How many HIV+ individuals are there in the US?

About 1 million!

What percent of HIV+ individuals are...

-- Women? 25%

-- African American? 50%

What percent of HIV+ individuals will have an ocular manifestation of the dz at some point?

About 75%!

Two meds commonly taken by HIV pts are notorious for causing uveitis in 1/4-1/3 of cases.

What are they?

-- Rifabutin--Cidofovir

Rifabutin-induced uveitis is more likely if another class of med is being taken concurrently.

What is it?

An azole antifungal

Cidofovir has what specific ocular side effect in about 10% of cases?

It lowers IOP
How many HIV+ individuals are there in the US?
About 1 million!
How many HIV+ individuals are there in the US?
About 1 million!

What percent of HIV+ individuals are…
--Women?

---

HIV and the Eye

Q

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Are HIV+ children more or less likely than HIV+ adults to have ophthalmic involvement?
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Less likely
HIV and the Eye

Ophthalmic HIV manifestations

A basic anatomic division
HIV and the Eye

Ophthalmic HIV manifestations

A basic anatomic division

Adnexa → Eye
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eye

A basic anatomic division

A basic anatomic division
Ophthalmic HIV manifestations

HIV and the Eye

Adnexa

Eye

Eyelids

Conj

A basic anatomic division
Ophthalmic HIV manifestations

HIV and the Eye

Adnexa

Eyelids

Conj

Eye
Ophthalmic HIV manifestations

HIV and the Eye

Adnexa

- Eyelids
- Conj

Eye

- Anterior segment
- Posterior segment

A basic anatomic division
Ophthalmic HIV manifestations

Adnexa

- Eyelids
- ?
- ?
- ?

Manifestations commonly (but not exclusively) associated with HIV

Eye

- Conj
- Anterior segment
- Posterior segment

HIV and the Eye
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
- HZO (*Herpes zoster ophthalmicus*)
- Molluscum
- Kaposi sarcoma

 Conj

Eye

Anterior segment

Posterior segment
Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

 Conj

Eye

Anterior segment

Posterior segment

What underlying commonality do these three conditions share?
Ophthalmic HIV manifestations

**Adnexa**
- **Eyelids**
  - HZO
  - Molluscum
  - Kaposi sarcoma

**Eye**
- **Conj**
  - Secondary to...
- **Anterior segment**
- **Posterior segment**

*What underlying commonality do these three conditions share?* All three are secondary to...
**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - Eyelids
    - HZO
    - Molluscum
    - Kaposi sarcoma
  - Conj
    - Secondary to...viral infection

- **Eye**
  - Anterior segment
  - Posterior segment

*What underlying commonality do these three conditions share?*
*All three are secondary to...a viral infection*
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids

- HZO (specific virus)
- Molluscum (virus family)
- Kaposi sarcoma (specific virus)

Conj

Eye

Anterior segment

Posterior segment

What is the implicated virus for each?

What underlying commonality do these three conditions share?
All three are secondary to... a viral infection
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - VZV
  - Poxvirus
  - Herpesvirus type 8

Eye
- Anterior segment
- Posterior segment

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What underlying commonality do these three conditions share?
All three are secondary to a viral infection.
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma

Eye
- Conj
- Anterior
- Posterior

In what fundamental way does HZO differ from Molluscum & Kaposi?
In what fundamental way does HZO differ from Molluscum & Kaposi?
HZO is a dermatitis whereas Molluscum and Kaposi are neoplasms.
**Ophthalmic HIV manifestations**

**Adnexa**

- **Eyelids**
  - HZO
  - Molluscum
  - Kaposi sarcoma

**Eye**

**Conj**

- Is a... **dermatitis**

**Anterior**

- Are... **neoplasms**

**Posterior**

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HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

Eye

Which of these adnexal manifestations of HIV is most common?

Pt presents with a chronic follicular conjunctivitis that fails to respond to conventional treatment. Close inspection of the lid margin reveals a previously unnoticed molluscum lesion, the excision of which leads to resolution of the conjunctivitis.

What aspect of the presentation might lead you to consider whether a molluscum pt might be HIV+?

The extent and/or severity of the molluscum lesions.
Ophthalmic HIV manifestations

Adnexa

Eyelids
- HZO
- Molluscum
- Kaposi sarcoma

Which of these adnexal manifestations of HIV is most common?
Molluscum contagiosum

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**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - Eyelids
    - HZO
    - Molluscum
    - Kaposi sarcoma

**Which of these adnexal manifestations of HIV is most common?**
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**What is the classic ophthalmic presentation (not HIV-related)?**
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**HIV and the Eye**

Ophthalmic HIV manifestations

**Adnexa**

Eyelids
- HZO
- **Molluscum**
- Kaposi sarcoma

**Posterior segment**

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**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - Eyelids
    - HZO
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HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
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The extent and/or severity of the molluscum lesions

Fill-in-the-blanks with respect to ocular molluscum presentation in AIDS vs non-AIDS pts:

<table>
<thead>
<tr>
<th></th>
<th>Laterality</th>
<th>Numerosity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-AIDS pts</strong></td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td><strong>AIDS pts</strong></td>
<td>?</td>
<td>?</td>
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**HIV and the Eye**

**Ophthalmic HIV manifestations**

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<tr>
<td><strong>Non-AIDS pts</strong></td>
<td>Unilateral</td>
<td>Few</td>
</tr>
<tr>
<td><strong>AIDS pts</strong></td>
<td>Bilateral</td>
<td>Numerous</td>
</tr>
</tbody>
</table>
Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

Eye

What percent of HIV pts will develop HZO?

