OCULAR PHARMACOLOGY
Pharmacology for Technicians

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Overview
- Role of the Assistant
- Medication Check
- Patient Safety
- Reaction Prevention
- Drug Categories
- Drug Administration
- Vitamin Supplements
- Drug Instillation Procedure
- Drug Documentation

ROLE of the ASSISTANT AND TECHNICIAN
- Accurate documentation/recording
- Patient Education...can assist in preventing mistakes
- NEVER Work in Doubt!
- Read and re-read the medication request
- Be careful with hand-offs/transfers!
- Patient Safety

The Medication Check
- For “Ophthalmic Use”, must be on the container
- Check name
- Check dosage
- Check expiration date
- Check for contamination

The Patient Checks
- Reason for visit
- Check patient’s current health condition
- Verify patient allergies
- Provider medication request
- Check visual acuity...always
- Check IOP...always
- Do not leave the patient unattended and routinely monitor
- Check blood pressure before dilation

PATIENT CASE HISTORY
The best way to prevent an adverse reaction is to perform an excellent case Hx?
- General Health
- Medications
- Allergies
Current Medications

- Name
- Amount taken
- Frequency
- Prescribed for
- Prescribed by
- Illegal drugs too!

Why is illegal drug use important?

Critical checks

- Doctor’s request
- Pupils
  - PERRLA
- Angles
  - Open/clear
- Pressures
- Medications…always inspect medication
  - Heart meds
  - Blood pressure…before dilation
- Current health

Blood Pressure

- Please understand the procedure
- Correct position
- Explain it
- Perform it
- Document it
- No more than 3 attempts

What is the speed in which you regulate the release of pressure during the measurement

Readings

- Normal
  - The “normal” for adults is approximately 120mmHg / between 70-80mmHg
- Abnormal
  - Mild Hypertension
    - 145-159mmHg/90-104mmHg
  - Severe Hypertension
    - 160mmHg or more/100mmHg or more
  - Hypotension
    - Below normal blood pressure

Tonometry

- Instruments
  - Applanation- Goldmann…-touches patient

This is the industry gold std

What medication is used during this test?

Pupil Testing

- Explain test
- Proper lighting
- Perform direct and consensual
- Swinging flashlight
- Evaluate near response
- Recording accuracy
Pupil Testing

- Light the pupil for _____ seconds?
- Assure that the sensory pathway is working
- Direct/consensual responses to light
- Response to accommodation

Anisocoria - unequal pupil sizes
- “cor” = pupil
- “aniso” = difference

Hippus - “jumping” pupil
- Most commonly seen in younger patients

Recording

- P-pupils
- E-equal
- R-round
- R-react to
- L-light
- A-accommodation
- -RAPD/-Marcus Gunn

Verify Angle Depth

- When the doctor has seen the patient
- When the doctor has not seen the patient

Wash your hands! Before and After Patient Care!

Drop Instillation

- Clean hands
- Explain procedure
- Remember safety
- Inspect bottle
- Check expiration date
- Do not contaminate the container

What is wrong with this picture?
Drops...

TPA – vs DPA

- **Therapeutic Pharmaceutical Application**... when the problem is known and you treat the condition
- **Diagnostic Pharmaceutical Application**... when the problem is unknown and you treat the symptoms

Pharmacology: Diagnostic Agents

**Mydriatic Drugs**

- **Phenylephrine** (Neo-Synephrine, Mydfrin)
  - Strength: 2.5%, 10%
  - Effective: 4-6 hours
  - Systemic Side Effects:
    - Irregular heart beat, headache, hypertension, cardiac arrest (very rare)
  - Action: Stimulates the iris dilator muscle

Pharmacology: Diagnostic Agents

**Cycloplegic Drugs**

- **Tropicamide** (Mydriacyl)
  - Strength: 0.5%, 1%
  - Effective: 5-6 hours
  - Systemic Side Effects: Uncommon

