

Case Studies in Ocular Disease

Dr. Gupta has no financial interests in any of the companies or products mentioned in the program

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Because...

- Some ocular conditions will not get better unless we do
- Optometrists long before most of us starting practicing fought to earn therapeutic privileges for ODs so we have to use them

Why the growth?

- We diagnose and intervene earlier
- We treat more aggressively
- Patients live longer
- Population is increasing

Retail Rx spending per capita each year

Of the countries shown below, Sweden spends the least for pharmaceuticals per capita, at \$351, while the U.S. spends the most at \$1,011.

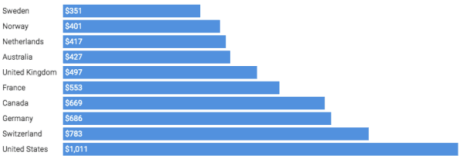


Chart: The Conversation, CO-BY-ND - Source: The Commonwealth Fund - Get the data

Before Prescribing Anything...

- Take a thorough medical history
- HPI and ROS
- Current Medications
- Allergies
- Pregnancy/Nursing

## Eye Infections/ Red Eye Emergencies

### Who sees most of them?

- Primary/Urgent care see 65%
- Eye Care specialists only see 35%

### Red Eye Emergencies: Things to quickly rule out

- Iritis
- Acute angle closure glaucoma
- Corneal ulcer
- Herpetic infection
- Fungal infection
- Corneal FB/Penetrating injury

### Iritis

- May be an autoimmune disorder
- 87.6% are anterior
- 55% are idiopathic
- 21% are traumatic

### When should lab tests be ordered?

- |                      |                         |
|----------------------|-------------------------|
| ■ Bilateral cases    | ■ Hyperacute cases      |
| ■ Atypical age group | ■ Worsens with tapering |
| ■ Recurrent uveitis  | ■ VA worsening          |
| ■ Recalcitrant cases | ■ Immunosuppressed px   |

### Work up

VA  
SLE  
Dilated exam !

## Systemic diseases causing uveitis

- Rheumatoid arthritis
- Reiter's syndrome
- Sarcoidosis
- Syphilis
- Ankylosing spondylitis
- PMR
- Lyme's disease
- JRA
- TB
- SLE
- Sjogren's syndrome
- Crohn's disease
- GCA
- Occult blood disorders
- AIDS

## Goals Of Treatment

- Make patient comfortable
- Improve Visual Acuity
- Decrease inflammation
- Determine any underlying cause
- Minimize side effects of treatment

2 Prescriptions will take care of your problem

1. Cyclogyl 2% or Scopolamine .25% or Atropine 1%
2. Topical Steroid – Pred Forte or Durezol

When you are done...

- Taper slowly
- QID x 1 week
- TID x 1week
- BID x 1week
- QD x 1week

ACG

- Pt complaint of dull ache
- Steamy Cornea
- Mid fixed dilated pupil
- Elevated IOP

ST: Treatment of ACG

PACG : Treatment of the acute attack

- Pilocarpine eye drop 1-2% in the affected and the fellow eye
- Topical beta-adrenergic blocker
- Carbonic anhydrase inhibitor

## LT: Peripheral Iridotomy

- Done at slit lamp
- Topical anesthetic, brimonidine, and pilocarpine instilled

## How to rule out penetration

- History
- SLE Exam – Seidel's sign
- Dilation
- What if you cant rule it out?

Once you do that...

Now you can take your time and figure out the correct diagnosis

What is the most important risk factor for eye infections?

## Bacterial Conjunctivitis

- How do we diagnose this condition?

## Bacterial Conjunctivitis

- What's usually not part of diagnosis ?  
– **CULTURING**

Media	Growth Supported
Blood agar	Most bacteria and fungi, except <i>Neisseria</i> , <i>Haemophilus</i> , and <i>Moraxella</i>
Chocolate agar	<i>Haemophilus</i> , <i>Moraxella</i> and <i>Neisseria</i>
Sabouraud dextrose agar	Fungi
MacConkey	Gram negative bacteria only, differentiate lactose positive and negative, which is helpful in identifying <i>Pseudomonas</i>
IMA with gentamicin	Fungi
Thioglycollate broth	Wide range of bacteria, including anaerobic, and fungi
Löwenstein-Jensen medium	Mycobacteria and <i>Nocardia</i>
Non-nutrient agar with <i>Escherichia coli</i>	<i>Acanthamoeba</i>
Brain heart infusion	Streptococci, meningococci, yeast and fungi
Cooked meat broth	Anaerobic and fastidious bacteria

