What Technicians and Nurses Need to Know About Anesthesia

Richard J. Ruckman, M.D., F.A.C.S.

No financial interest in products discussed.

Off-label use may be discussed.

For certain products, the brand name will be used.

Objectives

- Describe the goals of conscious sedation
- Recognize perioperative risks in outpatient surgery
- Discuss techniques, risks, and benefits of local, topical, and intraocular anesthesia
- Review nursing options for management of anesthesia-related complications

Anesthesia Evaluation

- The Technician’s Role
  - Starts as soon as patient walks into the exam room
  - Focused history
    - Allergies: Can you safely use anesthetic eye drops if allergic to Novacaine?
    - Medications, herbals, problems with previous surgery
    - Tamsulosin (Flomax)

Anesthesia Evaluation

- Most of the discussion will be related to cataract surgery
  - #1 ocular procedure ~ 3.57 million in 2012
  - 83% are performed in ASC’s
  - Grew 3.4% in 2012

Anesthesia Evaluation

- Demand for eye surgery will increase
- Number of ophthalmologists will not
- To meet the demand: doctors, technicians, and nurses must work as a team
- The RN will be the key liaison between the doctor and other staff members

Crew Resource Management, Richard J. Ruckman, M.D.
Ophthalmology Management, Aug., 2007
Perioperative Standards and Recommended Practices of AORN

- A fundamental precept of AORN is that it is the responsibility of professional registered nurses to ensure safe, high-quality nursing care to patient’s undergoing operative and other invasive procedures.

(AORN: Association of periOperative Registered Nurses)

Registered Nurses Providing Conscious Sedation

Be aware of current policies for your state:

“The perioperative registered nurse should consult with his or her state board of nursing for any changes or revisions to declaratory rulings and other guidelines that relate to the perioperative registered nurse’s role as a provider of moderate sedation/analgesia.”


Why be Familiar with “Conscious Sedation”?

- RN’s are increasingly involved in providing conscious sedation
- You may be the primary face-to-face contact with the patient and should be familiar with the anticipated effects of conscious sedation

Moderate Sedation/Analgesia (“Conscious Sedation”)

The use of moderate sedation/analgesia allows patients to tolerate unpleasant procedures while maintaining adequate cardiorespiratory function, protective reflexes, and the ability to respond purposefully to verbal and/or tactile stimulation.

**Continuum of Sedation**

<table>
<thead>
<tr>
<th></th>
<th>Minimal sedation</th>
<th>Moderate sedation/analgesia</th>
<th>Deep sedation/analgesia</th>
<th>General anesthesia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsiveness</td>
<td>Normal response to verbal stimulation</td>
<td>Purposeful response to verbal or tactile stimulation*</td>
<td>Purposeful response following repeated or painful stimulation*</td>
<td>Unresponsive even with painful stimuli</td>
</tr>
<tr>
<td>Airway</td>
<td>Unaffected</td>
<td>No intervention required</td>
<td>Intervention may be required</td>
<td>Intervention often required</td>
</tr>
<tr>
<td>Spontaneous ventilation</td>
<td>Unaffected</td>
<td>Adequate</td>
<td>Intervention may be required</td>
<td>Frequently inadequate</td>
</tr>
<tr>
<td>Cardiovascular function</td>
<td>Unaffected</td>
<td>Usually maintained</td>
<td>Usually maintained</td>
<td>May be impaired</td>
</tr>
</tbody>
</table>

*Reflex withdrawal from a painful stimulus is not considered a purposeful response.

Perioperative Standards and Recommended Practices, 2013 Edition page 420, AORN

**Objective of Conscious Sedation/Analgesia**

- Alteration of mood
- Enhanced cooperation
- Alteration in perception of pain
- Maintenance of consciousness
- Maintenance of intact protective reflexes
- Minimal variation of vital signs
- Some degree of amnesia
- Rapid, safe return to activities of daily living

**Pre-Procedure Patient Assessment**

- Comprehensive H-P and surgery may be performed on the same day
  - Performed by qualified personnel
  - Is comprehensive
  - Placed in record prior to surgery
  - May be combined with pre-surgical assessment
  - May not be more than 30 days in advance of surgery

Centers for Medicaid, CHIP, and Survey & Certification/Survey & Certification Group December 17, 2010

**Pre-Procedure Patient Assessment**

- Medications should include over-the-counter and herbal
  - Examples associated with increased risk of bleeding
    - Ginkgo biloba
    - Ginseng
    - Garlic
    - Ginger
    - Vitamin E
    - > 1000 units


**Pre-Procedure Patient Assessment**

- Lab Values
  - “We found that there was no benefit to the testing whatsoever, and we recommended that routine lab tests be dropped.”

