Periop IV lidocaine reduced postop pain and opioid requirement, as well as ileus, recovery time, hospital LOS and nausea/vomiting.
- IV lidocaine infusion was effective mainly in abdominal surgery populations.

Table 2. Incidence of Pharyngolaryngeal Complications with the Use of Laryngeal Mask Airway at 1, 2, and 24 h

	1 h		2 h		24 h	
	Pressure Limiting (n = 97)	Routine Care (n = 103)	Pressure Limiting (n = 97)	Routine Care (n = 103)	Pressure Limiting (n = 97)	Routine Care (n = 103)
Sore throat (%)	7.2	7.8	2.1*	8.7	3.1*	13.6
P value	0.883		0.038		0.008	
Dysphagia (%)	1*	12.6	0*	12.6	2.1*	8.7
P value	0.001		<0.001		0.038	
Dysphonia (%)	5.2*	15.5	4.1	11.7	4.1	6.8
P value	0.017		0.050		0.407	

* $P < 0.05$.

E Seet, et al, Anesthesiology; 2010; 112:652-7

Preoperative Dexamethasone Enhances Quality of Recovery after Laparoscopic Cholecystectomy

Effect on In-hospital and Postdischarge Recovery Outcomes

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ABSTRACT

Background: The effect of dexamethasone on quality of recovery after discharge from the hospital after laparoscopic surgery has not been examined rigorously in previous investigations. We hypothesized that preoperative dexamethasone would enhance patient-perceived quality of recovery on postoperative day 1 in subjects undergoing laparoscopic cholecystectomy.

GS Murphy et al, Anesthesiology 2011; 114:882-90

Systemic lidocaine to improve postop quality of recovery after amb lap surgery

De Oliveira, Gildasio S Jr Anesth Analg 2012; 115: 262-7

- RCT, 63 female were randomized to receive lidocaine or NS
- Lidocaine group: better global quality of recovery scores
- Faster hospital discharge criteria
- Less oral opioids

Periop Single Dose Systemic Dexamethasone for Postop Pain: *A Meta-analysis*

De Oliveira GS et al Anesthesiology 2011; 115:575–88

- 24 RCT with 2,751 subjects were included.
- Dexamethasone at doses more than 0.1 mg/kg is an effective adjunct in multimodal strategies to reduce postop pain and opioid consumption

Effect of Periop Alpha 2 Agonists on Postop Morphine Consumption and Pain Intensity

Blaudszun G et al Anesthesiology 2012; 116:1312–22

- 30 studies: 1,792 pts, 933 received clonidine or dexmedetomidine
- Postop morphine-sparing at 24 h
- 4.1 mg with clonidine and 14.5 mg with dexmedetomidine
- Decrease in pain intensity at 24 h
- 0.7 cm on a 10-cm VAS with clonidine and 0.6 cm with dexmedetomidine.
- Adverse effects: bradycardia and arterial hypotension

Non-Opioid Drugs for Minimizing Pain After Surgery

- Acetaminophen
- Propacetamol
- Steroid
- Beta blockade
- Ketamine
- Dextromethorphan
- Clonidine
- Dexmedetomidine
- Gabapentin
- Magnesium
- Neostigmine

White PF, Anesth Analg 2005; 101:S5-S22

Effect of transversus abdominis plane block after lap cholecystectomy Petersen PL Anesth Anal 2012;115: 527-33

- 80 pts were allocated to receive either bilateral ultrasound-guided posterior TAP blocks (20 mL 0.5% ropivacaine) or placebo blocks.
- TAP block may have some beneficial effect in reducing pain while coughing and opioid requirements
- But effect is probably rather small.

An ounce of prevention is worth a pound of cure.

