Anesthesia for Ambulatory Facial Cosmetic Surgery

Jason R. May
OMFS PGY-4
Travis Air Force Base
David Grant Medical Center

Anesthesia for Ambulatory Facial Cosmetic Surgery

- Pre-Op Exam
- Anesthesia Techniques
  - Minimal / Moderate / Deep Sedation, GA
  - Local Anesthesia
- Procedural Anesthesia and Sedation Pearls
  - Brow Lift
  - Blepharoplasty
  - Rhinoplasty
  - Cervicofacial Rhytidectomy
  - Otoplasty
  - LSR
  - Facial Filler
- Post-Operative Recovery
Pre-Op Exam Goals

- H+P
- Develop Anesthesia Plan
  - Reduce patient anxiety
  - Customize anesthesia care
- Discuss post-operative care and analgesia
- Informed Consent for *Elective* Surgery
  - Procedure
  - Anesthesia
- ASA Status

AAOMS Parameters of Care: Anesthesia in Outpatient Facilities

Patient Monitoring

- Oxygenation
  - Pulse Oximetry
- Ventilation
  - Capnography
  - Recommended precordial stethoscope
- Circulation
  - Automated noninvasive blood pressure device
  - EKG
  - Pulse oximetry
- Temperature
  - Available, not routinely used
Anesthesia Techniques

- Continuum
  - Minimal Sedation (Anxiolysis)
    - Surgeon + 1 BLS assistant
  - Moderate Sedation (Conscious Sedation)
    - Surgeon + 1 BLS assistant
  - Deep Sedation
    - Surgeon + 2 BLS assistant
  - General Anesthesia
    - Surgeon + 2 BLS assistant

Bispectral Index
“Goldilocks Anesthesia”

<table>
<thead>
<tr>
<th>BIS*</th>
<th>Sedation/Anesthesia Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>98-100</td>
<td>Awake</td>
</tr>
<tr>
<td>78-85</td>
<td>Minimal Sedation “Anxiolysis”</td>
</tr>
<tr>
<td>70-78</td>
<td>Moderate “Conscious” Sedation</td>
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<tr>
<td>60-70</td>
<td>Deep Sedation</td>
</tr>
<tr>
<td>45-60</td>
<td>GA</td>
</tr>
<tr>
<td>&lt;45</td>
<td>Over-anesthetized</td>
</tr>
</tbody>
</table>

*No units, measures weighted sum of electroencephalographic (EEG) subparameters
Which is the “Right” Technique?

• Outpatient Surgery Center
  – Pt’s paying fee for service
    • Anesthesia Drugs and Materials
    • Nursing Costs
  – Pt’s want “Luxury” care, do not want to stay ($$$) in hospital

Which is the “Right” Technique?

• Ideal Anesthetic- tailored to “fast-tracking”
  – Rapid induction
  – Optimal operating conditions
  – Rapid recovery
    • Surgery End, 1 hour out the door
  – No side effects
  – No PONV
Which is the “Right” Technique?

- Balanced Anesthesia
  - Anxiolysis
  - Amnesia
  - Analgesia
  - PONV prevention
- TIVA
  - Anesthesia care tailored to prevent PONV
  - Deepen/Lighten based on stimulating parts of procedure
- Adequate Airway Adjuncts and Support prn
## Which is the “Right” Technique?

<table>
<thead>
<tr>
<th>GA</th>
<th>LA + Sedation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher Risk with higher ASA</td>
<td>Lower peri and post-operative complications</td>
</tr>
<tr>
<td>Increased peri and post-operative complications</td>
<td>DVT, PE, pneumonia, N/V, bleeding</td>
</tr>
<tr>
<td>Longer Recovery</td>
<td>Shorter Recovery</td>
</tr>
<tr>
<td>Ideal for super anxious patients</td>
<td>Suboptimal for anxious patients</td>
</tr>
</tbody>
</table>

...We can anesthetize the face!

## Drugs
Remifentanil

- Rapid ester hydrolysis by nonspecific esterases in blood

- Very rapid biotransformation
  - Terminal elimination half-life of less than 10 min
  - Context/sensitive half-time (time required for plasma drug concentration to decline by 50% after termination of infusion) is approximately 3 minutes regardless of duration of infusion

~$122 2mg vial

Ketamine

- NMDA antagonist
- “Dissociates” thalamus (sensory) from limbic cortex (awareness of sensation)
  - Appear conscious, unable to process information

- Patient must be in correct anesthesia plane prior to ketamine administration
  - If part of balanced anesthesia, initial dose up to 0.5mg/kg, then give 10mg bumps q15-20 min
  - Max dose 2mg/kg during case
  - Avoid last 30 minutes of case
**Propofol**

- Inhibitory neurotransmitters mediated by GABA
- Rapid redistribution (2-4 minutes)
- Pain on injection
- Amnesia
- No analgesia
- Anti-emetic effects

**TIVA (Big MAC)**

- Propofol
  - 25-100 µg/kg/min
- Remifentanil-Propofol
  - 100 µg remifentanyl into 20mL (200mg) propofol
  - 25-75 µg/kg/min
- Friedberg’s Propofol-Ketamine Technique
• 20 pt’s per group, 4 groups
• Surgeries: subtotal thyroidectomy, lap chole
  – Propofol + sufentanil (TIVA)
    • Cost ~$0.24/min of anesthesia
    • Less drugs in PACU
    • Less time in PACU
  – Inhalational gas + sufentanil
    • Cost ~$0.15/min of anesthesia

Which is the “Right” Technique?

