Which candidates are not appropriate for ophthalmic ambulatory surgery?

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Conflict of interest

- None

Old postcard: “A blind man from Kotari”, Dalmatia, Croatia
Outline

- Current evidence regarding specific characteristics and medical conditions in ophthalmic patients inappropriate for ambulatory anesthesia
- Considerations regarding specific characteristics of eye surgery procedures not feasible in ambulatory setting
- Current issues and considerations regarding an approach to determine candidates not appropriate for ophthalmic ambulatory surgery
Approaches in case selection for ophthalmic AA:

- traditional
- evidence-based medicine
  - Guidelines and protocols:
    - patient selection for day case procedure
    - patient selection for procedure under local anesthesia


[www.asahq.org/guidelines/guidelines-for-ambulatory-anesthesia](http://www.asahq.org/guidelines/guidelines-for-ambulatory-anesthesia)
Expansion of ophthalmic ambulatory anesthesia

**Contributing factors to the growth of ophthalmic AA**

- minimally invasive eye-surgical techniques
- improvements in anesthesia techniques and pain control
- characteristics of ophthalmic patient population
- economic pressures

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*Source: American Hospital Association*

*Percentage of Inpatient vs. Outpatient Surgeries in USA*

*With permission from WMG Health*
Common day-case ophthalmic surgeries

- Cataract extraction
- Strabismus repair
- Glaucoma surgery
- Nasolacrimal duct probing
- Chalazion excision
- Eye examination under GA (tonometry)

- Surgery/ anesthesia time is a predictor for postoperative complications
- Longer operations with high risk of perioperative complications - not appropriate for ophthalmic AA
- Eye surgery – low risk (cardiac risk <1%)*

Is day-surgery safe?

- A large scale prospective cohort study of 57,709 day-surgery procedures from 8 DS centers, from 2005–2007, n= 697, age 0-100 years, (Denmark)

- Most frequently performed operations:
  - knee surgery 14.9%
  - foot and ankle surgery 6.4%
  - shoulder surgery 6.3%

- Highest rate of return hospital visits
  - tonsillectomy, adenoidectomy 11.4% (9.06-14.10)
  - surgically induced abortion 3.13% (2.52-3.84)
  - cholecystectomy 2.26% (1.48-3.30)

- Phacoemulsification (cataract)
  - proportion 2.4%
  - return hospital visits 0.50% (0.20-1.03)

- Return hospital visits 1.21% (95%CI, 1.12-1.30)

- Minor morbidity:
  - infection 0.44%
  - haemorrhage/haematomas 0.50%
  - thromboembolic events 0.03%

- Major morbidity rare, no deaths related to AA

Risk of hemorrhagic complications in eye-surgery procedures

- **High:** orbital and oculoplastic
- **Intermediate:** vitreoretinal, glaucoma, corneal transplant
- **Low:** cataract surgery

- Surgical bleeding and needle block hemorrhagia may be detrimental for vision function
- High/intermediate risk surgery in a patient with antiplatelet and anticoagulant therapy - not appropriate for outpatient setting
- Anterior chamber ocular procedures (cataract extraction) may be safely performed in outpatients under antiplatelet therapy and anticoagulants (heparin, vitamin K antagonists VKA, new oral anticoagulants NOAC)

A survey of Canadian anesthesiologists

<table>
<thead>
<tr>
<th>Presented condition</th>
<th>%, n= 1337</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASA PS IV</td>
<td>82.4</td>
</tr>
<tr>
<td>Angina pectoris IV</td>
<td>95.3</td>
</tr>
<tr>
<td>Prior myocardial infarction (1-6 months)</td>
<td>83.1</td>
</tr>
<tr>
<td>Congestive heart failure NYHA III</td>
<td>82.6</td>
</tr>
<tr>
<td>Congestive heart failure NYHA IV</td>
<td>98.4</td>
</tr>
<tr>
<td>Sleep apnea (GA + narcotics postoperatively)</td>
<td>84.2</td>
</tr>
<tr>
<td>Morbid obesity ( BMI 35-44 kg/m² ) + cardiovascular or respiratory complications</td>
<td>81.7</td>
</tr>
<tr>
<td>Morbid obesity ( BMI ≥45 kg/m² ) + cardiovascular or respiratory complications</td>
<td>95.2</td>
</tr>
<tr>
<td>No escort</td>
<td>88.1</td>
</tr>
</tbody>
</table>

