Lesson 1

Medico-Legal Issues

- Standard of Care
- Board of Optometry Rules
- Informed Consent
- Medical Documentation

Lessons to Learn

Eye Care Procedures

- “For the purpose of 1993 Public Acts Chapter 295, the performance of primary eye care procedures rational to the treatment of conditions or diseases of the eye or eyelid is determined by the board to be those procedures that could be performed in the optometrist’s office or other health care facilities that would require no more than a topical anesthetic.”

Informed Consent

*Elements of Informed Consent:*

1) The nature of the decision/procedure
2) Reasonable alternatives to the proposed intervention
3) The relevant risks, benefits, and uncertainties related to each alternative
4) Assessment of patient understanding
5) The acceptance of the intervention by the patient
Electronic Informed Consent

Medical Documentation

Lesson 2

Instrumentation

- Chalazion Clamps
  - Spring Loaded
  - Mechanical

- Forceps
  - Tissue – single tooth
  - Jewelers – no teeth & with long tip
  - Cilia – no teeth & short tip
Instrumentation

Jaeger Plate
- Metal or plastic
- Used to protect globe when giving injection

Camera Systems
- Indication:
  - Documentation of both anterior and posterior segment disease.
- Interpretation:
  - Used to follow progression/stability of ocular disease.

External Ocular Photography
- Bilateral
- Billable for Anterior Segment Abnormalities.
- Examples are slit lamp photography, stereo photography.
- Requires Interpretation and Report.

Fundus Photography
- Bilateral
- Billable for Glaucoma and Retinal Abnormalities.
- Requires Interpretation and Report.

Instrumentation

Stat Kits or Crash Carts
- Stat Kit 700
- Stat Kit 900

Oxygen System
- Your Stat Kit or Crash Cart should have oxygen delivery equipment.

www.statkit.com
STAT Kit 900 Pharmaceuticals

- Activated Charcoal
- Airway Adjuncts
- Albuterol Inhaler
- Amiodarone Hydrochloride
- Ammonia Inhalant
- Aspirin
- Atropine Sulfate
- Benadryl
- Clonidine
- Dextrose 50% Solution
- Diazepam
- Dilazem Hydrochloride
- Epinephrine
- Furosemide

STAT Kit 900 Pharmaceuticals

- Intravenous Fluids
- Lanoxin
- Lidocaine Hydrochloride
- Morphine Sulfate
- Nalbuphine
- Naloxone
- Nitroglycerin
- Oxygen
- Phenergan
- Procainamide
- Romazicon
- Sodium Bicarbonate
- Solu-Cortef
- Vasopressin

Treatment with a STAT Kit

- Acute Coronary Syndrome
- Allergy
- Anesthesia Related Over sedation
- Asthma
- Cardiac Arrest
- Congestive Heart Failure
- Cyanosis
- GI Distress with Hypotension
- Hypertension Emergencies
- Hypoglycemia
- Pain Management
- Poison Emergencies
- Seizures
- Vasovagal Syncope

Emergency Preparation

STEP 1: Determine who in your office can provide emergency care.
STEP 2: Keep track of emergency equipment and where it is located.
STEP 3: Devise an emergency plan for your staff.
STEP 4: Practice

Emergency Training

- Basic Life Support for Health Care Providers (BLS-HCP)
- Advanced Cardiac Life Support (ACLS)
- Pediatric Advanced Life Support (PALS)
- Emergency Medical Service Continuing Education (EMS-CE)

Professional Development

www.emergencyuniversity.com
Sterilization

Systems

- Autoclave (heat/steam) are required for invasive surgery; cost $1200 - $6000.
- Ethyl Oxide can also be used to sterilize instruments for intraocular surgery.
- Chemical (germicide) is an inexpensive way to sterilize hand instruments.

Autoclave Sterilization

![Statin Autoclave](image)

Chemical Sterilization

- Germicide is an inexpensive way to sterilize instruments for minor surgery.
- Most require 10 minutes for disinfection and 10 hours for sterilization.