• Balanced Anesthesia
  – Anxiolysis
  – Amnesia
  – Analgesia: We can anesthetize the face
  – PONV prevention

• TIVA
  – Anesthesia care tailored to prevent PONV
  – Deepen/Lighten based on stimulating parts of procedure
Facial Nerve Blocks

Local Anesthesia

<table>
<thead>
<tr>
<th>Agent</th>
<th>Cartridge Size (mg)</th>
<th>Max Dose (mg/kg)</th>
<th>Max Dose*</th>
<th>Redose Interval (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2% lidocaine</td>
<td>36</td>
<td>4.5</td>
<td>300</td>
<td>90</td>
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<tr>
<td>2% lidocaine 1:100k epi</td>
<td>36</td>
<td>7</td>
<td>500</td>
<td>90</td>
</tr>
<tr>
<td>3% mepivacaine</td>
<td>54</td>
<td>5.5</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>2% mepivacaine 1:20k levonordefrin</td>
<td>36</td>
<td>5.5</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>4% prilocaine</td>
<td>72</td>
<td>8</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>0.5% bupivacaine 1:200k epi</td>
<td>9</td>
<td>1.3</td>
<td>90</td>
<td>180</td>
</tr>
<tr>
<td>4% articaine 1:100k epi</td>
<td>68</td>
<td>7</td>
<td>500</td>
<td></td>
</tr>
</tbody>
</table>

*Max dose based on 70kg adult
Tumescent Anesthesia

• Formulation
  – 1L Normal Saline
  – 0.5-1 ampule (0.5-1mL) epinephrine 1:1000
  – 50mL 1% lidocaine
  – 2.5-10mL 8.4% sodium bicarbonate

• Administration
  – 18g spinal needle + 20ml syringe
  – Peristaltic pumping apparatus

Tumescent Anesthesia

• Tumescent means swollen and firm

• Advantages / Purpose
  – Hemostasis
  – Vasoconstriction, minimize absorption
  – Hydro-dissection, expand tissue spaces
  – Duration of anesthesia up to 24 hours
  – Higher toxicity dose of lidocaine; up to *45mg/kg
    • (We will not come close to 7mg/kg in facial procedures)

(Bacteriostatic lidocaine may decrease risk of infection)
Tumescent Anesthesia

• Local anesthesia with diluted lidocaine and epinephrine administered at dose 3.1 times higher than the currently recommended lidocaine dose (7mg/kg) yielded a peak plasma lidocaine level that was 72% below the level considered safe (5 microgram/mL)

Example Patient

• Anxiolyis
  — 2mg Versed pre-op holding
• Monitors
• Start Sedation
  — Remi/Prop infusion 50-75µg/kg/min
• Steroids
  — 8mg decadron
• +/-Foley
  — Consider ketamine (20-30mg) prior to foley placement
• Prep/drape
  — “Valley of the prep”
  — Turn down anesthesia, talk with patient
• Local anesthesia
  — Prior to injection, increase Remi/Prop 50-100µg/kg/min
  — Airway adjuncts
• TIVA sedation for continuation of case
  — Remi/prop infusion 50-75µg/kg/min, turn off ~7 minutes to end of case
• Anti-emetics prn

*Everything we do is to prevent PONV
Brow and Forehead Lift

- Entire brow and forehead injected with tumescent anesthesia
- Hair incision(s) and supratrochlear / supraorbital nerves injected with 2% lidocaine 1:100k epi
- If simultaneous eyelid surgery to be performed, tumescent anesthesia to forehead/brow first and allow vasoconstriction to take place
Blepharoplasty

- Pre-surgical scrub with cornea-safe solution
  - Ophthalmic betadine or dilute betadine
  - Avoid chlorhexidine (corneal chemical abrasion)
- Corneal shields placed
  - 0.5% tetracaine drops vs 0.5% proparacaine drops, 1-2 drops in each eye
  - Less corneal abrasions without lacrilube/ophthalmic bacitracin use
  - If using electrosurgery, plastic shields prevent corneal conduction

Blepharoplasty

- Deep Sedation for most stimulating part of procedure (corneal shields, local anesthesia)
- 2% lidocaine 1:100k epi
- ½” 32g needle
- Upper Eyelid:
  - 1-2mL per lid, Superficial injection just beneath skin
- Lower Eyelid:
  - Transconjuctival approach: 1-2mL split between medial, central, and lateral fat pads
  - Lateral orbital rim to bone parallel to lower eyelid in plane of periosteum
  - Advanced lateral to medial creating plane over orbital septum and orbicularis muscle
Blepharoplasty

- Lighten sedation after injection of local anesthesia, can deepen as needed during procedure.
  - Allow for patient to open/close eyes to eval for esthetics and symmetry