Pre-Procedure Patient Assessment - Anticoagulants

• Should warfarin (Coumadin) be discontinued prior to intraocular surgery?
  – Incidence of ocular hemorrhage 0-30% usually benign
  – Small risk of stroke if discontinued
  – Check with prescribing physician prior to stopping Coumadin

Audio-Digest, Vol. 43:3, Feb. 7, 2005

Pre-Procedure Patient Assessment - Anticoagulants

Warfarin (Coumadin) recommendations:
• OK for cataract surgery
• OK for subtenons
• Maybe for retrobulbar/peribulbar anesthesia
• Maybe for vitreoretinal surgery

J Cat Refractive Sug, Vol. 32, June 2006

Pre-Procedure Patient Assessment - Anticoagulants

Continue warfarin for most patients
Consider Heparin “bridging” for very high risk patients, i.e., recent embolus or multiple heart valves
Aspirin and anti-platelet drugs
“OK” to continue
Assess the risk . . . and document

Audio-Digest, Vol. 43:3, Feb. 7, 2005

Pre-Procedure Patient Assessment - Anticoagulants

“The issue of the medical-legal aspects is a very critical one . . . The older literature indicates that anticoagulation should be modified or discontinued prior to embarking on ocular surgery. But a more recent appraisal of the literature shows that certainly cataract surgery can be done safely despite anticoagulation.”

Trans Am Ophthalmologic Soc 2006, December; 104:149-160

Pre-Procedure Patient Assessment - Anticoagulants

Consider PT-INR monitoring system*
• Finger stick sample
• International Normalized Ratio (INR)
  – Not on therapy 0.9-1.1
  – Therapeutic range 2.0-3.0
  – Prosthetic heart valve/high risk 2.5-3.5

* Example – hemosense

Audio-Digest, Vol. 43:3, Feb. 7, 2005

Pre-Procedure Patient Assessment - Anticoagulants

Dabigatran (Pradaxa)
• Oral direct thrombin inhibitor
• Alternative to warfarin for atrial fibrillation
• Does not require INR testing
• Monitor: aPTT (a partial thromboplastin time)
• May discontinue 1-2 days prior to surgery

Drugs.com
Pre-Procedure Patient Assessment - Anticoagulants

- **Rivaroxaban (Xarelto)**
  - Direct factor xA inhibitor
  - Indicated afib, deep vein thrombosis, pulmonary embolus
  - Stop 24 hours prior to surgery
  - No reversal agent

- **Clopidogrel (Plavix)**
- **Prasugrel (Effient)**
  - Platelet activation inhibitor
  - Stop 7 days prior to surgery
  - Emergency surgery – platelet transfusion

Pre-Procedure Patient Assessment - Anticoagulants

- Drug – eluting heart stents
  - American Heart Association warns against discontinuing anticoagulant therapy* in first year after placement of drug eluting stent.

- ASA Anesthesia Classification
  - **Class P1** A normal healthy patient
  - **Class P2** A patient with mild systemic disease
    - Example: Asthma, obesity, diabetes mellitus
  - **Class P3** A patient with a severe systemic disease
    - Example: Cardiovascular disease that limits activity; severe diabetes with systemic complications

Perioperative Screening

**Objective:**
To initiate any effort which will eliminate or reduce surgical and post-operative discomfort and complications.

Goals to Achieve Patient Comfort

**How to Obtain Objective:**
  - Approach the patient with interest in his/her well being
  - Gain patient’s confidence
  - Preoperative verification – determine correct patient, correct site, and correct procedure
  - Always explain what you are about to do
  - Identify the patient’s personality and communicate this to the surgeon
ASA Anesthesia Classification

Class P4
A patient with a severe systemic disease that is a constant threat to life
Example: Renal insufficiency, angina, COPD

Class P5
A moribund patient who is not expected to survive without surgical intervention
Example: Ruptured abdominal aneurysm with profound shock


NPO Status
• “Healthy” patients undergoing elective procedures
  – Clear liquids: 2 hrs.
  – Light meal: 6 hrs.