~10%

HZO is fairly common—what factor should make you worry the pt might be HIV+?

Age. Most non-HIV related HZO cases occur in individuals older than 60. If a pt in his/her 40s or younger presents with HZO, consider HIV.
What percent of HIV pts will develop HZO?
~10%
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

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**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - Eyelids
    - HZO
    - Molluscum
    - Kaposi sarcoma

- **Eye**
  - Posterior segment

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**We have HZO listed as an eyelid manifestation. What other adnexal structures can it strike?**

Just about any of them, including the EOMs and conjunctivias.
**HIV and the Eye**

Ophthalmic HIV manifestations

- **Adnexa**
  - **Eyelids**
    - HZO
    - Molluscum
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Ophthalmic HIV manifestations

Adnexa

Eyelids

--HZO

--Molluscum

--Kaposi sarcoma

Eye

Conj

Posterior segment

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How does EOM involvement manifest clinically?
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How does EOM involvement manifest clinically?
As a palsy, with new-onset diplopia.
Ophthalmic HIV manifestations

Adnexa

Eyelids

--HZO

Molluscum

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How common is EOM palsy in HIV+ HZO pts?

Eye

Posterior segment

Anterior segment
Ophthalmic HIV manifestations

Adnexa

Eyelids
- HZO

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As a palsy, with new-onset diplopia

How common is EOM palsy in HIV+ HZO pts?
Very—as many as 1/3 will develop it
Ophthalmic HIV manifestations

**Adnexa**
- **Eyelids**
  - HZO
  - Molluscum
  - Kaposi sarcoma

**Eye**
- Anterior segment
- Posterior segment
- HZO

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**How does EOM involvement manifest clinically?**
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**What is the mechanism of EOM palsy?**
It is usually a cranial neuropathy due to a vasculitic process.

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Ophthalmic HIV manifestations

Adnexa

Eyelids
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Eye

Conj Posterior segment

Conj

Anterior segment

HZO—Molluscum—Kaposi sarcoma

HIV and the Eye

Posterior segment
Ophthalmic HIV manifestations

**HIV and the Eye**

**Adnexa**

- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma

**Eye**

- Posterior segment

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**Which cranial nerve is most commonly affected?**

CN3

**How does EOM involvement manifest clinically?**

As a palsy, with new-onset diplopia

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Which cranial nerve is most commonly affected? CN3.

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HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eye

Posterior segment

Eyelids

--HZO

Molluscum--Kaposi sarcoma

Eye

Conj

-HZO--

Anterior segment--

HZO

EOMs

Refer to the diagram for a visual representation of Ophthalmic HIV manifestations.
**What is Kaposi sarcoma?**

A highly vascular tumor usually of the skin or mucous membranes.

~5% of HIV+ pts will develop Kaposi's of the lid or conjunctiva.

Does it require treatment? Not unless it is causing discomfort and/or disfigurement via a mass effect.
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eye

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

What is Kaposi sarcoma?
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Ophthalmic HIV manifestations

Adnexa

Eyelids
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**HIV and the Eye**

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HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
-- HZO
-- Molluscum
-- Kaposi sarcoma

Conj
-- ?
-- ?

Eye

Anterior segment

Posterior segment

Manifestations commonly (but not exclusively) associated with HIV
Ophthalmic HIV manifestations

Adnexa

Eyelids
- HZO
- Molluscum
- Kaposi sarcoma

Conj
- Conj microvasculopathy
- SCC

Anterior segment

Posterior segment

(SCC = squamous-cell carcinoma)
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  - HZO
  - Molluscum
  - K

 Conj
  - Conj microvasculopathy
  - SCC

Eye
- Anterior segment
- Posterior segment

What is conj microvasculopathy?
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A general term for a constellation of changes commonly seen in the conj vasculature of HIV+ individuals.
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Is it common?
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--Microaneurysms
--Comma sign
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With what other disease is comma sign a well-known finding?
Sickle cell

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Are conj microaneurysms and caliber changes found in sickle dz too?

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Yes

What is comma sign?
Discrete short segments of perfused venules, their curved configuration is reminiscent of a comma
What two factors should increase one’s concern that a pt with SCC of the conj might also have AIDS?
--
--
What two factors should increase one’s concern that a pt with SCC of the conj might also have AIDS?