Inappropriate outpatient selection influences outcomes

- Reduced efficiency of outpatient ophthalmic service

- Outcomes:
  - perioperative morbidity and mortality
    - loss of visual acuity, blindness
  - prolonged postoperative stay
  - unanticipated hospital admission
  - return to hospital visit and readmission
  - patient and family dissatisfaction

- Outcome measures are indicators of anesthesia quality!
Factors influencing case selection

- **Medical factors**
  - Medical conditions, comorbidities
  - Medications (oral, topical, herbal supplements)

- **Surgery-related factors**
  - Types of procedures (length of procedure, postoperative complications, pain)
  - Surgeon’s skills
  - Surgeon’s demands (akinesia, painless, calm and cooperative patients)

- **Anesthesia factors**
  - Anesthesia skills (familiar with all types of anesthesia techniques)*
    - Monitored anesthesia care, MAC
    - Regional blocks
      - Needle blocks
        - Retrobulbar
        - Peribulbar
      - Sub-Tenon block
    - Topical anesthesia
    - General anesthesia (shorter acting anesthetics)

- **Social factors** (escort, support)

Proper screening and case selection is important to ensure patient safety!

Age of ophthalmic outpatients

- **Extremes of age (age alone is not an exclusion criterion)**

- **Inappropriate for local anesthesia, LA:**
  
  **Elderly***:
  - unable to lie still on the operating table, uncontrolled tremor and chronic cough
  - demented, uncooperative, disoriented
  - neurologic diseases (Parkinson’s disease)
  - deafness

  **Children:**
  - restlessness, scared, congenital diseases

- **Exclusion from ophthalmic AA:**
  - no responsible adult escort and no support upon discharge
  - unable to follow instructions after discharge

- **Systemic effects of eye drops on the elderly (cognitive dysfunction):**
  - Anticholinergic:
    - Atropine and Scopolamine (central anticholinergic syndrome)
    - Cyclopentolat (disorientation, psychosis, convulsions)

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ASA physical status

- Poorly optimized medical conditions ASA III and ASA IV are not suitable for ophthalmic ambulatory anesthesia
- ASA III can be treated safely (good pre-assessment, adequate preparation)*

*Ansell GL, Montgomery JE. Br J Anaesth 2004;92(1):71-4
Pre-existing medical conditions and perioperative adverse outcomes

<table>
<thead>
<tr>
<th>Medical condition</th>
<th>Associated adverse outcome</th>
<th>Increase in the risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestive heart failure</td>
<td>Prolonged postoperative stay</td>
<td>12% prolongation</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Intraoperative cardiovascular events</td>
<td>2 fold</td>
</tr>
<tr>
<td>Asthma</td>
<td>Postoperative respiratory events</td>
<td>5 fold</td>
</tr>
<tr>
<td>Smoking</td>
<td>Postoperative respiratory events</td>
<td>4 fold</td>
</tr>
<tr>
<td>Obesity</td>
<td>Intra/postoperative respiratory events</td>
<td>4 fold</td>
</tr>
<tr>
<td>GE reflux</td>
<td>Intubation related adverse events</td>
<td>8 fold</td>
</tr>
</tbody>
</table>

Predictors for perioperative morbidity

- American College of Surgeons’ National Surgical Quality Improvement Program (NSQIP) database from 2005-2010, n= 244 397 Day Case-eligible adult patients

- Predictors of early (-72 hours) perioperative morbidity and mortality (≈1:1000 patients) after controlling for surgical complexity:
  - Chronic obstructive pulmonary disease, COPD
  - History of transient ischemic attack/stroke
  - Obese BMI
  - Previous PCI/cardiac surgery
  - Prolonged operative time
  - Hypertension
  - Overweight BMI