Anesthesiology, April 2002;96/4:1007

Malignant Hyperthermia
• Genetic
• Triggered by:
  – Inhalation anesthetics
  – Depolarizing muscle relaxant succinylcholine (Anectine)
• Reversed by dantrolene (Dantrium)

AAAHC Standards Revisions 2011

Malignant Hyperthermia
• “This standard was amended to clarify that if succinylcholine is present on a crash cart and available as an emergency resuscitative medication only, dantrolene is required to be present in the facility. This standard remains in effect even if an organization is performing procedures using only a local anesthetic; if an organization has triggering agents, it must meet this standard.”

AAAHC Standards Revisions 2011

NPO Status
• For cataract surgery
  – Clear liquids: Median 6 hours
    Range 0-12 hours
  – Solid food: Median 6.5 hours
    Range 0-12 hours

Cataract Extraction with Lens Insertion January - June 2012
AAAHC Standards Revisions 2011
AAAHC Standards Revisions 2011
Institute for Quality Improvement 2012
Malignant Hyperthermia

- “Safe”
  - Narcotics
  - Propofol
  - Ketamine
  - Rocuronium (Zemuron) – non-depolarizing relaxant

www.mhaus.org  800-644-9737

Patient Requirements for Anesthesia with Cataract Surgery. Is it increasing?

- Initial anesthesia: IV Versed, topical, and intraocular lidocaine
- May be supplemented with Versed, Fentanyl, Propofol, and/or block
- Requirement for additional anesthesia:
  - 2005: Men 9.52%  Women 13.10%
  - 2012: Men 20.2%  Women 32.5%

The Center For Sight 2013

Increased Anesthesia Requirements

- Age*
  - The average age for cataract surgery is 67.4 compared to 2004 when the average age was 73, but the curve is bimodal with more younger and older people.
- Poly-pharmacy
- “More” nervous

* The Center For Sight 2010

Geriatric Anesthesia

- Geriatrics arbitrarily defined as 65 or older
- Aging is associated with 1.0-1.5% per year decrease in function of major organ systems after age 30
- Note: Functional age is far more important than chronological age

Moderate Sedation/Analgesia, 2nd edition 2004

Geriatric Anesthesia

- Prolonged circulatory time
  - Requires longer period for interval dosing
    - Standard mg/kg doses may not apply
- Decreased ventilatory responsiveness to hypoxia and hypercapnea
  - Greater risk for apnea
- Liver size and kidney function decreases
  - Less ability to breakdown anesthetics
- Increased risk of drug interactions

Moderate Sedation/Analgesia, 2nd edition, 2004

Geriatric Anesthesia

- Reduce dosage 30-50%
- Use small incremental doses of sedative and analgesic agents
- Wait longer to assess full pharmacologic effects
**Geriatric Anesthesia**

Elimination Half Life – Young Adult/Older Adult

<table>
<thead>
<tr>
<th>DRUG</th>
<th>YOUNG ADULT</th>
<th>OLDER ADULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>2.9 hrs.</td>
<td>4.5 hrs.</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>4 hrs.</td>
<td>15 hrs.</td>
</tr>
<tr>
<td>Diazepam</td>
<td>24 hrs.</td>
<td>72 hrs.</td>
</tr>
<tr>
<td>Midazolam</td>
<td>2.8 hrs.</td>
<td>4.3 hrs.</td>
</tr>
</tbody>
</table>

*Moderate Sedation/Analgiesia, 2nd Edition 2004*

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**Anesthesia and Surgery**

Intraocular Pressure Increases:

- Body position
- Hypoxia (low oxygen)*
- Hypercapnea (high CO2)
- Increased venous pressure

* Remember: Oxygen is a drug

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**Anesthesia and Surgery**

Intraocular Pressure Decreases:

