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
  - Closeable, puncture-resistant, leak-proof on sides and bottom
  - Accessible, maintained upright, and not allowed to overfill
  - Labeled or color coded
  - Colored red/labelled with the biohazard symbol
  - Labeled in fluorescent orange/orange – red with lettering and symbols in contrasting color

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 1/3
  - Increases anesthesia duration

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 (1000, per 70 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lidocaine</td>
<td>1 or 2%</td>
<td>&lt;2</td>
<td>1.5 to 2</td>
<td>4 mg per kg, even be exceeded 80mg</td>
<td>25 mL (0.5%), 50 mL (1%)</td>
</tr>
<tr>
<td>Lidocaine with epinephrine</td>
<td>1 or 2% 1000U</td>
<td>&lt;2</td>
<td>2 to 6</td>
<td>7mg per kg, even be exceeded 55mg</td>
<td>25 mL (0.5%), 50 mL (1%)</td>
</tr>
</tbody>
</table>

Based on Table from Achar S and Kundu S. Principle of office anesthesia: part I. Infiltrative anesthesia. Am Fam Physician. 2002 Jul 1;66(1)
**Lidocaine**

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

**Epinephrine**

- 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.

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 in 6 months in duration, there is a 60% chance that the lesion will positively respond (60% reduction) to an intraliesional steroid injection.
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

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

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

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

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

**Intramuscular Injections**

Video: Mike Dorkowski, OD

Smith et al., 2000, p. 387
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

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**Intramuscular Injections**

- **Botox**
  - Medication injected into orbicularis to relieve spasms
  - Duration of effect is about 3 months

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

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**Botox**

- Chemodenervation of muscle(s) innervated by facial nerve
  - J0585 (Injection, onabotulinumtoxin A)
  - 122.21

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**IVFA**

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

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- Use universal precaution
- Flashback implies stable venous access
- Open the cap at end of infusion line to confirm stability
- May need to keep cap off infusion set to avoid clotting
- Tape site down to stabilize
- Can reattach cap prior to attaching syringe if hydrostatic pressure too much
- Retain 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 1-10sec 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

Nausea
Vomiting
Pruritis
Urticaria
Anaphylaxis
Syncope
Tachycardia
Extravasation
Death

Injection site is 3.5 – 4 mm inferior temporal or inferior nasal to the limbus
- Anti – VEGF therapy
- 30g, 0.5” needle
- 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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