- Morbidity: pneumonia, unplanned postoperative intubation, wound disruption, postoperative bleeding, sepsis

Unplanned hospital admission after AA

Predictors¹:
- Length of surgery (> 1 h)
- Advanced age (> 80 years)
- Increased BMI (30-35 kg/m²)
- High ASA class (ASA PS ≥ III)

Outpatients surgery admission index (OSAI)²:
- 65 or older (1 point)
- Surgery time >120 minutes (1 point)
- Medical diagnoses (1 point):
  - Cardiac disease
  - Peripheral vascular
  - Cerebrovascular
  - Malignancy
  - HIV positive
- Regional anesthesia (1 point)
- General anesthesia (2 points)

<table>
<thead>
<tr>
<th>Point</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0, 1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>9.46 (8.12-11.03)</td>
</tr>
<tr>
<td>3</td>
<td>20.5 (17.45-24.08)</td>
</tr>
<tr>
<td>4, 5, 6</td>
<td>34.62 (28.55-41.97)</td>
</tr>
</tbody>
</table>

Who is not admitted for surgery?

- **Cardiovascular diseases**
  - Uncontrolled hypertension
  - Ischemic heart failure with unstable angina
  - Recent myocardial infarction
  - Decompensated heart failure
  - Significant cardiac arrhythmias (i.e. new-onset atrial fibrillation)
  - Severe valvular disease (i.e. aortic/mitral stenosis with symptoms)
  - Recent cardiac therapeutic intervention
    - Hemorrhagic complications (surgical bleeding, needle block) may compromise visual function
    - Low-risk eye surgery may be performed under antiplatelet dual therapy
    - If discontinuation of dual antiplatelet therapy is needed, continue aspirin
- **Outpatients with ICD - avoid free-standing/office based facilities**
  - Ocular procedures usually involve the use of bipolar electrosurgery
- **Cardiovascular effects of eye drops**
  - $\alpha$ adrenergic agonist Phenylephrine (hypertension, tachycardia, dysrhythmias)
  - Sympathetic agonist Epinephrine (hypertension, tachycardia, bradycardia)
  - Cholinergic agonist Acetylcholine (bradycardia, hypotension)
  - Nonselective $\beta$-adrenergic antagonist Timolol (bradycardia, hypotension, arrhythmia)

Who is not admitted for surgery?

- **Hyper-reactive airway diseases**
  - Severe **COPD** poorly optimized, intractable cough
  - **Asthma** with acute symptoms
  - Upper airway respiratory infection **URI** in children

- **Systemic effects of eye drops (bronchospasm)**
  - Nonselective $\beta$-adenergic antagonist **Timolol**
  - Cholinergic agonist **Acetylcholine**
  - Cholinesterase inhibitor **Echothiophate**

- Accumulation of $\text{CO}_2$ under drapes can lead to anxiety, hypertension and increased choroidal blood flow
- Indiscriminate $\text{O}_2$ supplementation may added the risk
- Hypoxemia can occur in the elderly by adopting the supine position
- Stopping smoking prior to surgery is strongly encouraged
Who is not admitted for surgery?

- Renal and hepatic disease
  - Patients on dialysis – (co-morbidity, practical difficulties) can be considered for simple eye-surgery
  - Severe liver disease - contraindicated
Who is not admitted for surgery?

- **Brittle diabetes mellitus**
  - DM is not an exclusion criteria for AA but blood glucose level should be controlled (fasting blood glucose level, glycated hemoglobin HbA₁c)
  - Chronically poorly controlled DM: decision should be made in conjunction with ophthalmologist (comorbidity, risk of surgical complications)

- Significant complications of hyperglycemia is an exclusion criterion:
  - severe dehydration
  - ketoacidosis
  - hyperosmolar nonketotic states

Who is not admitted for surgery?

