THE EXPANDING OPTOMETRIC SCOPE: INJECTION BASICS

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- An optometrist who uses a local anesthetic in the manner allowed by this subsection shall provide to the board of optometry proof that the optometrist has current CPR certification by an organization approved by the board; provided, that the optometrist may meet this requirement by providing proof to the board that another person who has current CPR certification will be present in the office of the optometrist at all times that a local anesthetic is used by the optometrist in conjunction with the treatment of an eyelid lesion.
- Compliance with this provision shall also require that the optometrist maintain in the optometrist’s office an AED at all times that a local anesthetic is administered by the optometrist.

Informed Consent
- Description of the diagnosis
- Description of all available management options
- Description of risks (with likelihood of occurrence)
- Description of potential benefits
- State who will perform the procedure

Always Ask About Allergies!

OSHA
- Universal Precautions is an approach to infection control. According to this concept, all human blood and certain human body fluids are treated as if known to be infectious with regard to blood borne pathogens.
- www.osha.gov

- Standard Precautions
  - Developed by the CDC and accepted by OSHA

  - All blood, body fluids, secretions, excretions, mucous membranes, non – intact skin and soiled items are potentially infectious
    - Excludes sweat
- **Environmental Controls**

  Consistent and stringent equipment and work area cleaning
  Proper disposal of waste such as sharps, biomedical, and pathological waste.
  Appropriate ventilation and other engineering controls.
  Installation of easily accessible and clearly identified waste containers, hand hygiene product dispensers, and dedicated hand wash sinks.
  Effective placement and segregation of sources of contamination.

- **Personal Protective Equipment**

  - Specialized clothing or equipment worn by an employee for protection against a hazard

- **Sharps**

  - Any items capable of piercing skin
    - Must be placed in OSHA compliant sharps container
      - Closed, puncture-resistant, leak-proof on sides and bottom
      - Accessible, maintained upright, and not allowed to overfill
      - Labeled or color coded
      - Colored red/labeled with the biohazard symbol
      - Labeled in fluorescent orange/orange – red with lettering and symbols in contrasting color

  [http://www.cdc.gov/sharpsafety/resources.html](http://www.cdc.gov/sharpsafety/resources.html)

- **Biohazard/Biomedical Waste**

  - Regulated wastes, other than sharps, that contain blood, fluid, or tissue which may transmit disease must be disposed of in red biohazard bags

- **Be Prepared**

  - Defibrillator
  - Breathing equipment/air supplies
  - Emergency drugs
  - IV supplies and tubing
- Easiest to withdraw medications from vials with smaller gauge needles (larger lumens)
- 20g easier to draw with than 27g
Types of Injections

- Intradermal
- Intralesional
- Subcutaneous/infiltrative
- Subconjunctival
- Intramuscular
- Intravenous
- Sub-Tenon’s
- Intravitreal
- Retrobulbar

Intradermal Injections

- Mainly used for diagnostic purposes

Intradermal/Cutaneous Injections

- Focal subcutaneous infiltration of the lid
- Use of local anesthetic to block the impulses of the nerves traversing the injected area

Infiltrative Injections

- Lidocaine: Stabilizes the neuronal membrane by inhibiting the ionic fluxes required for the initiation and conduction of nervous impulses

- Epinephrine
  - Promotes hemostasis
  - Decreases rate of systemic absorption by 1/3rd
  - Increases anesthesia duration

Infiltrative Injections

- Excessive blood levels of lidocaine may cause changes in cardiac output, total peripheral resistance, and mean arterial pressure

<table>
<thead>
<tr>
<th>Anesthetic</th>
<th>Equivalent concentration</th>
<th>Onset (minutes)</th>
<th>Duration (hours)</th>
<th>Maximal dose (mg per kg)</th>
<th>Maximal dose (total, per 70 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lidocaine (Marcaine)</td>
<td>1 to 2%</td>
<td>1.5 to 2</td>
<td>4 mg per kg, not to exceed 180 mg</td>
<td>18 mL (18%), 34 mL (34%)</td>
<td></td>
</tr>
<tr>
<td>Lidocaine with epinephrine</td>
<td>1 to 2%</td>
<td>1.5 to 2</td>
<td>7 mg per kg, even be doubled 50 mg</td>
<td>Based on lidocaine: 30 mg (2%), 90 mg (6%)</td>
<td></td>
</tr>
</tbody>
</table>

Based on Table from Achard S and Kunda S. Principle of office anesthesia: part I. Infiltrative anesthesia. Am Fam Physician. 2002 Jul 1;66(1)
- Onset within 30 sec
- Persists 15 min or longer
- Indicated for tonometry, foreign body removal, suture removal, conjunctival scraping, gonioscopic exam and prior to surgical operations such as cataract surgery
- 1/2 drops pre procedure
- Every 5 to 10 for deep anesthesia
- ~$7.50/15mL.

