Management of Ocular Infection: The Next Generation

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EVERY RED EYE DESERVES AN ANTIBIOTIC ???

Most common causes of ACUTE Conjunctivitis

- Toxic or chemical
- Viral
- Chlamydial
- Bacterial

Viral conjunctivitis is the #1 Cause of ACUTE INFECTIOUS Conjunctivitis

- **Adenovirus**
- **Enterovirus**
- **Herpes FAMILY of Viruses**
- **Miscellaneous**

Adenovirus Family

- **DNA Viruses**
- **At least 35 different serotypes**
- **Type 8 Classic EKC**
- **Types 10, 13, 19, and 37 new EKC**
- **Pharyngoconjunctival fever (PCF) Type 3 and 7**

Case #1

S: 17 Y/O Female with c/o itching , watering red OD X 4 days associated with flu-like symptoms.

O: “Mixed” conjunctivitis

Right Pre-Auricular node

Watery discharge with erythema OU

Pseudomembrane OD

Differential DX

- **H. Simplex**
- **Allergy**
- **Vernal/atopic**
- **GPC**
- **Bacterial**
- **Chlamydial**
- **Molluscum**
- **Moraxella**
- **Medicamatosa**

Adenoviral Symptoms

- **FB sensation**
- **Watering**
- **EKC-Photophobia and Pain**
- **Blurred vision**
- **PCF-Pharyngitis and pyrexia**

Adenoviral Signs

- **Follicular conjunctivitis- Variable most common in lower fornix**
- **Mild to moderate chemosis**
- **Lid swelling with mild ptosis**
- **Lymphadenopathy in 66%**

EKC SIGNS

- **Papillary response of upper tarsal conj.**
- **Subconj. Heme**
- **Pseudomembrane and conjunctival scarring-Severe form**
- **Subepithelial infiltrates-Severe form**

REMEMBER

ADENOVIRAL DISEASE IS BILATERAL

Treatment@@@@

- **Cool compresses and ASA**
- **Lubrication**
- **Decongestants**
- **Steroids (infiltrates, membranes, inflammation)**@@@@
- **Membrane removal**
- **Antibiotics??**
- **Cycloplegia??**
- **A Cure??**

HOW ABOUT A CURE
1 HERE
1 ON THE WAY

- **Current topical antiviral agents (Viroptic) are not effective@@@@**
- **Povidone Iodine 5%: Swish and spit!!**
- **Cidovovir will cure the common cold-OF THE EYE**

Enteroviruses

- **EHC-Epidemic Hemorrhagic Conjunctivitis**
- **AHC_Acute hemorrhagic conjunctivitis**
- **Called Apollo 11 disease after outbreak in Africa from 1969-70**
- **Enterovirus type 70**

EHC Symptoms

- **Marked conjunctival hemorrhage**
- **Bilateral**
- **Follicular conjunctivitis**
- **MINIMAL SPK**
- **PA Nodes common**

Herpes Family of Viruses@@@@

- **Herpes simplex**
- **Herpes zoster**
- **Epstein Barr-Infectious mononucleosis**
- **CMV-Cytomegalovirus**

Herpes Simplex

- **Type I Above waist-Trigeminal ganglia**
- **Type II below waist-most severe in eye infection-Saccral ganglia@@@@**
- **50% reoccurrence within 2 years**
- **Multiple triggers@@@@**
- **90% carry antibodies by age 10**

Herpes Simplex

- **Primary disease**
- **Recurrent disease**
  - **Conjunctivitis**
  - **Keratitis**
- **Stromal disease**

Primary H. simplex

- @@@@
- **Pre-auricular node common**
- **Vesicles**
- **Follicles**
- **No dendrite**
- **Self-limiting disease-BUT-Treat aggressively to prevent recurrence**

Recurrent H. simplex

- **Pre-auricular node rare**
- **Virus involves deeper tissues with each episode**
- **50% get recurrence within 2 years**
- **Steroids will exacerbate infectious H. simplex disease**
- **Contra-indicated in purely infectious disease**

QUICK QUIZ

ANYONE THAT WOULD TX HERPES SIMPLEX OCULAR DISEASE WITH TOPICAL STEROIDS WOULD BE CLASSIFIED AS WHAT?

A. A GENIUS

B. A HERO

C. ONLY A PERSON WITH SBS WOULD USE STEROIDS ON HERPES SIMPLEX

Stromal H. simplex-
A whole new ball game

- **Mechanism is primarily inflammation@@@@**
- **Stromal infiltrates are the critical sign**
- **Balanced use of topical steroid (FML) with anti-viral cover@@@@**
- **Consider oral acyclovir at this point in time**

Characteristics of Herpes Viruses

- **Latency**
- **Recurrence**

Antiviral Therapy
Symptomatic TX

- **Cool compresses**
- **Decongestants**
- **Cycloplegics**
- **ASA or tylenol**

Idoxuridine

- **Indications-H. Simplex**
- **Problem -Poor ocular penetration**
- **Dosage:**