- **Obesity is not an exclusion criteria**
- Obesity-associated comorbid conditions:
  - OSA, Obstructive sleep apnea
  - Metabolic syndrome, Diabetes
  - Difficult airway
  - Hypoventilation syndrome

- **Complex obese patients are not appropriate for AA**¹
  - Super obesity BMI > 50kg/m²
  - Morbid obese BMI 40-50 kg/m² with cardiorespiratory symptoms
  - OSA with inadequately treated comorbid conditions²,³
  - Severe OSA requiring postoperative narcotics²,³
  - OSA patients unable to use CPAP after discharge²,³
  - ASA Scoring system for perioperative risk from OSA³; [SurgicalRiskCalculator.com](https://SurgicalRiskCalculator.com)

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² Joshi GP, Ankichetty SP, Gan TJ, Chung F. Anesth Analg 2012;115:1060-8
³ Anesthesiology 2014;120(2):268-86
Who is not admitted for surgery?

- **Malignant hyperthermia** MH susceptibility is not an exclusion criterion in appropriate facilities:
  - postoperative temperature monitoring > four hours
  - dantrolene

- **Higher susceptibility for MH**
  - Strabismus surgery
  - Ptosis surgery

- **Multiple chronic centrally active drug therapies** are not exclusion criterion if it is possible to avoid interaction of monoamine oxidase inhibitors MAOi with:
  - cocaine (cocaine eye drops)
  - meperidine
  - indirect acting catecholamine (ephedrine)

- **Acute substance abuse**
How fit are You?

If you reach the 4th floor you are fit for the eye surgery.
Global health implications of preanesthesia examination for ophthalmic outpatients

New medical issues and unstable existing conditions found by preanesthesia medical examination; by provider and retrospective review (n=530)

<table>
<thead>
<tr>
<th>Area</th>
<th>New medical issues</th>
<th>Unstable existing</th>
<th>New or unstable existing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Provider</td>
<td>Chart review</td>
<td>Provider</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>29 (5%)</td>
<td>58 (11%)</td>
<td>30 (6%)</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>5 (1%)</td>
<td>10 (2%)</td>
<td>8 (2%)</td>
</tr>
<tr>
<td>Hematology/oncology</td>
<td>4 (1%)</td>
<td>11 (2%)</td>
<td>3 (1%)</td>
</tr>
<tr>
<td>Neurology</td>
<td>3 (1%)</td>
<td>3 (&lt;1%)</td>
<td>2 (&lt;1%)</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>2 (&lt;1%)</td>
<td>4 (1%)</td>
<td>1 (&lt;1%)</td>
</tr>
<tr>
<td>Dermatology</td>
<td>2 (&lt;1%)</td>
<td>2 (&lt;1%)</td>
<td>1 (&lt;1%)</td>
</tr>
<tr>
<td>Renal</td>
<td>12 (2%)</td>
<td>16 (3%)</td>
<td>7 (1%)</td>
</tr>
<tr>
<td>Endocrine</td>
<td>8 (2%)</td>
<td>16 (3%)</td>
<td>4 (1%)</td>
</tr>
<tr>
<td>Other</td>
<td>12 (2%)</td>
<td>14 (3%)</td>
<td>5 (1%)</td>
</tr>
<tr>
<td>All (95%CI)</td>
<td>66 (12%, 10-16%)</td>
<td>117 (22%, 19-26%)</td>
<td>54 (10%, 8-13%)</td>
</tr>
</tbody>
</table>

Philips MB, Bendel RE, Crook JE, Diehl NN. Anesthesiology 2013;118:1038-45
Conclusions

- There is a growing trend of more sophisticated eye surgery procedures performed on more demanding outpatients while maintaining safety.
- Inappropriate candidates should be recognized and assessed by an experienced anesthesiologist before the procedure.
- Each complex ophthalmic outpatient should be evaluated individually with multidisciplinary input and the implementation of clinical pathways.
- Pre-existing medical conditions are rarely an exclusionary criterion and routine laboratory testing is not recommended but pre-anesthesia examinations may be relevant for long term patient health.
- Screening candidates who are not appropriate for ophthalmic ambulatory anesthesia is helpful in reduction of cancellations. The efficiency of ophthalmic outpatient service is thus maintained and patient safety ensured.
Thank you for your attention!