- Higher Viscosity
- Increase corneal contact time, deeper penetration, greater anesthetic effect
- BAK preserved
- Indicated for procedures of short duration i.e. Tonometry, foreign body removal, suture removal
- ~$20/5mL.

- Onset of action between 20 to 60 seconds
- Persists 5 to 30 min or more
- Viscous gel formulation for extended localized contact
- Only FDA-approved lidocaine available for ocular procedures
- Preservative free
- Recommended 2 drops prior

- Indicated for the production of topical anesthesia of accessible mucus membranes of the oral and nasal cavities.
- Good for off label, deeper anesthesia of the conjunctiva

Lidocaine

LIDOCAINE HYDROCHLORIDE INJECTION, FOR INFILTRATION AND NERVE BLOCK, SHOULD BE EMPLOYED ONLY BY CLINICIANS WHO ARE WELL VERSED IN DIAGNOSIS AND MANAGEMENT OF DOSE-RELATED TOXICITY AND OTHER ACUTE EMERGENCIES THAT MIGHT ARISE FROM THE BLOCK TO BE EMPLOYED AND THEN ONLY AFTER ENSUING THE IMMEDIATE AVAILABILITY OF OXYGEN, OTHER RESUSCITATIVE DRUGS, CARDIOPULMONARY EQUIPMENT AND THE PERSONNEL NEEDED FOR PROPER MANAGEMENT OF TOXIC REACTIONS AND RELATED EMERGENCIES. (See also ADVERSE REACTIONS and PRECAUTIONS.) DELAY IN PROPER MANAGEMENT OF DOSE-RELATED TOXICITY, UNDERVENTILATION FROM ANY CAUSE AND/OR ALTERED SENSITIVITY MAY LEAD TO THE DEVELOPMENT OF ACIDOSIS, CARDIAC ARREST AND, POSSIBLY, DEATH

- Promotes hemostasis (<1:100,000 no sig ↑)
- Decreases rate of systemic absorption by 1/3
- Reduces likelihood of systemic side-effects
- Increases analgesia duration by up to 50%
- Wait at least 7 min for vasoconstriction to occur
Potential Adverse Effects

- Contraindicated in patients with a known history of hypersensitivity to local anesthetics of the amide type
- CNS manifestations may be characterized by lightheadedness, nervousness, apprehension, euphoria, confusion, dizziness, drowsiness, tinnitus, blurred or double vision, vomiting, sensations of heat, cold or numbness, twitching, tremors, convulsions, unconsciousness, respiratory depression and arrest
- Drowsiness following the administration of lidocaine HCl is usually an early sign of a high blood level of the drug and may occur as a consequence of rapid absorption.

Potential Adverse Effects

- Cardiovascular manifestations are usually depressant and are characterized by bradycardia, hypotension, and cardiovascular collapse, which may lead to cardiac arrest.
- The administration of local anesthetic solutions containing epinephrine or norepinephrine to patients receiving monoamine oxidase inhibitors or tricyclic antidepressants may produce severe, prolonged hypertension.
- Concurrent administration of vasopressor drugs with epinephrine is CI.
- The intramuscular injection of lidocaine HCl may result in an increase in creatin phosphokinase levels.

Infiltrative Technique

- 1 ml syringe
- 27g, ½ inch needle
- Asepsis
- Medication draw
- Pull skin slightly taut
- Introduce needle, bevel up and approximately 15 degrees to the eyelid surface
- Inject the medication
- Apply pressure post-injection

When Not To Inject...

- Hot Compresses
- Drainage (epilation, stab incision)
- Expression of purulent material
- Orals 7-10d;  Doxycycline 100mg po q12h
  Cephalexin 500mg po q12h
  Amoxicillin 500mg po q8h
  Erythromycin 250mg po q6h
  Augmentin 500mg po q12h
Injecting medication directly into the lesion
- Chalazion
- Capillary hemangioma
- Keloid scar

Rule of Sixes
If the chalazion is smaller than 6mm and/or less than 6 months in duration, there is a 60% chance that the lesion will positively respond (60% reduction) to an intralesional steroid injection.