Society for Ambulatory Anesthesia Consensus Statement on Perioperative Blood Glucose Management in Diabetic Patients Undergoing Ambulatory Surgery

Girish P. Joshi, MB, BS, MD, FFARSCI,* Frances Chung, MD, FRCPC,† Mary Ann Vann, MD,† Shireen Ahmad, MD,§ Tong J. Gan, MD, FRCA,‖ Daniel T. Goulson, MD,¶ Douglas G. Merrill, MD,# and Rebecca Twersky, MD, MPH**

Optimal evidence-based perioperative blood glucose control in patients undergoing ambulatory surgical procedures remains controversial. Therefore, the Society for Ambulatory Anesthesia has developed a consensus statement on perioperative glycemic management in patients undergoing ambulatory surgery. A systematic review of the literature was conducted according the protocol recommended by the Cochrane Collaboration. The consensus panel used the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system for providing suggestions. It was revealed that there is insufficient evidence to provide strong recommendations for the posed clinical questions. In the absence of high-quality evidence, recommendations were based on general principles of blood glucose control in diabetics, drug pharmacology, and data from inpatient surgical population, as well as clinical experience and judgment. In addition, areas of further research were also identified. (Anesth Analg 2010;111:1378–87)

G Joshi et al, Anesth Analg 2010; 111:1378-87

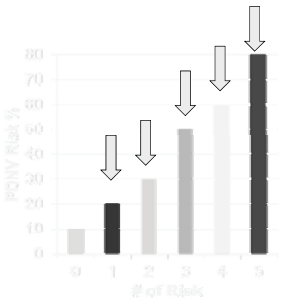
To cure sometimes
To relieve often
To comfort always

Society for Ambulatory Anesthesia Guideline for the Management of PONV

TJ Gan et al, Anesth Analg 2007; 105:1615-28

Simplified risk score for PDNV in adults

Risk Factors	Points
Female sex	1
History of PONV	1
Age < 50 years	1
Opioids in PACU	1
Nausea PACU	1
SUM	**0…5**



Apfel, Anesthesiology 2012; 117: 475-86

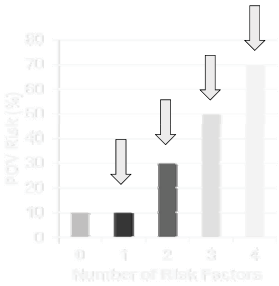
Strategies to Decrease Risk of PONV

1. Use regional anesthesia (avoid GA)
2. Propofol for induction & maintenance
3. Avoid nitrous oxide
4. Avoid volatile agents
5. Minimize intraop & postop opioids
6. Adequate hydration

TJ Gan et al, Anesth Analg 2007; 105:1615-28

Simplified risk score for POV in Children

Risk Factors	Points
Surgery ≥ 30 min	1
Age ≥ 3 yrs	1
Strabismus surgery	1
History of POV or PONV in relatives	1
SUM =	**0…4**



Gan TJ, et al submitted 2013

Who is at risk for PDNV?

Apfel, Anesthesiology 2012; 117: 475-86

- A prospective multicenter study: 2,170 adults
- Overall incidence of PDNV: 37%
- 5 independent predictors

NK_1 Antagonist

A Randomized Double Blind Comparison of the NK_1 Antagonist, Aprepitant vs. Ondansetron for the Prevention of PONV

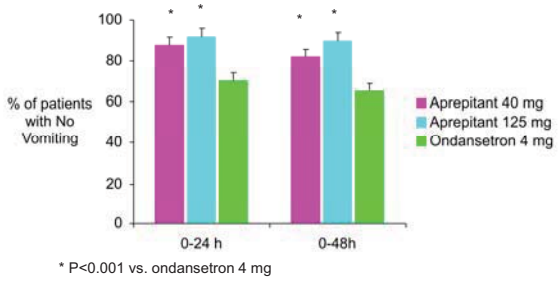
- 805 pts, GA, open abdominal surgery
- Aprepitant 40 mg p.o. 1-3 h before induction
- Aprepitant 125 mg p.o. 1-3 h before induction
- Ondansetron 4 mg iv before induction

TJ Gan et al Anesth Analg 2007; 104:1082-9

Palonosetron

- Unique structural characteristics fused tricyclic ring
- More potent at 5-HT_3 receptors
- Longer acting
  - –Plasma half life 40 h vs. 5-12 h