- Sedation
- Adequate ventilation*
- Medication - Versed, Valium

* Remember: Oxygen is a drug

---

**Anesthesia**

A Guide to Topical/Regional Anesthetics – Esters:

| Bupivacaine | 0.25%, 0.5%, 0.75% | 5-11 min. | 480-720 m in. |
| Lidocaine | 0.5%, 1%, 2%, 4% | 4-6 min. | 40-120 m in. |
| Mepivacaine | 1%, 2%, 3% | 3-5 min. | 120 m in. |

* With regional use

---

**Anesthesia**

A Guide to Topical/Regional Anesthetics – Amides:

| Bupivacaine | 0.25%, 0.5%, 0.75% | 5-11 min. | 480-720 m in. |
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* With regional use

---

**Anesthesia**

A Guide to Topical Anesthetics

Since most topical anesthetics such as fluress are esters, consider the use of preservative-free lidocaine in the presence of a Novocain allergy.
Anesthesia

Lidocaine allergy:
• Amide allergy unlikely
• Risk is preservatives
  - Methylparaben
  - Metabisulfite
• Converts to p-aminobenzoic acid
If in doubt, consider allergy testing to preserved and unpreserved lidocaine

Most Common Systemic Medications for Ophthalmic Surgery
• Diazepam – Valium
• Midazolam – Versed
• Flumazenil – Romazicon
• Fentanyl Citrate – Sublimaze
• Naloxone – Narcan
• Propofol – Diprivan
• Thiopenal – Pentothal
• Alpha 2 agonists

Anesthesia Survey for Cataract Surgery
ASORN/ ASCRS

I.V. Meds

<table>
<thead>
<tr>
<th>Medication</th>
<th>Quantity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midazolam</td>
<td>43/170</td>
<td>25%</td>
</tr>
<tr>
<td>Midazolam-Fentanyl</td>
<td>29/170</td>
<td>17%</td>
</tr>
<tr>
<td>Midazolam-Fentanyl-Propofol</td>
<td>50/170</td>
<td>29%</td>
</tr>
<tr>
<td>Midazolam-Propofol</td>
<td>24/170</td>
<td>14%</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>2/170</td>
<td>1%</td>
</tr>
<tr>
<td>Fentanyl-Propofol</td>
<td>2/170</td>
<td>1%</td>
</tr>
<tr>
<td>Propofol</td>
<td>11/170</td>
<td>7%</td>
</tr>
<tr>
<td>Pentothal</td>
<td>3/170</td>
<td>2%</td>
</tr>
</tbody>
</table>

Midazolam was used 85% of the time. The Center For Sight 2012

Anesthesia - Systemic Medications

Diazepam - Valium*
Midazolam - Versed*
• Anti-anxiety
• Amnesic
• Not pain relief
• Anti-emetic
• Careful in angle closure glaucoma

* Class of benzodiazepine

Anesthesia - Systemic Medications

Midazolam
• Onset, IV 1-5 minutes
• Duration 20-40 minutes
• Half life 1-4 hours

Flumazenil - Romazicon
• Receptor antagonist
• Reverse sedation effect of benzodiazepines
• Half life less than Versed
  • Half life: 41-79 minutes, metabolized by liver
Anesthesia - Systemic Medications

Fentanyl - *Sublimaze*
- Narcotic
- Pain relief
- Not amnesic
- Nausea/vomiting

Fentanyl
- Onset, IV 1-3 minutes
- Duration 20-60 minutes
- Half life 2-4 hours

Morphine
- More histamine release
- More nausea, vomiting, pruritus
- More hypotension

Meperidine – *Demerol*
- More sedative effect in elderly
- Do not use in renal failure

Naloxone - *Narcan*
- Competes with narcotics at receptor site
- Reverses respiratory depression of Fentanyl
- Half life less than Fentanyl
  - Half life: 60-90 minutes, metabolized by liver

Propofol - *Diprivan*
- General anesthetic
- Onset: 1-2 minutes
- Duration: 3-10 minutes
- Pain relief/amnesic
- Antiemetic
- Reduced clearance in the elderly

Criteria for discharge may include, but are not limited to:
- Sufficient time interval (eg, two hours) since the last administration of an antagonist (eg, naloxone, flumazenil) to prevent resedation of the patient

*Perioperative Standards and Recommended Practices, 2013 Edition, AORN*
Anesthesia - Systemic Medications