- If GA, consider deep extubation to prevent valsalva/cough during wake up
  - Prevention of post-operative bleeding and hematoma formation
Rhinoplasty

• Deep Sedation vs GA
  – Airway management
  – Maintain 0.05% oxymetazoline soaked pledgets during procedure until lateral osteotomies performed for hemostasis and airway control
  – Throat Pack
  – Trim vibrissae with bacitracin/dean scissors
    • Infection control and visualization of incisions
Rhinoplasty

- Sensory branches from V1 and V2
- Local anesthesia for vasoconstriction and analgesia
  - Average ~12ml 2% lidocaine 1:100k epi
  - Anesthesia injected in proper tissue planes just over nasal bones and upper/lower nasal cartilages rather than subcutaneous
- Blocks include:
  - Infraorbital nerve block (1cc)
  - Infratrochlear nerve block (1cc)
  - Dorsal (external) nasal nerve block (3cc)
  - Incision margins (0.5cc)
  - Caudal septum (1cc)
  - Alar facial groove near angular artery (0.5cc)
  - ANS (1cc)
  - Glabella (1cc)
  - Nasal tip (1cc)
Infraorbital 1cc
Supratrochlear 1cc

Glabella 1cc
Dorsal (external) nasal 1cc
Nasal tip 1cc

Incision Margins 0.5cc

Caudal Septum 1cc
ANS 1cc
(superior labial artery)
Alar facial groove 1cc
(angular artery)
Cervicofacial Rhytidectomy

• GA vs deep IV sed
  – Longer procedure length (4+ hours)
  – BP 20-30% lower than baseline during dissection, then bring back up to baseline prior to closure
  – Inject entire lift site ~10 ml 2% lido 1:100k epi
  – Inject ~50ml Tumescent anesthesia in submental region
  – Inject ~50ml Tumescent anesthesia in both pre/post auricular sites
GAN Block

Cervical Plexus Block

- Bisect origin and insertion of SCM
- ~3-5ml LA each pass Sub-Q

6cm
Cervical Plexus (Ventral Rami)

- Ventral Rami
  - Branches to the skin
    - Lesser Occipital (C2)
    - Great Auricular (C2, C3)
    - Transverse Cervical (C2, C3)
    - Supraclavicular (C3, C4)
  - Phrenic Nerve (C3-C5)
  - Ansa Cervicalis (motor C1-C3)
    - Strap muscles
      - Omohyoid
      - Sternohyoid
      - Sternothyroid
      - *Thyrohyoid (C1)

- Dorsal Rami
  - Greater Occipital (C2)
  - 3rd occipital (C3)
  - Cutaneous branches (C4-6)
**Otoplasty**

- "Ring Block"

**Laser Skin Resurfacing**

- GA vs Deep IV sed
  - dependent on surface area of skin resurfacing
- Armored LMA- flexible/maneuverable
  - Secure to teeth with silk suture
- Lowest allowable FiO2
- Wrap H2O soaked towel around tube
- Metal corneal shields vs laser safety goggles
Laser Skin Resurfacing

- Post-operative pain
  - Cold compresses

- PONV
  - Intraop analgesia adequate
    - 0% PONV
    - 12% post-op pain requiring analgesia
  - Intraop analgesia inadequate
    - 35% PONV
    - 75% post-op pain requiring analgesia

Injectable Fillers

- Topical vs Local Anesthesia
  - 46 pt split-face study
  - 33% pt preferred topical anesthesia over nerve blocks
  - 56% of those pts perceived less pain with nerve blocks

- Pt preference
Post-Operative Recovery

- Preemptive Analgesia
- PONV
  - Immediate vs delayed
  - All cosmetic surgery pt’s at risk for PONV
- Goal:
  - Procedure end, Patient out door < 1 hour

Analgesia

- Believe it or not...
  - Most patients are *NOT* that uncomfortable afterwards!
  - PO Tylenol vs NSAIDs
  - Minimal narcotics
PONV > Pain

• We can control pain

• We **MUST avoid** PONV, and **CAN prevent**

• Valsalva avoidance
  – Less post-operative bleeding and hematoma

• Everything we do during TIVA is to prevent PONV
  – Steroids
  – Propofol
  – Avoidance of volatiles
  – Zofran

CTZ in Medulla

• 5-HT3
  – Ondansetron
• Histamine
  – Phenergan
• Muscarinic ACh
  – Scopalamine
• Dopamine
  – Droperidol, reglan
• Substance P/NK-1
  – Emend
• Opioids
• Non-chemical
  – Smell, gastric distention, motion
• Steroids
  – Decadron 8mg
Conclusion

- Pre-Op Exam
- Anesthesia Techniques
  - Anxiolysis, Sedation, GA
  - Local Anesthesia
- Procedural Anesthesia and Sedation Pearls
  - Brow Lift
  - Blepharoplasty
  - Rhinoplasty
  - Cervicofacial Rhytidectomy
  - Otoplasty
  - LSR
  - Facial Filler
- Post-Operative Recovery

Cosmetic Surgery very similar to routine OMS procedures
We do more stimulating procedures to patients regularly
After profound local anesthesia, now performing sedation