--If the individual is from ______ region of a continent

--If the individual is less than ______ age
What two factors should increase one’s concern that a pt with SCC of the conj might also have AIDS?
--If the individual is from sub-Saharan Africa
--If the individual is less than 50 years old
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma

Eye
- Conj
  -- Conj microvasculopathy
  -- SCC
- Anterior segment
- Posterior segment

What manifestations are these?
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

Eye
- Anterior segment
  -- KCS (Keratoconjunctivitis sicca)
  -- Infectious keratitis
  -- Iridocyclitis
- Posterior segment
Ophthalmic HIV manifestations

HIV and the Eye

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma

Conj
- Conj microvasculopathy
- SCC

Eye
- Anterior segment
  -- KCS
  -- Infectious keratitis
  -- Iridocyclitis

- Posterior segment

How common are anterior segment manifestations in HIV?
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

Eye
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment

How common are anterior segment manifestations in HIV? They are present in about 1/2 of cases.
**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - Eyelids
    - HZO
    - Molluscum
    - Kaposi sarcoma
  - Conj
    - Conj microvasculopathy
    - SCC

- **Eye**
  - **Anterior segment**
    - KCS
    - Infectious keratitis
    - Iridocyclitis
  - **Posterior segment**

*What percent of HIV+ individuals will develop keratoconjunctivitis sicca?*
What percent of HIV+ individuals will develop keratoconjunctivitis sicca? ~20
What percent of HIV+ individuals will develop keratoconjunctivitis sicca?
~20

What is the underlying problem?
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma

Conj
- Conj microvasculopathy
- SCC

Eye
- Anterior segment
  -- KCS
  -- Infectious keratitis
  -- Iridocyclitis

- Posterior segment

What percent of HIV+ individuals will develop keratoconjunctivitis sicca?
~20

What is the underlying problem?
Aqueous-phase deficiency secondary to inflammatory damage to the lacrimal glands
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

Eye
- Anterior segment
  -- Conj microvasculopathy
  -- KCS
  -- Infectious keratitis
  -- Iridocyclitis
- Posterior segment

What sorts of bugs cause keratitis in HIV+ pts?
(Hint: 3 are general categories, and are not limited to HIV+ pts; one is a specific bug found almost exclusively in HIV-associated keratitis)
Ophthalmic HIV manifestations

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

**Eye**
- Anterior segment
  - KCS
  - *Infectious keratitis*
  - Iridocyclitis
- Posterior segment

What sorts of bugs cause keratitis in HIV+ pts?
(Hint: 3 are general categories, and are not limited to HIV+ pts; one is a specific bug found almost exclusively in HIV-associated keratitis)

- Viral
- Bacterial
- Fungal
- Microsporidia
Ophthalmic HIV manifestations

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

**Eye**
- Anterior segment
  - KCS
  - **Infectious keratitis**
    - Iridocyclitis
- Posterior segment

---

**Which two viruses are most commonly implicated in viral keratitis associated with HIV infection?**

- VZV
- HSV
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  --HZO
  --Molluscum
  --Kaposi sarcoma

Conj
- Conj microvasculopathy
- SCC
- KCS
- Infectious keratitis
- Iridocyclitis

Eye
- Anterior segment
- Posterior segment

Which two viruses are most commonly implicated in viral keratitis associated with HIV infection?
VZV and HSV

HIV and the Eye
Does being HIV+ convey an increased risk of bacterial keratitis?

**Ophthalmic HIV manifestations**

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

**Eye**
- Anterior segment
  - KCS
  - **Infectious keratitis**
    - Iridocyclitis
- Posterior segment

**HIV and the Eye**

*Viral*  
*Bacterial*  
*Fungal*  
*Microsporidia*
Does being HIV+ convey an increased risk of bacterial keratitis? In and of itself, probably not. However, the associated immunodeficiency, coupled with HIV-induced KCS and other factors, probably places HIV+ individuals at increased risk.
Ophthalmic HIV manifestations

HIV and the Eye

Adnexa

- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma

- Conj
  - Conj microvasculopathy
  - SCC

Eye

Anterior segment

- KCS
- Infectious keratitis
  - Iridocyclitis

Posterior segment

Does being HIV+ convey an increased risk of fungal keratitis?
Ophthalmic HIV manifestations

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

**Eye**
- **Anterior segment**
  - KCS
  - **Infectious keratitis**
    - Iridocyclitis
- **Posterior segment**

---

Does being HIV+ convey an increased risk of fungal keratitis? Probably…but not definitely
Does being HIV+ convey an increased risk of fungal keratitis? Probably…but not definitely

What about the hx would suggest that a pt with fungal keratitis might have an underlying HIV infection?
**HIV and the Eye**

Ophthalmic HIV manifestations

- **Adnexa**
  - Eyelids
    - HZO
    - Molluscum
    - Kaposi sarcoma
  - Conj
    - Conj microvasculopathy
    - SCC

- **Eye**
  - Anterior segment
    - KCS
    - Infectious keratitis
      - Viral
      - Bacterial
      - Fungal
      - Microsporidia
    - Iridocyclitis
  - Posterior segment
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

Eye
- Anterior segment
  -- Conj microvasculopathy
  -- SCC
  -- Infectious keratitis
  -- Iridocyclitis
- Posterior segment

What sort of bug is microsporidia?