Pharmacology: Diagnostic Agents

**Cycloplegic Drugs**

- **Cyclopentolate** (Cyclogel)
  - Strength: 1.0% and 2.0%
  - Effective: 24 hours
  - Side Effects: Dry mouth, excitation, facial flushing, tachycardia, angle closure due to dilation
  - Action: Paralyzes the sphincter muscle of the iris (dilation) and the ciliary muscle (prevent accommodation)

Pharmacology: Diagnostic Agents

**Stains**

- **Fluorescein**... used to stain cornea surface
  - Strips
  - Mixed with anesthetic
  - Injected (angiography)

- **Rose Bengal**... used to stain dead cells
Pharmacology: Anesthetics

- Commonly used anesthetics:
  - Proparacaine 0.5%
  - Tetracaine 0.5%
  - Lidocaine 1.0%-5.0%
  - Benoxinate plus fluorescein (Fluress)
  - Proparacaine plus fluorescein (Fluoracaine)

What is the typical duration for routine anesthetics?

Pharmacology: Therapeutic Agents

- Miotics
  - Action: contraction of the iris sphincter muscle (pupil constriction)
  - Use: lowering of intraocular pressure by improving drainage of the aqueous humor through the trabecular meshwork.

Pharmacology: Therapeutic Agents

- Glaucoma Treating Drugs
  - Adrenergic-blocking agents
    - Timolol, Betaxolol, Levobunolol
  - Adrenergic-stimulating agents
    - Epinephrine
    - Dipiverfrin
  - Carbonic Anhydrase Inhibitors
    - Acetazolamide
    - Methazolamide
    - Dorzolamide

Pharmacology: Therapeutic Agents

- Glaucoma Treating Drugs
  - Alpha Agonists
    - Apraclonidine
    - Brimonidine
  - Protaglandin Analogs
    - Bimatoprost
    - Latanoprost
    - Travoprost

Pharmacology: Therapeutic Agents

- Antibiotics
- Antivirals
- Antifungals
- Corticosteroids...prevents swelling
- Non-steroidal Anti-inflammatory Drugs (NSAIDS)
- Decongestants
- Antihistamines
- Mast Cell Stabilizers
- Lubricants

Medication Application Procedures

- Wash hands thoroughly before administration
- Give medications with patient in inclined position...why?
- Tilt head backward or lie down and gaze upward/downward
- Gently grasp lower eyelid below eyelashes and pull the eyelid away from the eye to form a pouch
- Place dropper directly over the eye, Avoid contact of the dropper with the eye, finger or any other surface
- Release the lid slowly and close the eye
- Occlude puncta for 2-3 minutes
- Wait 5 minutes before administering a second medication or drop
- Dim room lighting can assist in reducing blink reflex
Punctal Occlusion
- Prevent systemic absorption
- Aids in reducing reactions
- Patients with heart condition must be watched
- Close eyes for 2-3 minutes

VITAMIN SUPPLEMENTS

CLASSIFICATIONS
- Orals
- Solutions
- Suspensions
- Ointments
- Pumps
- Implants

Topical Anesthetics
- Proparacaine
- Tetracaine
- Cocaine

Mydriatics & Cycloplegics
- Tropicamide
- Phenylephrine 2.5-10%
- Cyclogyl
- Atropine
- Homatropine
- Scopalamine

Dyes & Stains
- Fluorescein
- Rose Bengal
- Lissamine Green
- Fluress
CLINICAL ADMINISTRATION

- Patient History
- Clinical Procedures Which May Be Influenced by Medications

THERAPEUTIC AGENTS

TPA – known problem

- Antibiotics
- Anti-virals
- Drugs that lower IOP
- Anti-inflammatory agents
- Non-Steroidal
- Combinations

GLAUCOMA MANAGEMENT

- Pilocarpine
- Beta-Blockers
- Carbonic Anhydrase Inhibitors
- Adrenergic Agonists

OCULAR INFLAMMATION

- Corticosteroids
- Steroid-Antibiotic Combinations
- Non-Steroidal Anti-inflammatory Drugs (NSAIDS)
- Oral Analgesics