Chemical Germicide

- Metricide
- Metricide 28
- Activator

Injectable Medications

- Syringes and Needles
- Gloves - Examination
- Disinfecting Agents
- Topical Anesthetics
- Injectable Medications

Lesson 3
**Medical Supplies**

**Syringes**
- Tip, Barrel, Plunger
- 6 cc/ml
- 5 cc/ml
- 1 cc/ml

**Hypodermic Needles**
- 20 gauge 1 inch (use for withdrawal)
- 27 gauge 1/2 inch
- 30 gauge 1/2 inch
- Bevel, Shaft, Hub

**Safety Needle Devices**
Sharps with Engineered Sharps Injury Protections (SESIP)
- Self Re-sheathing Needles
  - Sleeve moves forward over the needle where it locks in place
- Syringe with Retractable Needles
  - Push on the plunger retracts the needle

**Gloves**
- Use latex, not vinyl
- Use powder free
- Use correct size
- Non-sterile vs. sterile?
- 8 – 12 percent of health care workers are latex sensitive

**Proper Glove Removal**

**Prep Pads**
- Alcohol and Iodine Preps are useful for disinfecting dermal tissue.
## Topical Anesthetics

### Proparacaine Solution
- **Good** for decreasing reflexive tearing and eye movements.
- Injection procedures requiring conjunctiva surface anesthesia.

### Xylocaine Solution
- **Excellent** for deeper anesthesia of the conjunctiva and the punctum.
- Injection procedures requiring deeper conjunctiva anesthesia.

### Topical Anesthetics

#### Cetacaine Topical Anesthetic Spray
- **Superior** for anesthesia of the conjunctiva and procedures involving the nasolacrimal duct.

### Cetacaine FACTOID
- Cetacaine Topical Anesthetics are also available in liquid and gel forms.
- Rapid onset within seconds and effective for up to 60 minutes.

### LMX 4% Cream
- **OTC** Uses encapsulated liposomes.
- Excellent for anesthesia of the skin.
- Increased effect with occlusive dressing.
Injectable Medications

**Xylocaine 2%**
- Used for anesthetic prep of Surgical areas.
- Xylocaine 2% with 1:100000 concentration of epinephrine.

**The Xylocaine Difference**
- Xylocaine 2% is for injection only and come w/ or w/o epi.
- Xylocaine 4% is only for topical application.

Caution!

- Xylocaine 2% with epinephrine can cause significant side effects
- Hypertension in patients taking MOIs or TCAs
- Phenothiazines and butyrophenones may reduce or reverse the beneficial effect of epinephrine

Injectable Medications

**Methylprednisolone**
- Used for recalcitrant anterior uveitis.

**Injectable Medications**

**Kenalog 40 mg/ml**
- Used for intermediate uveitis and intalesional steroid injections.

**Injectable Medications**

**Mannitol 25%**
- Used for Acute Angle Closure Glaucoma
- Crystallization may occur at room temperature.
Injectable Medications

- Contains all medical supplies to do IVFA’s.

Angio-Paks
Order to your specifications.

Lesson 4

Biohazard Waste/ Sharps
- Definitions
- Packaging
- Sharp Containers
- Storage and Pick-up

Biohazardous Definitions

- Any material other than sharps that is contaminated with blood, bodily fluid, or tissue is biomedical waste.
- Needles and other sharps must be disposed of in proper containers.
- Universal precautions must be used on ALL patients

Bloodborne Pathogens

- Include
  - Hepatitis B
  - Hepatitis C
  - Human Immunodeficiency Virus
- Exposure can occur via
  - Needle stick
  - Mucous membrane contact
  - Non-intact skin contact
  - Contact with tears?

Exposure Control Plan

- According to the OSHA Bloodborne Pathogens Standard, an Exposure Control Plan must meet certain criteria:
  - It must be written specifically for each facility
  - It must be reviewed and updated at least yearly (to reflect changes such as new workers
  - positions or technology used to reduce exposures to blood or body fluids)
  - It must be readily available to all workers
  - You must regularly educate your workers on the uses of the Exposure Control Plan and where it’s kept, so it is available when needed.