- Viral
- Bacterial
- Fungal
- Microsporidia
What sort of bug is microsporidia?
Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it's an obligate intracellular parasite.
**What sort of bug is microsporidia?**
Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.

**What other opportunistic fungus was previously (mis)classified as a protozoan?**

---

**Ophthalmic HIV manifestations**

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma

**Conj**
- Conj microvasculopathy
- SCC

**Eye**

**Anterior segment**
- KCS
- Infectious keratitis
- Iridocyclitis

**Posterior segment**
Ophthalmic HIV manifestations

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma

**Eye**
- Conj
  - Conj microvasculopathy
  - SCC

- Anterior segment
  - KCS
  - Infectious keratitis
    - Iridocyclitis

- Posterior segment

**What sort of bug is microsporidia?**
Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.

**What other opportunistic fungus was previously (mis)classified as a protozoan?**
Pneumocystis
What sort of bug is microsporidia? Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.

What other opportunistic fungus was previously (mis)classified as a protozoan? Pneumocystis

Pneumocystis is notorious for causing pneumonia in AIDS pts. Is it a known ocular pathogen as well?
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma

Conj
- Conj microvasculopathy
- SCC

Eye
- Anterior segment
  -- KCS
  -- Infectious keratitis
  -- Iridocyclitis
- Posterior segment

Microsporidia
- Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.
- Pneumocystis
  - Pneumocystis is notorious for causing pneumonia in AIDS pts. Is it a known ocular pathogen as well?
  - Yes—it causes choroiditis
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

Eye
- Anterior segment
  -- KCS
  -- Infectious keratitis
  -- Iridocyclitis
- Posterior segment

--- What sort of bug is microsporidia?
Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.

--- What is the full name of this species?
Pneumocystis jiroveci
(I thought it was P carinii).
What gives?
This is a common mistake.
P. carinii was used until researchers realized that different species had different hosts. P. jiroveci infects humans, whereas P carinii infects rats.

--- What other opportunistic fungus was previously (mis)classified as a protozoan?
Pneumocystis
Pneumocystis is notorious for causing pneumonia in AIDS. Is it a known ocular pathogen as well?
Yes—it causes ocular microsporidiosis.
**HIV and the Eye**

**Ophthalmic HIV manifestations**

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**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma

**Eye**
- Conj
  - Conj microvasculopathy
  - SCC
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment
  - Microvasculopathy
  - SCC

**What sort of bug is microsporidia?**
Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.

**What is the full name of this species?**
*Pneumocystis jiroveci* (or *jirovecii*)

**What other opportunistic fungus was previously (mis)classified as a protozoan?**
*Pneumocystis*

*Pneumocystis* is notorious for causing pneumonia in AIDS pts. Is it a known ocular pathogen as well?
Yes—it causes choroiditis.

What gives?
This is a common mistake. *P. carinii* was used until researchers realized that different species had different hosts. *P. jiroveci* infects humans, whereas *P. carinii* infects rats.
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

Eye
- Anterior segment
  -- KCS
  -- Infectious keratitis
  -- Iridocyclitis

What sort of bug is microsporidia?
Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.

What is the full name of this species?
Pneumocystis jiroveci (or jirovecii)

What other opportunistic fungus was previously (mis)classified as a protozoan?
Pneumocystis
Pneumocystis is notorious for causing pneumonia in AIDS pts. Is it a known ocular pathogen?
Yes—it causes conjunctivitis.

What gives?
This is a common mistake. P. carinii was used until researchers realized that different species had different hosts. P. jiroveci infects humans, whereas P. carinii infects rats.
Ophthalmic HIV manifestations

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

**Eye**
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment

**HIV and the Eye**

What sort of bug is microsporidia?
Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.

What is the full name of this species?
*Pneumocystis jiroveci* (or *jirovecii*)

What other opportunistic fungus was previously (mis)classified as a protozoan?
*Pneumocystis*
Pneumocystis is notorious for causing pneumonia in AIDS pts. Is it a known ocular pathogen as well?

Yes—it causes ocular disease.

What other opportunistic fungus was previously (mis)classified as a protozoan?
*Pneumocystis jiroveci*? I thought it was *P carinii*. What gives?
This is a common mistake. *P carinii* was used until researchers realized that different species had different hosts. *P jiroveci* infects humans, whereas *P carinii* infects rats.
What sort of bug is microsporidia?
Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.

What is the typical presentation in HIV+ pts?
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

Eye
- Anterior segment
  - Conj microvasculopathy
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment

What sort of bug is microsporidia?
Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.

What is the typical presentation in HIV+ pts?
An epithelial keratopathy
What sort of bug is microsporidia?
Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.

What is the typical presentation in HIV+ pts?
An epithelial keratopathy

What is the treatment?
What sort of bug is microsporidia?
Once thought to be a protozoan, recent DNA analysis indicates microsporidia is more closely related to fungi. For our purposes, it’s an obligate intracellular parasite.