## When to Culture

- When something in history or exam seems out of the ordinary
- When patient fails to get better

## Antibacterial agents

- Sulfa Preparations
- Erythromycin
- Bacitracin
- Bacitracin / Polymyxin B
- Bacitracin / Polymyxin B / Neomycin
- Tetracycline
- Gentamycin
- Tobramycin
- Trimethoprim / Polymyxin B

## Which Antibiotic is the best?

## How important is our choice of Antibiotic?

This screenshot shows a table with multiple columns, likely representing different antibiotic regimens and their clinical outcomes. The text is small and difficult to read, but it appears to be a summary of data from a clinical trial.

Clinical Ophthalmology 2010; 4:1451-1457

## What is the proper dosing for antibiotics?

This screenshot shows a table with multiple columns, likely representing different antibiotic regimens and their clinical outcomes. The text is small and difficult to read, but it appears to be a summary of data from a clinical trial.

Clinical Ophthalmology 2010; 4:1451-1457

## Management

- Discontinued contact lens wear
  - Of course she had no back up eyeglasses so I had to refract her
- 1 drop of cyclogyl instilled in office
- Given Rx for Zymaxid QID
- Given Rx for Topical NSAID prn use
- Also given Rx for bacitracin ophthalmic ointment at bedtime

## To Patch or Not to Patch?

- Not typically done anymore
- Relative contraindication for contact lens wearer
- Better option is bandage contact lens

## Follow up care

- Patient educated on limited use of NSAID
- Bandage CL inserted
- Patient was seen daily for follow up
- Getting better with each visit

## Patient may have Recurrent Corneal Erosion

- What are risk factors for RCE?
  - Trauma – especially with organic material
  - Corneal dystrophy
  - Dry eyes
  - Diabetes
  - Corneal surgery

## Management

- ST: Treat corneal abrasion again
- LT: What are your options?

## Muro 128

- Drops during the day
- Ointment at bedtime

Bandage CL

PTK

Anterior Stromal Puncture

Doxycycline

- 50 to 100 mg BID
- What do you need to educate patients on?

Superficial keratectomy

Explanations for fluctuating vision

- Use anesthetic and pledget to smooth out edges of abrasion

- Blood sugar fluctuations
- Accommodative strain

## How do you check for Accommodative strain?

- NRA/PRA
- Cycloplegic exam

### NRA/PRA

- **Negative relative accommodation** is a measure of the maximum ability to relax **accommodation** while maintaining clear, single binocular vision.
- **Positive relative accommodation** is a measure of the maximum ability to stimulate **accommodation** while maintaining clear, single binocular vision.

### Examples

- NRA/PRA: +1.00 / -1.00
- What if it was +2.50 / -.50
  - Then you need to add +1.00

### Low density lipoprotein

- Optimal: <100
- Borderline high: 130-159
- High: > 160

### High-density lipoprotein

- Good cholesterol – helps remove cholesterol from the arteries

### HDL: Normal Values

- Low: <40
- High: > 60



## Single best way to raise HDL?

- Exercise
- Moderate exercise for 30 min 5x/week
- Strenuous exercise for 20 min 3x/week

## Total cholesterol

- Overall measure of hypercholestermia
- Desirable: <200
- Borderline: 200-239
- High: >240

## Triglycerides

- Generally get higher with physical inactivity, smoking, and obesity
- Optimal: <150
- Borderline: 200-499
- High: >500

## Low density lipoprotein

Bad cholesterol – bind to arteries and increase risk for disease

## Atherosclerosis

- Leading cause of morbidity and mortality in the U.S.
- Accounts for more than 1/3 of all deaths each year
- About 13 million Americans have coronary heart disease (CHD)
- Dyslipidemia is the most prevalent and important modifiable risk factor for atherosclerosis