Packaging Biomedical Waste

- Waste should be placed in a red bag which has been labeled according to federal, state and local regulations with the biohazard symbol & word "biohazard".
Sharps Containers

- OSHA requires sharps containers to be closable, puncture-resistant, leak proof on the sides and bottom, and appropriately labeled or color coded.
- NEVER recap a needle

Storage of Medical Waste

- Stored in a designated and secured area until pickup by Waste Management Company.
- Regular scheduled pickups should be maintained throughout the year.

Lesson 5

Injection Procedures

- Intradermal, Subcutaneous, & Intralesional
- Intramuscular
- Intravenous
- Subconjunctival & Subtenons

Procedural Precaution

- Schedule procedure if possible.
- Recline patient for all periocular injections unless the slit lamp is utilized.
- Don’t dramatize.

Injection Procedures

Intradermal

- Between epidermis & dermal layers.
- Less blood supply = longer absorption time.
- Use for diagnostic tests.
- Use 26-27 gauge, 1/4 to 1/2 inch needle.

Subcutaneous

- Loose connective tissue underlying dermis; blood supply not as rich as muscle.
- Absorption time about 30 minutes.
- Used for epinephrine, insulin, tetanus toxoid, vaccine, narcotics, vitamin B12.
- 25-27 gauge, ½ to 7/8 inch needle.
Subcutaneous Injection

- Subcutaneous injection demonstrating a bolus or wheal of medication under and around skin lesion.

Infiltrative Technique

Description
- Used for local anesthesia, and nerve blocks.
- Used for intralesional steroid injections.
- Gauge and needle lengths vary dependent upon injection site.

Infiltrative Technique

Advantages
- Local infiltration; provides high local concentration of drug.
- Useful for anesthetic preparation.
- Allows for more complete anesthesia.
- Good delivery of drug to specific local site.

Intralesional Injection

- Chalazion
  - AKA: Meibomian cyst
  - Chronic, sterile, granulomatous inflammatory lesion.
  - Caused by retained sebaceous material leaking from meibomian glands or other sebaceous glands into adjacent stroma.

Chalazion

Signs
- Non-tender, round nodule; can be anterotarsal or retrotarsal.

Treatment
- One-third resolve spontaneously.
- Warm compresses and lid scrubs.
- Intralesional steroid injection.
- Surgical excision and drainage.
- How big?, Duration?, Anterior or Posterior to tarsal plate?
Chalazion

- Prognosis with different management options
  - Hot Compress with Digital Massage – 40%
  - conservative
  - Injection Alone – 80%
  - Injections + Compress/Massage – 90%
  - Incision + Curettage – near 100%

“Rule of Six”

- 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 Intralesional Steroid Injection.

Injectable Steroids

- Kenalog 40mg/ml is the drug of choice for treating chalazia.
- (also available 10mg/ml)

Intralesional Injection

Technique

- Administer topical anesthetic.
- Apply chalazion clamp.
- Use 27 gauge, ½ inch needle.
- Can also use tuberculin syringe
- Insert needle directly into center of lesion. (bevel up)
- Inject contents of syringe (0.1-0.3cc) & remove needle.
- Remove chalazion clamp.

Intralesional Video

- Demonstration of Infiltrative Intralesional Injection Technique administering Kenalog 40.
Intralesional Injection

Contraindications
- Must rule out sebaceous carcinoma in recalcitrant cases
- Known hypersensitivity
- Darkly pigmented patients
  - Hypopigmentation risk
- Active infection
  - Never inject a painful lesion

Complications
- Chemosis / Pain.
- Brusing/Bleeding.
- Retained drug deposits.
- Depigmentation at site of injection.
- Ptosis
- Eyelid Necrosis
- Subcutaneous Fat Atrophy.

Intramuscular Injection

- For larger volume (3ml) & quicker absorption.
- Less irritation from drug due to less sensory fibers.
- Absorption time 10-30 minutes.
- 19-23 gauge, 1 to 1 ½ inch needle.