Propofol - Diprivan
- Contraindicated in allergies to soybean oil or eggs
- Good culture media
- Preserved EDTA
- Generic — may contain sulfites; risk of anaphylaxis

Propofol - Diprivan
- Respiratory depression
- Must have resuscitation equipment immediately available!
- There is no reversing agent

Thiopental - Pentothal
- General anesthesia
- Barbiturate
- Methohexitol - Brevital
- Respiratory depression
- Bronchospasm
- Myocardial depression
- Dysrhythmia
- Resuscitation equipment immediately available
- Useful if allergic to soy or eggs

Alpha 2 – Agonists
- Clonidine – Catapres
  - Hypotension
  - Bradycardia
  - Sedation
  - Analgesia
- Dexmedetomidine – Precedex
Anesthesia - Systemic Medications

Clonidine – Catapres
- Oral dose 45 minutes prior to surgery
- Beware of drug interactions
  - Digitalis, beta blockers, calcium channel blockers
- Dosage protocol is BP dependent

Office Based Surgery – Course AAO 2006

Dexmedetomidine – Precedex
- Alpha 2 agonist
- I.V. only for “sedation and analgesia in ICU setting”
- Sedative/analgesia without respiratory depression
- Short duration
- No post-op nausea and vomiting
- Not amnesic
- Goes off patent 2013

Comparison of Dexmedetomidine and Midazolam Sedation for Cataract Surgery under Topical Anesthesia
- Each group received loading dose and continuous infusion as well as topical lidocaine for all cases
- Pain scores were similar but operating conditions for the surgeon were worse with midazolam
- Conclusion – Dexmedetomidine is more complicated to use but provides better “conscious” sedation.

Muller, et al., JCRS 2005 31:1845-46

Anesthesia - Systemic Medications

Drug Shortages
- www.ashp.org
  - American Society of Health System Pharmacists
- www.fda.gov/drugs

Anesthesia - Second Eye Syndrome

Increased Requirements for Sedation During Clear Cornea Cataract Extraction

Can anesthesia techniques be modified to reduce complaints of pain and awareness with second eye surgery?
“What did you do differently, doctor?”

Ruckman – ASCRS 2004
**Anesthesia - Second Eye Syndrome**

More Aware of Second Eye Surgery?

<table>
<thead>
<tr>
<th></th>
<th>Yes/Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>18/28</td>
<td>64%</td>
</tr>
<tr>
<td>Valium</td>
<td>12/24</td>
<td>50%</td>
</tr>
<tr>
<td>Versed</td>
<td>6/26</td>
<td>23%</td>
</tr>
</tbody>
</table>

There is a significant difference among the three groups. 
P = .0090  
Chi – Square Test

More Pain With Second Eye Surgery?

<table>
<thead>
<tr>
<th></th>
<th>Yes/Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>9/28</td>
<td>32%</td>
</tr>
<tr>
<td>Valium</td>
<td>5/24</td>
<td>21%</td>
</tr>
<tr>
<td>Versed</td>
<td>2/26</td>
<td>08%</td>
</tr>
</tbody>
</table>

No significant difference among the three groups. 
P = .08  
Chi – Square Test

**Anesthesia - Second Eye Syndrome**

Increased Requirements for Sedation During Clear Cornea Cataract Extraction

Increased pain and awareness can be modified by preemptive changes in anesthesia technique with increased use of sedation.

"... cataract extraction ... there was a subtle increase in pain in the second surgery relative to the first. This appears to be associated with decreased preoperative anxiety and may be related to the amnestic effects of intravenous sedation."


**Anesthesia – Retinal Surgery**

Improved technique and shorter cases mean fewer patients require general anesthesia

Preferred anesthesia
- **Buckle** – block and/or conjunctival cutdown with local anesthesia
- **Trauma** – usually general; do not use retrobulbar with open globe
- **Membrane peel**
  - Need: absolute akinesia, no body movement
  - Recommend: most likely case to need anesthesia clearance

Post-op nausea and vomiting
- Check IOP
- Risk of increased IOP with either gas or silicon oil
Anesthesia - Visual Analog Scale for Accessing Surgical Pain

- Pain assessment required by JCAHO and AAAHC
- Scale 0-10
  - 0 no pain
  - 10 the most intense pain imaginable
- Validated psychometric performance

