An Update on Ambulatory anesthesia

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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

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

Awake Craniotomy for Removal of Intracranial Tumor: Considerations for Early Discharge
• 241 pts
• 76 pts (31%) 23 h stay
• 15 pts (6%) day surgery

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

Ambulatory Anesthesia: An update
• Preoperative preparation
• Selection of patients, preop testing
• Ambulatory anesthesia new literature
• Safe discharge

**Ambulatory Patient Selection Criteria**

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

<table>
<thead>
<tr>
<th>Presented condition</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior MI (1-6 months)</td>
<td>83</td>
</tr>
<tr>
<td>CHF III</td>
<td>82</td>
</tr>
<tr>
<td>CHF IV</td>
<td>98</td>
</tr>
</tbody>
</table>


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

<table>
<thead>
<tr>
<th>Presented condition</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep apnea-GA narcotics post-op</td>
<td>84</td>
</tr>
<tr>
<td>Morbid obesity (BMI 35-45) with CVS or resp cx</td>
<td>82</td>
</tr>
<tr>
<td>Morbid obesity (BMI&gt;45 kg/m²) with CVS or resp cx</td>
<td>95</td>
</tr>
<tr>
<td>No escort</td>
<td>88</td>
</tr>
</tbody>
</table>


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**Pt Selection**

- Elderly pt
- Coronary ht disease
- Obstructive sleep apnea
- Asthma
- Upper resp. infection

- DM
- Morbid obesity
- Pediatric pt
- Malignant hyperthermia
- Monoamine oxidase inhibitor

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**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

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**Pt Selection: Exclusion Criteria**

- Unstable ASA physical status 3 and 4
- Complex morbid obesity/complex sleep apnea
- Acute substance abuse
- Sickle cell disease
• The risks reported do not constitute a contraindication for elderly pts – day surgery

• Require more careful intraop CVS Mx


Pts with Pre-existing Medical Diseases

• What are the risks having outpt surgery?

• What happens if pts have pre-existing medical diseases?

F Chung, Br J Anaesth 1999

Preexisting Med. Condition

CHF
Hypertension
Asthma
Smoking
GE reflux
Obesity

F Chung, Br J Anaesth 1999

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

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

Outpt surgery admission index

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>&gt; 65 yr</td>
<td>1</td>
</tr>
<tr>
<td>+ve HIV</td>
<td>1</td>
</tr>
<tr>
<td>Cardiac Dx</td>
<td>1</td>
</tr>
<tr>
<td>OR &gt; 120m</td>
<td>1</td>
</tr>
<tr>
<td>PVD</td>
<td>1</td>
</tr>
<tr>
<td>Regional</td>
<td>1</td>
</tr>
<tr>
<td>CVD</td>
<td>1</td>
</tr>
<tr>
<td>GA</td>
<td>2</td>
</tr>
<tr>
<td>Malignancy</td>
<td>1</td>
</tr>
</tbody>
</table>

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

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


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

2297 pts screened
824 not eligible
1061 recruited
412 refused
412 refused
1061 recruited
527 testing
499 no testing
12 withdrew
23 OR cancelled
19 changed to testing

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

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

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.


- 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.
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

Preoperative Dexamethasone Enhances Quality of Recovery after Laparoscopic Cholecystectomy
Effect on In-hospital and Postdischarge Recovery Outcomes
Glenn G. Murphy, M.D.,* Joseph W. Stack, M.D.,† Steven B. Greenberg, M.D.,‡ Michael J. Avenon, Ph.D.,‡ Jeffrey H. Vrabel, M.D.,‡ Marguerite Nunnan, R.N.,‡ Jennifer Vaughn, R.N.‡

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 in postoperative day 1 in subjects undergoing laparoscopic cholecystectomy.

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

Periop lidocaine infusion for postop pain control: a meta-analysis

- 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.

Preop 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

- 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.

To cure sometimes
To relieve often
To comfort always
Society for Ambulatory Anesthesia Guideline for the Management of PONV


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


Simplified risk score for PDNV in adults

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Points</th>
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<tbody>
<tr>
<td>Female sex</td>
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<tr>
<td>History of PONV</td>
<td>1</td>
</tr>
<tr>
<td>Age &lt; 50 years</td>
<td>1</td>
</tr>
<tr>
<td>Opioids in PACU</td>
<td>1</td>
</tr>
<tr>
<td>Nausea PACU</td>
<td>1</td>
</tr>
<tr>
<td><strong>SUM</strong></td>
<td><strong>0...5</strong></td>
</tr>
</tbody>
</table>

Apfel, Anesthesiology 2012; 117: 475-86

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

NK₁ Antagonist
A Randomized Double Blind Comparison of the NK₁ 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-HT₃ receptors
- Longer acting
  - Plasma half life 40 h vs. 5-12 h

Patients with No Vomiting

Advantage of Palonosetron

- Ondansetron: less effective in pts with ↑ P450₂D₆ activity (fast metabolization)
- 5HT₃ 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

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Discharge
Success of outpatient surgery -- appropriate and timely discharge

British anesthetist
Patient discharged 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?

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

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

Driving Simulation

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

Reaction Time & Road Position:

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