Infiltrative/Subcutaneous Injections: Papilloma Excision Coding and Billing
- 96372
  - 22.80
  - 20.87
- 67840
  - 309.41
  - 283.22

Infiltrative Injections: Potential Complications

Duane’s Ophthalmology 2006
Intralesional Injections

- Administer topical anesthetic
- Apply chalazion clamp q Use 27 gauge, ½ inch needle
- Insert needle directly into center of lesion
- Inject contents of syringe (.1cc-.2cc) & remove needle

Photo: Talley, DK

Intralesional Injections: Kenalog Risks

- Pain on injection
- Depigmentation of the lid
- Delayed wound healing
- Temporary ptosis

Intralesional Coding and Billing

- Chalazion intralesional injection
  - 11900
  - 51.17
  - 55.90

Subconjunctival Injections: Indications

- Uveitis
- CME
- Noncompliant patient
- Failing trabeculectomy
- Pre/post pterygium surgery
- Anterior scleritis
- Anesthesia
- Antibiotics

Subconjunctival Injections: Equipment

Subconjunctival Injections: Medications
**Subconjunctival Injections: Technique**
- 1 ml syringe
- **27g, ½ inch needle**
- Instill anesthetic
- ?Brimonidine or Phenylephrine
- Tent vs inferior fornix
  - If tenting, superior temporal or inferior 4:00 or 8:00
  - If using fornix method, inferior fornix
- Inject medication forming a bleb within the subconjunctival space
  - ~.5cc

**Subconjunctival Injections: Coding and Billing**
- Subconjunctival injection
  - 68200
    - 46.67
    - 42.54
- Sub – Tenon’s injection
  - 108.75
  - 99.54

**Sub – Tenon’s/Deep Subconjunctival Injections**

**Injection of medication directly into muscle**
- Faster rate of absorption
- Common sites
  - Deltoid
  - Ventrogluteal
  - Vastus lateralis
  - Dorsogluteal

**Intramuscular Injections**

**Subconjunctival Injections: Potential Complications**
- Hemorrhage
- Increased IOP
- Conjunctival necrosis
- Globe perforation
- Cataract

**Subconjunctival Injections**

**Video: Mike Dorkowski, OD**

**Subconjunctival Injections**

**Video: Mike Dorkowski, OD**
Proper asepsis

Spread skin of the administration site taut between thumb and forefinger of your “other” hand

Insert needle decidedly at 90 degree angle and inject the medication

Withdraw the needle and hold pressure with gauze

1 – 3 cc syringe
20 – 25g needle
Needle 5/8 – 1.5 inch long
  • Under 130 lbs = 5/8 – 1”
  • 130 – 152 lbs = 1”
  • 152 – 260 lbs = 1 – 1.5”
  • Over 260 lbs = 1.5”

Botox

Medication injected into orbicularis to relieve spasms

Duration of effect is about 3 months

Chemodenervation of muscle(s) innervated by facial nerve

J0585 (Injection, onabotulinumtoxinA) = 122.21

NaFl

Biological dye
Water soluble
Adjusted to pH of 8+
Ideal for angiography

Use universal precaution
Flashback means stable venous access
Open the cap at end of infusion to confirm stability
May need to keep cap off initially if concern over quality of veins to avoid infiltration
Tape site down to stabilize
Can retract cap prior to attaching syringe if hydrostatic pressure too much
Remove tourniquet once site is stable
Watch for extravasation during push
- Speed of injecting bolus has been disproven to increase risk of nausea/vomiting, is anecdotal
- Suggested rates vary from 1-dial for entire bolus
- Leave the line in until confirm patient is stable
- Phlebotomy requires good tactile sense, use this over what you visualize
- Control the site to prevent vein from "rolling"

Prepare IV tray.
- Wash hands and don Gloves.
- Advance infusion line into vein (bevel up) watching for blood return.
- Remove tourniquet.
- Attach syringe.
- Inject medication.
- Remove needle and apply gauze.
- Inspect injection site and apply bandage.
- Discard gloves/Waste
- Check vitals

Injection site is 3.5 – 4 mm inferior temporal or inferior nasal to the limbus
- Anti – VEGF therapy
- CSME
- Endophthalmitis
Intravitreal Complications

- Common
  - Conjunctival hemorrhage
  - Retinal hemorrhage
  - Vitreous detachment and floaters
  - Pain and irritation
  - Foreign body sensation

- Rare
  - Thromboembolism
  - Inflammation and increased IOP
  - CVA
  - Endophthalmitis
  - Cataract
  - Retinal detachment

Intravitreal $$

- 67028
  - 96.72
  - 105.66

Retrobulbar Injections

- Globe anesthesia
- Blocks cranial nerves 3, 4, and 6 as well as ciliary nerves
- 23 – 25g, 1 3/8” needle
- Blunt tip
- Face bevel toward globe
- Insert needle through lower lid
- Penetrate muscle cone with needle
- Aspirate
- Inject medication

Retrobulbar Complications

- Ecchymosis of the eyelid
- Extraocular muscle palsies
- Upper eyelid ptosis
- Globe perforation
- CRAO
- Optic atrophy
- Proptosis
- Elevated IOP
- Excitation of CNS
- Anesthesia
- Depression of cardiovascular system
- Anesthesia
- Oculocardiac reflex
- Acute neurogenic pulmonary edema
- Respiratory arrest
- Death

Thank ya. Thank ya very much

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