OCULAR INFECTIONS

- Topical Antibiotics
- Oral Antibiotics
- Anti-Viral
- Analgesics

OCULAR ALLERGIES

- Artificial Tears
- Antihistamine-Decongestants
- Corticosteroids
Other considerations

- Eye color
- Chronic illnesses … diabetic pts
- Age
  - Older patients take longer to dilate due to small pupils
  - Very young patients take longer due to trust
- Ask the patient if they have ever been dilated before

### CAP Colors

<table>
<thead>
<tr>
<th>Cap Color</th>
<th>Drug Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tan</td>
<td>Antibiotics, Antivirals, Antifungals</td>
</tr>
<tr>
<td>Pink</td>
<td>Anti-inflammatory/steroids treats allergic reactions, swelling, redness (slows healing can cause cataracts and glaucoma). Do not use on fungal infections</td>
</tr>
<tr>
<td>Red</td>
<td>Mydriatics/Cycloplegics (dilate pupil)</td>
</tr>
<tr>
<td>Grey</td>
<td>Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) control inflammation caused by ocular allergies without steroidal side-effects</td>
</tr>
<tr>
<td>Green</td>
<td>Miotics (stimulates sphincter and causes pupil constriction)</td>
</tr>
<tr>
<td>Yellow or Blue</td>
<td>Beta-Blockers traditionally used to treat glaucoma, reduce IOP by decreasing aqueous humor</td>
</tr>
<tr>
<td>Purple</td>
<td>Adrenic Agonists (reduce IOP)</td>
</tr>
<tr>
<td>Orange</td>
<td>Carbonic Anhydrase Inhibitors (reduce IOP)</td>
</tr>
<tr>
<td>Turquoise</td>
<td>Prostaglandin Analogues (reduce IOP by increasing aqueous outflow)</td>
</tr>
</tbody>
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### IN-OFFICE PROCEDURES

#### Patient Instruction- Solutions and Suspensions

- Wash hands thoroughly before administration
- Tilt head backward or lie down and gaze upward
- Gently grasp lower eyelid below eyelashes and pull the eyelid away from the eye to form a pouch
- Place dropper directly over the eye. Avoid contact of the dropper with the eye, finger or any other surface
- Release the lid slowly and close the eye
- Occlude punta for 2-3 minutes
- Wait 5 minutes before administering a second medication or drop

#### Patient Instruction- Ointment

- Wash hands thoroughly
- Tilt head backward or lie down and gaze upward
- Gently pull down the lower lid to form a pouch
- Place .25 to .50 inch of ointment with a sweeping motion
- Close the eye for 1-2 minutes
- Temporary blurring of vision may occur.
- Remove excess ointment with a tissue
- Wait 10 minutes before applying the second ointment

### ABBREVIATIONS
**Examples**

- ad lib - freely as needed
- ac – before meals
- bid - twice a day
- gtt- Drops
- hs- at bedtime
- pc - after meals
- po - by mouth
- prn - as needed

**Examples- con’t**

- oint - ointment
- q - every
- qh- every hour
- q4h- every four hours
- qid- 4 times a day
- sig- instructions
- sol- solution
- susp- suspension

**Examples- con’t**

- tab- tablet
- tid- three times a day
- top- topically
- ung- ointment
- ut dict- as directed

**HOW TO WRITE AN Rx**

**Make sure that you include:**

- Full name of patient
- Address can be optional
- Date of Rx
- Inscription: name of drug; concentration
- Subscription: amount to be dispensed
- Instructions: route of administration; number of drops or tablets; frequency of use; refill

**What else?**

- Make sure that it is legible!
- Legal considerations
- Never go beyond your training
- Don’t rush patient care
- Protect your patients and your practice
- Documented training
References and resources

- Ophthalmic Drug Facts 2002
- Ophthalmic Medications and Pharmacology
- Review of Optometry: 2002 Clinical Guide to Ophthalmic Drugs (Melton and Thomas) May issue

THANK YOU!
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