What is the typical presentation in HIV+ pts?
An epithelial keratopathy

What is the treatment?
Topical fumagillin
In general, iridocyclitis in HIV is secondary to one of two sorts of events. What are they?
In general, iridocyclitis in HIV is secondary to one of two sorts of events. What are they?
Two meds commonly taken by HIV pts are notorious for causing uveitis in 1/4-1/3 of cases. What are they?

-- Rifabutin
-- Cidofovir
Two meds commonly taken by HIV pts are notorious for causing uveitis in 1/4-1/3 of cases. What are they?
--Rifabutin
--Cidofovir
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

Eye
- Anterior segment
  -- KCS
  -- Infectious keratitis
    -- Iridocyclitis
  -- Drug rxn
- Posterior segment
  -- Posterior-segment infection

Two meds coi
- Rifabutin
- Cidofovir

Rifabutin-induced uveitis is more likely if another class of med is being taken concurrently. What is it?
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

Conj
--Conj microvasculopathy
--SCC

Eye

Anterior segment

--KCS
--Infectious keratitis
--Iridocyclitis

Posterior segment

Drug rxn

Posterior-segment infection

Two meds commonly taken by HIV pts are notorious for causing uveitis in 1/4-1/3 of cases. What are they?

--Rifabutin
--Cidofovir

Rifabutin-induced uveitis is more likely if another class of med is being taken concurrently. What is it?

An azole antifungal
Two meds commonly taken by HIV pts are notorious for causing uveitis in 1/4-1/3 of cases. What are they?

- Rifabutin
- Cidofovir

Cidofovir has another ocular side effect (not necessarily a bad thing) in about 10% of cases—what is it?

- Drug reaction
- Posterior-segment infection

Iridocyclitis

KCS

Infectious keratitis
**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - Eyelids
    - HZO
    - Molluscum
    - Kaposi sarcoma
  - Conj
    - Conj microvasculopathy
    - SCC

- **Eye**
  - Anterior segment
    - KCS
    - Infectious keratitis
      - Iridocyclitis
  - Posterior segment

**Two meds commonly taken by HIV pts are notorious for causing uveitis in 1/4-1/3 of cases.**

- Rifabutin
- Cidofovir

**Drug rxn Posterior-segment infection**

Cidofovir has another ocular side effect (not necessarily a bad thing) in about 10% of cases—what is it?

- It lowers IOP

**Iridocyclitis**
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma

Conj
- Conj microvasculopathy
- SCC

Anterior segment
- KCS
- Infectious keratitis
  -- Iridocyclitis

Posterior segment

Drug rxn

Two meds commonly taken by HIV pts are notorious for causing uveitis in 1/4-1/3 of cases. What are they?
- Rifabutin
- Cidofovir

Cidofovir has another ocular side effect (not necessarily a bad thing) in about 10% of cases—what is it?
- It lowers IOP

Under what circumstances would it be a bad thing?
Ophthalmic HIV manifestations

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

**Eye**
- Anterior segment
  - KCS
  - Infectious keratitis
    - Iridocyclitis
  - Drug rxn
- Posterior segment
  - Posterior-segment infection

---

**HIV and the Eye**

2 meds commonly taken by HIV pts are notorious for causing uveitis in 1/4-1/3 of cases. What are they?

- Rifabutin
- Cidofovir

Cidofovir has another ocular side effect (not necessarily a bad thing) in about 10% of cases—what is it?

- It lowers IOP

Under what circumstances would it be a bad thing?

If the combination of (Cidofovir-induced) uveitis + ocular hypotension led to hypotony maculopathy.
With which posterior-segment infections is a mild iridocyclitis commonly associated in HIV+ pts?

--

--
With which posterior-segment infections is a mild iridocyclitis commonly associated in HIV+ pts?
--CMV
--VZV
With which posterior-segment infections is a **mild** iridocyclitis commonly associated in HIV+ pts?
--CMV
--VZV

With which posterior-segment infections is a **severe** iridocyclitis commonly associated in HIV+ pts?
--
--
--
With which posterior-segment infections is a mild iridocyclitis commonly associated in HIV+ pts?
--CMV
--VZV

With which posterior-segment infections is a severe iridocyclitis commonly associated in HIV+ pts?
--Toxoplasmosis
--TB
--Syphilis
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

Conj
--Conj microvasculopathy
--SCC

Eye

Anterior segment
--KCS
--Infectious keratitis
--Iridocyclitis

Posterior segment

Secondary to…
Not 2o to…

What manifestations are these?
**HIV and the Eye**

Ophthalmic HIV manifestations

**Adnexa**

- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma

- Conj
  -- Conj microvasculopathy
  -- SCC

**Eye**

- Anterior segment
  -- KCS
  -- Infectious keratitis
  -- Iridocyclitis

- Posterior segment

   *NOT an anatomic division*

Secondary to… opportunistic infection

Not 2° to… opportunistic infection
Ophthalmic HIV manifestations

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

**Eye**
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment
  - Secondary to... opportunistic infection
  - Not 2º to... opportunistic infection