J. Am Coll Surg. 2005.03.034

Topical Non-Steroidal Anti-Inflammatory Drugs (NSAID’s)

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Inflammation</th>
<th>Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diclofenac</td>
<td>0.1%</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Bromfenac</td>
<td>0.09%</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Nepafenac</td>
<td>0.1%</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ketorolac tromethamine</td>
<td>0.45%</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ketorolac tromethamine</td>
<td>0.5%</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Anesthesia - Systemic Medications Post-Op Nausea and Vomiting (PONV) Medications:

- 5HT3 – Serotonin antagonists
  - ondansetron – Zofran
  - dolasetron – Anzemet
  - granisetron – Kytril
- Dexamethasone
- Antihistamines
  - promethazine – Phenergan
  - dimenhydrinate – Dramamine
- Dopamine antagonists
  - Metoclopramide-Reglan
- Anticholinergics
  - scopolamine – Transderm Scopol

Outpatient Surgery, July, 2005
Anesthesia

Pharmacogenetics
- Genetics may explain wide range of responses to analgesics and anesthetics
  - Example
    - Codeine is prodrug which converts to morphine by cytochrome P450 enzyme
      - 10-30% of world population have polymorphisms which may cause them to be hypo- or hyper-metabolizers
    - Marker for red hair may share genome for increased anesthetic requirement


Anesthesia

Pharmacogenetics
- Redheads
  - More resistant to local anesthetic
  - More sensitive to pain from heat and cold
  - May be more resistant to Propofol

Anesthesiology 2004; 101:279-83
russellmd.blogspot.com

Average Times for Cataract Surgery

<table>
<thead>
<tr>
<th>Time</th>
<th>Median (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-procedure time</td>
<td>26-143</td>
</tr>
<tr>
<td>Operating time</td>
<td>0-34</td>
</tr>
<tr>
<td>Discharge time</td>
<td>9-57</td>
</tr>
<tr>
<td>Facility time</td>
<td>41-234</td>
</tr>
</tbody>
</table>

Represents 66 centers with 120,734 cases
Institute for Quality Improvement, Accreditation Association for Ambulatory Health Care, Inc. 2012

Anesthesia Options for Cataract Surgery

Preferred Anesthesia Method
- I.V./Topical 53%
- I.V./Peribulbar 15%
- I.V./Retrobulbar 11%
- I.V. 6%
- I.V./Topical/Intracameral 5%
- Oral/Topical 6%
- Topical 4%

Cataract Extraction with Lens Insertion 2007, AAAHC 2008

Anesthesia Options

Retrobulbar
- Anesthesia and Akinesia
  - Lidocaine ± epinephrine ± Hyalurondase
  - Risks:
    - Intraocular injection
      - Caution with eyes > 26 mm
    - Retrobulbar hemorrhage
    - Respiratory depression
    - Marcaine
    - Agitation/Confusion
    - Strabismus*


Anesthesia Options

Retrobulbar – Hyaluronidase
- Hylenex, Vitrase
- Hydrolyzes hyaluronic acid
- Enhances diffusion of ocular anesthesia
- May accelerate onset of anesthesia
- May lower IOP
- May reduce incidence of post op strabismus

Anesthesia Complications Management

**Retrobulbar**
Monitor patient
• Use proper needle
• Sedate patient
• Do not exceed 6 cc of anesthesia
• Have resuscitation equipment available

**Anesthesia Options**

**Parabulbar**
- Subtenon’s dissection – direct pathway to the retrobulbar space
- Blunt metal or flexible (Greenbaum) cannula
- More effective than retrobulbar
- May be repeated
- Avoids many of the risks of retrobulbar
- Requires ophthalmologist to administer

**Peribulbar**
- Anesthesia
- Some lid akinesia
- Some globe akinesia
- Safer than retrobulbar

Anesthesia Options

Mixing eye drops:
• Considered compounding
• USP 797 applies
  - [www.usp.797.org](http://www.usp.797.org)
• Need to be able to document
  - Compatibility
  - Reduced medical error potential
  - For "immediate use" only
  - Policy and procedure in place
• Solution: Contract with USP 797 compliant compounding pharmacy

CMS: Safe Use of Single Dose/Single Use Medications

- Administering drugs from one SDV (single dose vial) to multiple patients without adhering to USP 797 standards is not acceptable under CMS infection control regulations.