## Treatment

- Lifestyle changes – diet and exercise
- Medications

## Diet changes

## Dietary Modifications

- Eat more fiber
- Know your fats
- Smart protein
- Low-carb diet

**Top 10 Foods Highest in Cholesterol to Avoid**  
(Serving of Cholesterol = 100% of the Daily Value (DV))

<b>1. Full Fat Foods (Refrigerate Big Breakfast)</b>  100% DV (200mg) cholesterol per 100g 100% DV (200mg) cholesterol per 100g	<b>2. Liver</b>  100% DV (200mg) cholesterol per 100g serving 100% DV (200mg) cholesterol per 100g
<b>3. Fatty Meats (Chicken Leg)</b>  100% DV (200mg) cholesterol per roasted leg ( thigh and wing) 100% DV (200mg) cholesterol per 100g	<b>4. Canned Tuna</b>  100% DV (200mg) cholesterol per 100g 100% DV (200mg) cholesterol per 100g
<b>5. Desserts (Chocolate Mousse)</b>  100% DV (200mg) cholesterol per 100g 100% DV (200mg) cholesterol per 100g	<b>6. Eggs</b>  100% DV (200mg) cholesterol in 1 large egg 100% DV (200mg) cholesterol per 100g
<b>7. Unspiced Cream</b>  100% DV (200mg) cholesterol per 100g 100% DV (200mg) cholesterol per 100g	<b>8. Bacon</b>  100% DV (200mg) cholesterol per 100g 100% DV (200mg) cholesterol per 100g
<b>9. Cheese</b>  100% DV (200mg) cholesterol per 100g 100% DV (200mg) cholesterol per 100g	<b>10. Butter</b>  100% DV (200mg) cholesterol per 100g 100% DV (200mg) cholesterol per 100g

## 1<sup>st</sup> Line Medications

- Statins are also called HMG-CoA reductase inhibitors. They include [lovastatin \(Mevacor\)](#), [simvastatin \(Zocor\)](#), [pravastatin \(Pravachol\)](#), [fluvastatin \(Lescol\)](#), [atorvastatin \(Lipitor\)](#), and [rosuvastatin \(Crestor\)](#).
- Statins block an enzyme called HMG-CoA reductase, which is necessary for the production of cholesterol.
- Statins lower LDL cholesterol number and they lower your risk of developing hardening of the arteries (atherosclerosis)

## Side effects of statins

<p><b>1. Muscle-related issues</b></p> <p>Reported rates of 0.3% to 5.3%. The wide range reflects different populations, as well as different definitions of muscle issues. Statin-induced myopathy is generally defined as muscle pain, weakness, and/or cramps with blood creatine kinase (CK) levels at least 10 times the normal upper limit. CK, while an essential enzyme for muscle function, is a marker for muscle damage when found in elevated levels in the blood.</p> <p>One rare disorder to note: statins may be environmental triggers for anti-HMG-CoA reductase recruiting autoimmune responses which causes severe muscle cell death caused by an autoimmune response against the enzyme that statins target. It likely targets those with underlying genetic susceptibility. Immediate treatment is with immunosuppressants.</p>
<p><b>2. New-onset diabetes</b></p> <p>One study found a 25% increase in new diabetes cases in statin patients compared to others, which increased when more risk factors were present.</p>
<p><b>3. Increased hemorrhagic stroke incidence</b></p> <p>While the risk of ischemic stroke (obstructed blood flow to tissues) is lowered with statins, the risk for a hemorrhagic stroke (a brain aneurysm or blood vessel leak) is associated with lower LDL-C.</p>

## Lipids & the Eye

- Amarois Fugax/Hollenhorst plaques
- Retinal vein occlusions
- Xanthelasma
- Corneal arcus

## Ophthalmic Migraines

- Scintillating scotoma or “aura” lasting 20-30 min
- Can occur with or without headache
- Diagnosis made by patient complaint and dilated exam to rule out other conditions

- 1. Abnormal electrical activity in the visual cortex
- 2. Transient constriction of blood vessels

## Ophthalmic Migraines

- Treatment: None
- If occurring frequently, refer to PMD for migraine work up.
- Studies show medications used for migraine headaches can also decrease frequency of ophthalmic migraines

## What is vasovagal?

- Occurs when you faint because your body overreacts to certain triggers, such as the sight of blood or extreme emotional distress. It may also be called neurocardiogenic syncope.
- What happens: heart rate and blood pressure drop suddenly. That leads to reduced blood flow to your brain, causing you to briefly lose consciousness.