**How common are posterior segment manifestations in HIV?**
How common are posterior segment manifestations in HIV?
They are present in at least 1/2 of cases.
**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - Eyelids
    - HZO
    - Molluscum
    - Kaposi sarcoma
  - Conj
    - Conj microvasculopathy
    - SCC

- **Eye**
  - Anterior segment
    - KCS
    - Infectious keratitis
    - Iridocyclitis
  - Posterior segment
    - Secondary to opportunistic infection
    - Not 2\(^{o}\) to opportunistic infection

**What general class of manifestations are these?**
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

Eye
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment
  - Secondary to opportunistic infection
    - Infectious chorioretinitis
    - Necrotizing retinitis
  - Not 2o to opportunistic infection

What general class of manifestations are these?
Ophthalmic HIV manifestations

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
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  - Conj microvasculopathy
  - SCC

**Eye**
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment
  - Secondary to opportunistic infection
    - Infectious chorioretinitis
      - Necrotizing retinitis
  - Not 2° to opportunistic infection

(Name four general classes of infectious agents)
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
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  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

Eye
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment
  - Secondary to opportunistic infection
    - Infectious chorioretinitis
      - Necrotizing retinitis
  - Not 2° to opportunistic infection

Infectious chorioretinitis
- Viral
- Bacterial
- Fungal
- Parasitic
Which of these is the most common cause of infectious retinitis/choroiditis in AIDS pts?
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma

Conj
- Conj microvasculopathy
- SCC

Anterior segment
- KCS
- Infectious keratitis
- Iridocyclitis

Eye
- Posterior segment
  Secondary to opportunistic infection
    -- Infectious chorioretinitis
      -- Necrotizing retinitis
  Not 2° to opportunistic infection

Infectious chorioretinitis
- Viral
- Bacterial
- Fungal
- Parasitic

Which of these is the most common cause of infectious retinitis/choroiditis in AIDS pts?
Viral pathogens
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

Eye
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment
  - Secondary to opportunistic infection
    - Infectious chorioretinitis
    - Necrotizing retinitis
  - Not 2° to opportunistic infection

Infectious chorioretinitis
- Viral
  - Name three specific viruses (two are grouped together)
- Bacterial
- Fungal
- Parasitic
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

Conj
--Conj microvasculopathy
--SCC

Eye

Posterior segment

Anterior segment
--KCS
--Infectious keratitis
--Iridocyclitis

Infectious chorioretinitis

Viral
--CMV
--VZV/HSV

Bacterial
Fungal
Parasitic

Secondary to opportunistic infection
--Infectious chorioretinitis
--Necrotizing retinitis

Not 2o to opportunistic infection
Which is the most common viral cause (and #1 cause overall)?
Which is the most common viral cause (and #1 cause overall)?

**CMV retinitis** is the most common cause of posterior-segment infection among HIV+ individuals, and the leading cause of vision loss in this population as well.
**HIV and the Eye**

**Ophthalmic HIV manifestations**

**Adnexa**
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

**Eye**
- Anterior segment
  -- KCS
  -- Infectious keratitis
  -- Iridocyclitis
- Posterior segment
  -- Secondary to opportunistic infection
  -- Not 2º to opportunistic infection

**Infectious chorioretinitis**

*How severe is the vision loss in CMV retinitis?*
- Left untreated, it will progress slowly but relentlessly to NLP.

*Which is the most common viral cause (and #1 cause overall)?*  
**CMV retinitis** is the most common cause of posterior-segment infection among HIV+ individuals, and the leading cause of vision loss in this population as well.
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

Eye
- Posterior segment
  - Secondary to opportunistic infection
  - Not 2\(^{o}\) to opportunistic infection

Infectious chorioretinitis
- Viral
  - CMV
  - VZV/HSV
- Bacterial
- Fungal
- Parasitic

How severe is the vision loss in CMV retinitis?
Left untreated, it will progress slowly but relentlessly to NLP.

Which is the most common viral cause (and #1 cause overall)?
CMV retinitis is the most common cause of posterior-segment infection among HIV+ individuals, and the leading cause of vision loss in this population as well.
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

Conj
--CM
--SS

Infectious chorioretinitis

Viral
--CMV
--VZV/HSV

Anterior segment

Conj
--CM
--SS

Posterior segment

Secondary to opportunistic infection

Not 2° to opportunistic infection

What is the time frame for progression to NLP?

How severe is the vision loss in CMV retinitis?

Left untreated, it will progress slowly to NLP.