YOU MUST BE KIDDING - one drop q 1h daytime and q 2h ATC

OR

- **Every minute X 5 doses every 4H ATC**
- **Ointment used 5X daily ATC**

Idoxuridine dosage forms

- **Herplex 0.1%-15cc by Allergan (Also available in the handy 50 gallon economy size)**
- **Stoxil 0.1% -15cc-SKF**
- **Stoxcil 0.5% Ophthal. Oint 4gm**

Adenine arabinoside

- **Indications-Herpes simplex**
- **Caution-May be mutagenic**
- **Dosage-Instill Ointment 3-5X daily**
- **Problem-ONLY available as ointment**
- **VIRA-A 3% 3.5gm tube-PD**

Trifluorothymidine@@@

- **FORMER drug of choice for topical management of Herpes simplex ocular disease.@@@@@**
- **Rapid absorption**
- **Toxicity occurs when used over 21 days**
- **Dosage-5-8X daily**
- **Viroptic 1%-7.5cc-Burroughs**

Meet Zirgan

- **NEW DOC for H.simplex**
- **Selective toxicity**
- **Gel dosage form**

CLINICAL PEARL ALERT

- **If treatment failure with one product switch to another- generally no cross toxicity or sensitivity occurs**
- **Use Viroptic daily and Vira-A oint HS for best effect**

Acycloguanosine (Acyclovir)

- **The "Jewish Penicillin" of the anti-viral products**
- **A pro-drug-minimal side-effects**
- **Topical agent no more effective than viroptic**
- **Standard of care for H. Zoster and resistant H. simplex**

Zovirax (Burroughs)

- **Oral dosage form 200, 400 and 800mg tablets and 200mg/5cc suspension**
- **H. simplex 400mg TID@@@@**
- **H. Zoster-”Chickenpox”-200-400mg QID X 10D**
- **Recurrent-800mg 5 times daily X 10-14 days@@@@**

For ALL Herpes It's the Drug of Choice

- **Recurrent or resistant simplex**
- **ALL Zoster patients over 50**

Famvir
Famcyclovir

- **Third generation anti-viral medication**
- **Pro-drug**
- **Selective toxicity**
- **Excellent anti-herpetic activity**
- **Quite expensive**

Famvir
Indications/Dosage forms

- **Indications:**
- **Resistant ocular simplex or Type II simplex**
- **125-250mg BID**
- **Hepes zoster 500mg TID**
- **Dosage forms:**
- **125/250/500mg tablets**

ANTI-VIRAL PHARMACOLOGY

Anti-viral agents function by inhibiting viral DNA synthesis. This is accomplished by blocking the key enzymes:

- **Thymidine kinase**
- **DNA polymerase**
- **Deoxycytidine kinase**
- **Thymidylate synthetase**

Case 2

S:54 y/o with red eye X 72H

FB sensation with sticky discharge in AM

O: Mixed conjunctivitis

- **No PA Nodes**
- **Mild chemosis**
- **Yellow/green discharge**
- **Min SPK**
- **No corneal infiltrates**

Conjunctivitis-An Ocular Emergency??

- **Environmental**
- **Viral**
- **Bacterial**
- **Other**

Tests

- **Cultures**
- **Diff-Quick**
- **Gram Stain**

Diff-Quick Technique
Even a “DIP” Can Do It

Dip 5 times for one second into:

- **The fixative**
- **Solution I**
- **Solution II**
- **Rinse in distilled water**
- **Air dry**

Differentiates White Blood Cell Types@@@@

- **Poly's: Polymorphonucleocytes (PMN's): Bacterial infection@@@@**
- **Lymphocytes: Viral infection**
- **Eosinophils: Allergic disease**

Gram Stain

- **Differentiates bacteria by differences in cell wall morphology@@@@**
- **Designates bacteria as Gram (+) or (-)@@@@**

Gram Stain Solutions

- **Gram crystal violet:All stain blue**
- **Gram iodine: All cells stay blue**
- **Decolorizer: Gram (+) cells “seal” in blue color, Gram (-) cells are colorless with holes in cell wall**
- **Safranin counterstain: Stains Gram**

(-)cells red

Culturette Etiquette

- **Choose proper culturette: Bacterial vs Viral**
- **Break solution bulb BEFORE swabbing**
- **Avoid pus-Dead cells only**
- **Plate ASAP**

Plating Etiquette

- **Blood agar: Detects hemolysis: a sign of greater pathogenicity**
- **Chocolate agar:Heated blood agar: Provides nutrients for Hemophilus growth**
- **Sabouraud's: Fungal growth media**
- **Overlaid E-Coli plate: Culture media for acanthamoeba**

Let's Start with the Kids: Pediatric conjunctivitis plays by different rules

Don't treat pediatric conjunctivitis without first:

- **Check history**
- **Check ears**
- **Check throat**
- **Check temperature**

Kids Conjunctivitis-NO drops alone if…..