## What is emergency criteria for HTN?

- Systolic pressure over 180
- Diastolic pressure over 120

## Factors Influencing Blood Pressure

$$\text{Blood Pressure} = \text{Cardiac Output} \times \text{Systemic Vascular Resistance}$$

## What is normal BP?

- Systolic = 120 mm Hg
- Diastolic = 80 mm Hg

Categories of BP in Adults\*

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
<b>Hypertension</b>			
Stage 1	130–139 mm Hg	or	80–89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

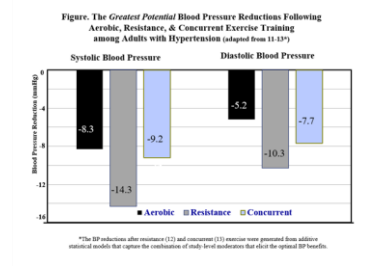
## Treatment

- Exercise
- Low Sodium Diet
- Medications

## Lifestyle Modifications

- Lose weight
- Quit smoking
- Exercise

## Exercise



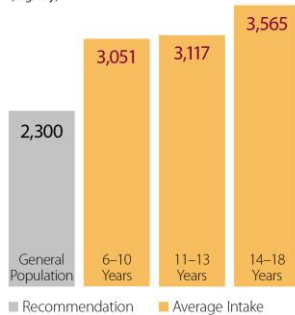
## Calculate Body Mass Index

$$BMI = \frac{\text{weightInPounds} \times 703}{\text{heightInInches} \times \text{heightInInches}}$$

Or

$$BMI = \frac{\text{weightInKilograms}}{\text{heightInMeters} \times \text{heightInMeters}}$$

Average Sodium Intake in Children  
(mg/day)



Where does the sodium come from?

## Lifestyle Modifications and HTN

LIFESTYLE MODIFICATION RECOMMENDATIONS		
Modification	Recommendation	Average Systolic Blood Pressure Reduction Range
Weight reduction	Maintain normal body weight (body mass index 18.5-24.9)	5-20 mmHg/10kg
DASH (Dietary Approaches to Stop Hypertension) eating plan	Adopt a diet rich in fruits, vegetables, and low-fat dairy products with reduced content of saturated fat	8-14 mmHg
Dietary sodium reduction	Reduce dietary sodium intake to 2.4 grams per day	2-8 mmHg
Physical activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 min per day, most days of the week)	4-9 mmHg
Moderation of alcohol consumption	Limit consumption to no more than 2 drinks (24 oz beer, 10 oz wine, or 3 oz 80-proof whiskey) per day in most men and no more than 1 drink per day in women	2-4 mmHg

United States Department of Health and Human Services, National Heart, Lung, and Blood Institute. Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7 Express), 2003.

## Drug Classes

- Thiazide diuretics
- Beta blockers
- Angiotensin-converting enzyme (ACE) inhibitors
- Angiotensin II receptor blockers (ARBs)
- Calcium channel blockers
- Renin inhibitors

## Ocular Manifestations of HTN

- Vessel changes/AV nicking
- Retinal hemorrhages
- Papilledema

## Grades of HTN Retinopathy

- Grade 1
  - Vascular Attenuation
- Grade 2
  - As grade 1 + Irregularly located, tight constrictions - Known as 'AV nicking' or 'AV nipping' - Salu's Sign
- Grade 3
  - As grade 2 + Retinal edema, cotton wool spots and flame-hemorrhages 'Copper Wiring' + Bonnet's Sign + Gunn's Sign
- Grade 4
  - As grade 3 + optic disc edema + macular star 'Silver Wiring'

## How do you show meaningful use?

“Patient educated to work with PMD on maintaining proper bp”

2 things you can do when your patient has hypertensive retinopathy

- Emphasize need for yearly ocular health exams
- Perform fundus photography

Your patient has a corneal foreign body

## Management

- #1 PRIORITY:
- Rule Out Ocular Penetration
- What if you can't?

## Management

- #2 PRIORITY:  
» Remove Foreign Body

## Corneal Foreign Body

- Can use foreign body spud, 25-gauge needle, Q-tip
- Afterwards, measure size of resultant corneal epithelial defect

How do you treat the rust ring?

What happens if you don't remove the  
rust ring?