Indications
- Usually reserved for irritating medications
- Optometric Use
  - Anaphylactic reaction to IVFA
  - IM benadryl or IM epinephrine 1:100
  - Nausea and vomiting from acute angle closure
  - IM phenergan for patients with nausea and vomiting response to IVFA

Potential Injection Sites
- Deltoid
- Dorsogluteal
  - Watch out for sciatic nerve!
- Ventrogluteal
- Rectus femoris (anterior thigh)
  - Best for emergent anaphylaxis
Intramuscular Injection

- Technique
  - Swab the area clean with alcohol swab
  - Apply pressure to the skin in a spreading motion in order to make sure the entry point is taut
    - Ensures muscle is isolated and prevents injection into the subcutaneous space
  - Insert needle fully into tissue at a 90 degree angle and inject bolus
  - Retract needle and apply direct pressure to the injection site with a cotton ball or gauze pad

Intravenous Injection

- Highest risk to patient.
- Impossible to reverse effects once given.
  - “Instant” delivery
- Requires greatest amount of training
- Ideal for large volumes of medication

Intravenous Injection

- Optometric Use
  - Typically reserved for fluorescein angiography
  - Indocyanine Green used to define CNVs
  - Can also be used to deliver mannitol for acute angle closure
  - May also be used to deliver phenergan prior to IVFA in known nausea patients

Why FA?

- Detection of subclinical retinal changes
- Confirmation of noted retinal or choroidal vessel leakage
- Examples:
  - Ischemic disease
  - Vein occlusion
  - Diabetes
  - Macular edema
  - RPE detachments
  - Many others

Angiographic Answers

- Documentation of Retinal circulation:
  1. Velocity of Blood Flow
  2. Anatomic detail otherwise invisible
  3. Assessment of integrity of normal barriers to dye flow
Retinal Realities
• #1- healthy retinal vessels are not fenestrated and therefore should not leak dye.
• #2- vessels comprising a non-compromised choriocapillaris are fenestrated and should leak… creates the choroidal flush seen in the early phase
• #3 An intact RPE-Bruch’s membrane complex forms a barrier between fluid within the choriocapillaris and sensory retina
• #4 RPE-Bruch’s provides a filter which prevents complete visualization of fluorescence within the underlying choroid.

IVFA-Equipment
• 25% Fluorescein Dye
• Infusion set-23 or 25g
• Tourniquet
• Syringe-3 or 5cc
• Alcohol prep pads
• Band-Aids
• Emesis basin
** Angio-Pro-Pak
Justiceop.com
$5.45/pk

Safety precautions
• Informed consent
• Blood borne pathogens
• Hand washing
• Glove up!
• Sharps
• Proper disposal

Informed Consent
Fluorescein angiography is a photographic test generally used to determine information about blood vessels, and other structures in and near the retina. No X-rays are involved. During the test, an injection of fluorescein dye is given in a vein in the arm or hand, then a series of photographs are taken. Sometimes the results of the test can be determined immediately, but usually the film must first be developed and analyzed.

For several hours following the test, the patient’s skin may appear slightly yellow and his urine may be discolored for 1-2 days. Generally there are no other side effects, but occasionally one may experience irritation or bruising at the site of the injection or very brief nausea. On occasion, an allergic reaction can occur as with the administration of any drug; such a reaction should, of course, be treated in an accepted medical fashion depending upon its nature and severity.
IVFA-Practical Considerations

- Use universal precaution on ALL patients
- Flashback does not equal stable venous access
- Open the cap at end of infusion set to confirm
- May need to keep cap off initially if concern over quality of veins to avoid blowing a vein
- Tape site down to stabilize
- Can reattach cap prior to hooking up syringe filled with dye if time is a factor
- Remove tourniquet once site is stable

IVFA-Practical Considerations

- Watch for extravasation during push and discontinue injection if occurs
- Speed of push has been disproven to increase risk of nausea/vomiting, it is anecdotal
- Suggested rates vary from 1-6sec 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”

Where?

Intravenous Injection

**Technique**
- Prepare IV tray.
- Wash hands and Glove.
- Inject infusion line into vein (bevel up) watching for blood return. Use 15-45 degree angle.
- Usually antecubital space
- Remove tourniquet.
- Attach syringe.
- Inject medication. (2ml 25% or 5ml 10)

OR.....