CMS: Safe Use of Single Dose/Single Use Medications

Immediate Use Compounding: USP 797
- The compounding process must be simple and involve the transfer of no more than three sterile non-hazardous products
- Must be accomplished within one hour
- Aseptic technique must be followed
CMS: Safe Use of Single Dose/Single Use Medications

Immediate Use Compounding: Must be . . .
- Under continuous supervision of the person who prepared it
- Given within one hour
- Labeled
- Discarded within one hour if not used

CMS, June 15, 2012
Ref. SAP 12-35-ALL

Anesthesia Options: Topical

- Eye drops
  - with or without pledget
    - Tetracaine/Proparacaine
    - Lidocaine gel 3.5%
  - TetraVisc (Ocusoft)
  - Akten (Akorn)

Anesthesia Options: Topical

- Tetracaine hcl 0.5% and lidocaine 2% jelly equally effective
  - For cataract surgery
  - For anesthesia – Intravitreal injections

JCRS Vol. 33, Jan. 2007

Anesthesia Options: Topical

- Gives good conjunctival anesthesia
- No lid akinesia
- Eye movement present
- Deep eye pain present

Anesthesia Options

Intraocular:
- Lidocaine 1% - non-preserved (MPF – Methylparaben Free)
- Relieves deep ocular pain
- No akinesia

Anesthesia Options: Topical

- Tetracaine hcl 0.5% and lidocaine 2% jelly equally effective
  - For cataract surgery

JCRS Vol. 33, Jan. 2007

Anesthesia - Intracameral Lidocaine 1% MPF

Clinical Recommendations

- “Significantly reduces intraoperative pain”
- Rating A1*: “very important or crucial to good clinical outcome”

* A: recommended/crucial to good outcome
II: substantial evidence to support the statement
Ophthalmology: guide for authors
**Anesthesia - Intraocular**

**The Technique:**
- OR team trained – calm atmosphere
- Vocal anesthesia
- Adjust microscope light
- Music lessens the need for I.V. sedation, lowers heart rate and blood pressure *

*Allen, American Psychosomatic Society 1998

**Anesthesia - Intraocular**

**The Technique:**
- Lidocaine 1% MPF (Methylparaben Free)
  - 0.5 cc at start of case
  - May be repeated (careful if posterior capsule rupture)
  - With Epinephrine may reduce risk of IFIS*

*Intraoperative Floppy Iris Syndrome

**Anesthesia – Intraocular**

**Epinephrine for Intracameral Use**
- Preservative free 1:1000 Epinephrine may contain bisulfite
  - Bisulfite is toxic to cornea
  - Undiluted Epinephrine has pH of 3.0
- Recommend for intracameral use
  - Dilute Epinephrine 1:4 with BSS, BSSplus or preservative free Lidocaine
  - Adding bisulfite, preservative free Epinephrine to 500 ml BSS appears to be safe

*ASCRS Clinical Alert, March 13, 2013

**Anesthesia - Intraocular**

**Advantages:**
- Less anesthesia
- Good “deep” pain relief
- Consistent rapid onset
- Patient more awake
- Cosmetic surgery - no subconjunctival hemorrhage
- Useful in high myopia*

*JCRS, Oct. 2008

**Anesthesia - Intraocular**

**Disadvantages:**
- Transient visual loss
- Patient awake - eye movement
- Conjunctival and corneal discomfort may still be present
- Corneal endothelial toxicity
- Patients can be frightened by visual awareness – 16% in one study*

*Advanced Ocular Care, Jan/Feb 2011

**Anesthesia**

**Vocal:**
Rapport is another important factor which must be considered. If good rapport exists, the staff can speak calmly and quietly to relax the patient.
Anesthesia - You as the Patient

- What would I expect from anesthesia personnel?
  - Tell me what to expect
  - Allow me time to ask questions
  - Answer my questions
  - Know how I am doing during the procedure
  - Don’t rush off until the next person has enough information to do a good job
  - Assure me that I am your first priority

Con. Sed. Anes. & The JCAHO
3rd edition 2005

What Technicians and Nurses Need to Know About Anesthesia

Richard J. Ruckman, M.D., F.A.C.S.