Which is the most common viral cause (and #1 cause overall)?
CMV retinitis is the most common cause of posterior-segment infection among HIV+ individuals, and the leading cause of vision loss in this population as well.
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- SCC
  -- Infectious chorioretinitis
  -- Necrotizing retinitis

Eye
- Anterior segment
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
  -- Infectious keratitis
  -- Iridocyclitis

Posterior segment
- Secondary to opportunistic infection
- Notsecondary to opportunistic infection

Infectious chorioretinitis
- Viral
  -- CMV
  -- VZV/HSV
- Bacterial
- Fungal
- Parasitic

What is the time frame for progression to NLP?
Weeks to months

How severe is the vision loss in CMV retinitis?
Left untreated, it will progress slowly to NLP

Which is the most common viral cause (and #1 cause overall)?
CMV retinitis is the most common cause of posterior-segment infection among HIV+ individuals, and the leading cause of vision loss in this population as well.
**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - Eyelids
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    - Molluscum
    - Kaposi sarcoma
  - Conj
    - Conj microvasculopathy
    - SCC

- **Eye**
  - Posterior segment
    - Secondary to opportunistic infection
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**Viral, Bacterial, Fungal, Parasitic**
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**Ophthalmic HIV manifestations**

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- Yes
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**Pattern of spread?**

- A slowly advancing ‘fire line’
- ‘Brushfire’

**Classic description**

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<td>Periphery</td>
</tr>
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<td>Yes</td>
<td>No</td>
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</tr>
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</table>

**Does either type present with a red eye?**

Pain?

NO

Red eye?

?  ?

---

**How common is latent CMV infection in the population at large?**

Very—estimates range from 40-100%

**How common is CMV retinitis among AIDS pts?**

It will arise in about 1/3 of these pts

---

**By how much is CMV the most common posterior-segment opportunistic infection?**

By a mile. CMV accounts for up to 90% of all posterior-segment infections in AIDS.
# HIV and the Eye

**How does CMV retinitis present?**
If the initial lesion is macular or affects the ONH, the pt might c/o decreased vision. However, if the lesion is peripheral, the pt might note only floaters, or be asymptomatic.

**What about its appearance on DFE?**
There are two classic presentations:

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<thead>
<tr>
<th>Location</th>
<th>Posterior Type</th>
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How is CMV retinitis managed?

With ganciclovir (in various forms) and/or foscarnet

Are these meds curative?

No—they suppress viral replication, but do not eliminate the infection

Does that mean pts must receive long-term suppressive therapy?

It used to. However, because HAART can facilitate successful reconstitution of the host immune system, anti-CMV maintenance therapy is unnecessary so long as the CD4 count remains elevated.
**HIV and the Eye**

*How is CMV retinitis managed?*
With ganciclovir (in various forms) and/or foscarnet

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**Eyelids**
- HZO
- Molluscum
- Kaposi sarcoma

**Conj**
- Conj microvasculopathy
- SCC

**Anterior segment**
- KCS
- Infectious keratitis
- Iridocyclitis

**Infectious chorioretinitis**
- Viral
  -- CMV
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- Bacterial
- Fungal
- Parasitic

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**Posterior segment**

Secondary to opportunistic infection
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Not 2º to opportunistic infection
HIV and the Eye

How is CMV retinitis managed?
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(Two route categories)

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**HIV and the Eye**

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**Adnexa Eye**

Eyelids
Anterior segment
Conj Posterior segment
HZO
Molluscum
Kaposi sarcoma

---

**Ophthalmic HIV manifestations**

---

**KCS**

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**Infectious keratitis**

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**Iridocyclitis**

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**Secondary to opportunistic infection**

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**CMV**

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**Ophthalmic HIV manifestations**

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**Infectious chorioretinitis**
HIV and the Eye

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**Posterior segment**

---Infectious chorioretinitis---Necrotizing retinitis
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Ophthalmic HIV manifestations

Adnexa Eye

Eyelids Anterior segment

Conj Posterior segment--HZO

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HIV and the Eye

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Anterior segment

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Adnexa Eye

Eyelids

Ophthalmic HIV manifestations
**HIV and the Eye**

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**Endophthalmitis**

**RD**

**Vitreous hemorrhage**

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What are the risks associated with injections and/or surgery?
The usual suspects—endophthalmitis, RD, vitreous hemorrhage
HIV and the Eye

Conj microvasculopathy
SCC
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What is the risk of developing CMV retinitis in the untreated fellow eye?

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**What is the risk of developing CMV retinitis in the untreated fellow eye?**
Very high. In one study of the ganciclovir implant, 50% of pts developed CMV retinitis in the fellow eye within 6 months, whereas the risk was only ~10% for pts receiving intravenous treatment.
How is CMV retinitis managed?
With ganciclovir (in various forms) and/or foscarnet

Are these meds curative?

HIV and the Eye

Eye

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Speaking of reconstituting the host immune system in a pt with a hx of CMV retinitis, what problem can result?

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**reconstitution of the host immune system**
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So-called immune recovery uveitis (IRU)

**What is the relationship between IRU and CMV retinitis?**
For some reason, only eyes that have or had CMV retinitis can develop IRU

**How does it present?**
As an anterior and/or intermediate uveitis with decreased vision

**How common is it?**
~10% of CMV retinitis pts who successfully undergo immune-system reconstitution will experience it

**What factors place a pt at greater risk of developing IRU?**
--Experiencing an increase in their CD4 count of at least 50, with the total surpassing 100
--Hx of extensive CMV retinitis (the greater the retinal area infected, the greater the risk)
--Hx of cidofovir use
HIV and the Eye

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**What is the relationship between IRU and CMV retinitis?**
**HIV and the Eye**

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What is the cause of the decreased vision?
CME +/- an ERM

Does the CME respond well to topical or sub-Tenon’s steroids?
No
How about intravitreal steroids?
Dunno, because those are absolutely contraindicated in eyes with a hx of CMV retinitis!
How is CMV retinitis managed?
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**What is another cause of decreased vision in CMV retinitis?**
Rhegmatogenous retinal detachment secondary to infection-induced retinal breaks

**Is RD common in CMV retinitis pts?**
Pre-HAART it was—estimates ran as high as 50%. It is vastly lower in pts treated with HAART and anti-CMV meds, however.