Intravenous Injection

**Technique**
- Remove needle and apply gauze.
- Check vitals on patient.
- Discard supplies.
- Inspect injection site and apply bandage.
- Discard gloves.
IVFA-Procedure

Site Selection
Alcohol Prep

IVFA-Procedure

Tourniquet
Venipuncture-shallow

IVFA-Procedure

Remove infusion set
Apply pressure

“Open” System

Incidence of Complications

- Yannuzzi et al, *Fluorescein Angiography Complication Survey (FACS)*, 1984
- 2434 responding retinal specialists
- N=221,781 IVFAs performed in 1984
- Frequency of a moderate adverse reaction (transient effect with possible need for medical intervention) was 1:63
- Severe reaction (prolonged effects requiring intense treatment) was 1:1900
- Rate of death 1:222,000.

Jennings and Mathews

- 1st optometric exploration into the adverse reactions of IVFA-1994
- N=1,173
- 2.2% of patients had adverse effects
- Nausea most common 0.8%, Urticaria 0.6%, Emesis 0.2%, Extravasation 0.2%
- Concluded no one factor existed which served to adequately predict which patients will have an adverse rxn to the NaFl dye
FANG-Complications

- Nausea
- Vomiting
- Pruritis
- Urticaria
- Anaphylaxis
- Syncope
- Tachycardia
- Extravasation
- Death-MI

Anaphylaxis

- Type I Hypersensitivity
- Symptoms
  - Itchy rash
  - Throat swelling
  - Low blood pressure
  - Occurs within minutes to hours

Anaphylaxis

- Treatment
  - Activate EMS
  - Lay patient down with legs elevated
  - On side if vomiting
  - Epinephrine 1:1000
    - EpiPen
  - Diphenhydramine (Benadryl)

Subconjunctival Injection

Description

- Between anterior conjunctiva & Tenon's.
- High local concentration with less systemic side effects.
- Good delivery of drug for unreliable patients.
- Eliminate need for adjunctive topical drug therapy.

Subconjunctival Injection

- Advantages
  - Less invasive and lower risk than Subtenon’s injection
  - High local concentration of drug
    - Decreased systemic side effects
  - Useful for noncompliant patients or those with difficulty administering topical medications
  - Can be used to address anterior and posterior segment pathology
Injection Vs. Drops?
- Recalcitrant Anterior Uveitis
- Vitritis with associated Cystoid Macular Edema

Subconjunctival Injection
- Medications Available
  - Corticosteroids
  - Antibiotics
  - Mitomycin C
    - Rarely used in optometric practice
  - 5 FU
    - For recalcitrant pterygia

Subconjunctival Injection
- Should NOT be performed if any of the following are present
  - Known allergy/hypersensitivity to the medication
  - Active infection (corticosteroids)
  - Corneal epithelial defects (anti-metabolites)

Subconjunctival Injection Technique
- Apply topical anesthetic.
- May use 4% xylocaine
  - Also available in 0.5% and 2%
  - Often combined with epi 1:100,000
  - Increases effectiveness
  - Caution in patients with liver and/or heart disease (HTN)
- Instill Alphagan P (.15% or .10%)
- May grasp & tent up conjunctiva w/ forceps (Difficult)

Subconjunctival Injection
- Use one of three approaches
  - Trans-fornix
  - 4 and 8 o’clock
  - Superior temporal
Inferior Fornix

“Tent”????

Subconjunctival Injection

Complications
- Perforation of the globe.
- Conjunctival chemosis.
- Subconjunctival hemorrhage.
- Mild Pain.
- Retained drug deposits.

Advantages
- Same as subconjunctival injection.
- Beneficial for posterior segment drug therapy.

Disadvantages
- Slightly greater risk of perforation.
- Difficult to excise if adverse effect.
- Slower absorption.

Subtenons Injection

Technique
- Inject between Tenons capsule and sclera.
- Use 25 gauge, 5/8 inch needle.
- Follow same procedure as with subconjunctival injection.

Complications
- Perforation of globe.
- Conjunctival chemosis.
- Subconjunctival hemorrhage.
- Mild Pain.
- Retained drug deposits.
Acknowledgements

• Erin Jaffe
• John Neal, O.D.
• Erin Nosel O.D., FAAO
• Drew Rixon, O.D., FAAO
• Jennifer Sanderson O.D.
• David K. Tailey O.D., FAAO
• Corrie Wicklund O.D.