Patients with No Vomiting



* P<0.001 vs. ondansetron 4 mg

TJ Gan et al Anesth Analg 2007; 104:1082-9

Advantage of Palonosetron

- Ondansetron: less effective in pts with ↑ $P45O_{2D6}$ activity (fast metabolization)
- $5HT_3$ associated with QT prolongation
- Association of dolasetron with severe arrhythmias
  - HPB (Canada) = black box warning
- Palonosetron
  - no association with QT prolongation
  - long half life
  - Indication for late phase PONV
  - Chemotherapy induced for nausea and vomiting

Palonosetron

Ambulatory Anesthesia: An update

- Preoperative preparation
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- Ambulatory anesthesia new literature
- Safe discharge

Discharge

Success of outpatient surgery -- appropriate and timely discharge

British anesthetist

Patient disharged home without escort

Killed in car accident

British anesthetist charged with manslaughter

- Car Accidents After Ambulatory Surgery in Pts Without an Escort
  - F Chung et al , Anesth and Analg 2008;106;817-20

Hong Kong

- Patient discharged home after monitored anesthesia care
- Patient without escort
- Went home on subway
- Purse was snatched

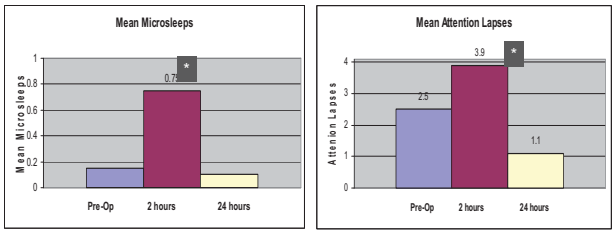
Intranasal Midazolam Premedication

American Academy of Pediatrics & American Academy of Pediatric dentistry

- Guideline for monitoring and Mx of pediatric pts during and after sedation
- Preferable to have 2 or more adults accompany children still in car safety seats
- 4 children in car seats died during transport

When can patients drive safely after GA?

Polygraphic/EEG Monitoring: Higher rates at Pre-Op and 2 hours



F Chung et al , Anesthesiology 2005

Objective and subjective sleepiness, alertness and fatigue in normal controls and pts before surgery

Measure	Controls Mean (SD)	Patients Mean (SD)
Attention lapses	0.15 ± 0.48	2.5 ± 1.7**
Micro-sleep	0.20 ± 0.61	0.15 ± 0.36
Stanford sleepiness	2.2 ± 0.8	2.4 ± 0.8
Alertness Scale	37.0 ± 5.3	42.6 ± 5.4*
Fatigue Severity	27.5 ± 9.3	26.4 ± 11.3

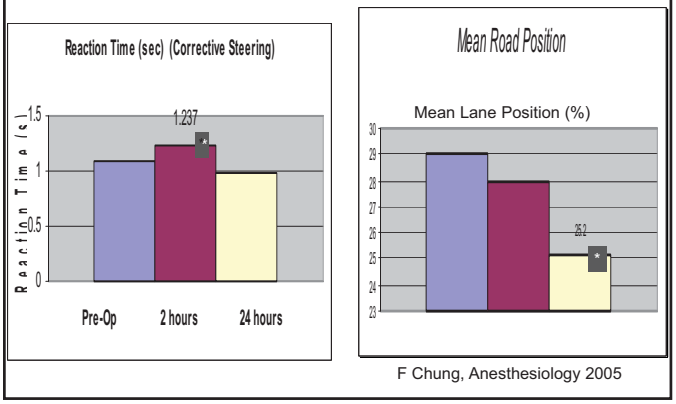
F Chung et al, Anesthesiology 2005

Driving Simulation

- Lower alertness levels & impaired driving performance preop
- Driving simulation, EEG-verified sleepiness & attention deficits at 2h postop, normal at 24 h

F Chung et al Anesthesiology 2005

Reaction Time & Road Position:



F Chung, Anesthesiology 2005

- Recent Japanese observational report in GI journal
- Over 10,000 pt sent home without escort after gastrocopy- propofol sedation

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