- Recurrent or active otitis media
- Fever
- Sore throat
- Generally ill
- Treat with Polytrim/fluoroquinolone and effective oral anti H. Flu

Why treat conjunctivitis:

- **Prevent conversion to chronic disease**
- **Hasten cure**
- **Prevent spread to other ocular structures or sinus**
- **Reduce contagion**
- **Prevent complications**

Treatment Agents

- **Polytrim**
- **Fluoroquinolone**
- **Antibiotic Steroid**
- **Rarely orals (Exc. Pediatric)**

15 Y/O female presents with mom-C/O red eye-Simple Right??

- **Has seen one nurse practitioner**
- **Has seen Two Optometrists**
- **Tx with Ciloxan**
- **Tx with Tobradex**
- **Mom wonders why nobody can cure her daughter**

Zithromax
Azithromcin

- **Broad spectrum activity**
- **68 hour 1/2 life**
- **DOC in penicillin sensitive patients**
- **Effective in pediatric Hemophilus**
- **Mild-medium GI side effects**
- **Excellent compliance (5 day TX) (1 day for chlamydia)**
- **Moderate cost**
- **Drug Interactions??**

The Killer Conjunctivitis

- **Neonatal conjunctivitis is different**
- **Chemical vs infectious cause**
- **Chemical: Crede prophylaxis with silver nitrate is no big deal**
- **Infectious IS A BIG DEAL**

Neonatal Conjunctivitis

- **Ophthalmia Neonatorum**
- **Any conjunctivitis in the first month of life**
- **Chemical vs infectious**

Neonatal Conjunctivitis

- **Always an emergency**
- **Tx presumptively**
- **Always culture to R/O gonococci**

Neonatal Conjunctivitis Infectious Types

- **Neisseria gonorrhea**
- **Neisseria meningidis**
- **Chlamydia trachomatis**
- **Staph. Aureus**
- **Strep. Pyogenes**
- **Strep. pneumoniae**

Chlamydial Conjunctivitis

- **Most common cause of CHRONIC conjunctivitis in all age groups**
- **STD**
- **Mother should be checked prior to birth**
- **Onset in 2nd week post-partum**
- **Potential conjunctival scarring**
- **Systemic complications**

Chlamydia
Clinical signs

- **Moderate mucopurulant discharge**
- **Papillary conjunctivitis**
- **Possible pseudomembranes**

Chlamydia
Treatment

- **Both topical and systemic**
- **Treat parents and friends also**
- **The family that gets treated together stays together**
- **Erythromycin ophth. Oint**
- **Zithromax 10mg/kg/day X 1 day, then 5mg/kg/D X 4 days**
- **Adults: 1 gm (4 tablets)**

Neisseria Conjunctivitis- A TRUE Ocular Emergency

- **Onset within first week of life**
- **HYPER-purulent conjunctivitis**
- **Marked inflammation of eye and lids**
- **STD**
- **Delayed treatment/loss of eye/potentially fatal infection**

Neisseria
Lab Work-up

- **Labs are mandatory-STAT**
- **Fastest is gram stain-don’t wait for cultures**
- **Confirmatory culture**

Neisseria Treatment

- **Ocular irrigation with antibiotic solutions**
- **IV Pen or cephalosporin-Dose by weight**
- **TX parents**
- **Multiple infections possible with several STD's**

Maternal Herpes simplex-Type II-Genital herpes

- **High incidence of infant mortality**
- **Mother must be pre-tx with oral acyclovir**

The “Like-New” 3 year old SCL

- **37 yowf with eye pain-”thinks she scratched her eye**
- **Wears the “30” day XSCL**
- **Orders them through the mail**
- **No local eye doctor**
- **Current pair 3 years old**
- **HX of frequent “pink-eye”**

Infectious Keratitis

Herpes Keratitis

Fungal Keratitis

Bacterial Keratitis

Amoebic Keratitis

Treated at Urgent Care

- **Urgent care doctor agreed and treated as an abrasion**
- **Pressure patched X 3 days**
- **Erythromycin Ointment**
- **Suffered significant VA loss**
- **Patient won settlement prior to trial**

Moral:
NEVER PATCH AN INFECTED EYE

In other words:
NEVER PATCH A PAINFUL EYE
WITH A HX OF CL WEAR

Respond To This Statement

The current standard of care is to culture ALL suspected bacterial corneal ulcers

A. TRUE

B. FALSE

Culturing: The 1,2,3,4 Rule

- **1: Less than +1 anterior chamber RX**
- **2: Less than 2 mm in size**
- **3: At least 3mm from optic axis**
- **4: Less than 1/4 depth of cornea**

Bacterial Keratitis TX

- **Cephalexin 50mg/cc + Tobramycin 13.5mg/cc**
- **Fluoroquinolone**
- **Fluoroquinolone + Cephalexin**
- **Vancomycin 50mg/cc for MRSA**
- **LASIK Ulcers: Vancomycin + Amikacin**

Bacterial Ulcer Guidelines

- **Always culture if you have the means**
- **Patients that get better never sue-those that don’t-DO**
- **Consider the 1-2-3-4 rule**
- **Fluoroquinolone mono-therapy is not fool-proof**
- **Grade the ulcer-Location, location, etc**
- **Step TX based on cultures**

The Newest Fluoroquinolones

- **Besivance: Besifloxacin: 1st chloro-fluoroquinolone: better against MRST Never used orally**
- **Moxifloxacin 0.5%: 4th gen Moxeza**
- **Gatifloxacin: 4th gen**