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With what dreaded condition is posterior-segment VZV/HSV infection associated?
With what dreaded condition is posterior-segment VZV/HSV infection associated? **Necrotizing retinitis**, a subject we will address in detail shortly.
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

Conj
--Conj microvasculopathy
--SCC

Anterior segment
--KCS
--Infectious keratitis
--Iridocyclitis

Posterior segment

Secondary to opportunistic infection
--Infectious chorioretinitis
--Necrotizing retinitis

Not 2° to opportunistic infection

Infectious chorioretinitis

Viral
--CMV
--VZV/HSV

Bacterial
--?

Fungal

Parasitic

Name two specific bacteria
HIV and the Eye

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Eye
- Posterior segment
  Secondary to opportunistic infection
    -- Infectious chorioretinitis
      -- Necrotizing retinitis
  Not 2o to opportunistic infection

Infectious chorioretinitis
- Viral
  -- CMV
  -- VZV/HSV
- Bacterial
  -- Syphilis
  -- TB
- Fungal
- Parasitic
HIV and the Eye

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Infectious chorioretinitis
- Viral
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  -- Syphilis
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Is bacterial chorioretinitis a common opportunistic infection in HIV+ pts?
**Ophthalmic HIV manifestations**

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**Infectious chorioretinitis**
- Viral
  - CMV
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*Is bacterial chorioretinitis a common opportunistic infection in HIV+ pts?*
No. Mycobacterial infection is particularly uncommon.
Is bacterial chorioretinitis a common opportunistic infection in HIV+ pts? No. Mycobacterial infection is particularly uncommon.

What aspect of the presentation should make you suspect a chorioretinitis is bacterial?
Infectious chorioretinitis

- Viral
  -- CMV
  -- VZV/HSV
- Bacterial
  -- Syphilis
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**Is bacterial chorioretinitis a common opportunistic infection in HIV+ pts?**
No. Mycobacterial infection is particularly uncommon.

**What aspect of the presentation should make you suspect a chorioretinitis is bacterial?**
If it is unresponsive to appropriate antiviral/fungal/parasitic therapy
Ocular syphilis in AIDS pts can present with a clinical picture similar to what white-dot syndrome?
Ocular syphilis in AIDS pts can present with a clinical picture similar to what white-dot syndrome?

Acute posterior multifocal placoid pigment epitheliopathy (APMPPE)

Infectious chorioretinitis
- Viral
  - CMV
  - VZV/HSV
- Bacterial
  - Syphilis
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Secondary to opportunistic infection

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Infectious keratitis

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HIV and the Eye

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HIV and the Eye

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Eye

Infectious conditions

- Viral
  - CMV
  - VZV/HSV

- Bacterial
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  - TB

Ocular syphilis in AIDS pts can present with a clinical picture similar to what white-dot syndrome?
Acute posterior multifocal placoid pigment epitheliopathy (APMPPE)

By what name is the lookalike ocular syphilitic condition known?
Ophthalmic HIV manifestations

HIV and the Eye

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By what name is the lookalike ocular syphilitic condition known?
Acute syphilitic posterior placoid chorioretinopathy (ASPPC)
Ophthalmic HIV manifestations

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APMPPE has a classic FA pattern—what is it?

'Blocks early, stains late'
Ophthalmic HIV manifestations

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**Are there any factors in the clinical history to push you toward one or the other?**
Yes—ASPPC patients are immunocompromised, whereas APMPPE patients aren’t
Ophthalmic HIV manifestations

**HIV and the Eye**

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**Does FA in ASPPC demonstrate the same pattern?**

Yes

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HIV and the Eye

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**APMPPE has a classic FA pattern—what is it?**
‘Blocks early, stains late’

**Does FA in ASPPC demonstrate the same pattern?**
Yes

**Are there any factors in the clinical history to push you toward one or the other?**
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

Eye
- Infectious
  - Viral
    -- CMV
    -- VZV/HSV
  - Bacterial
    -- Syphilis
    -- TB
- HZO
- Molluscum
- Kaposi sarcoma
- HZO
- Molluscum
- Kaposi sarcoma

Ocular syphilis in AIDS pts can present with a clinical picture similar to what white-dot syndrome?
Acute posterior multifocal placoid pigment epitheliopathy (APMPPE)

By what name is the lookalike ocular syphilitic condition known?
Acute syphilitic posterior placoid chorioretinopathy (ASPPC)

APMPPE has a classic FA pattern—what is it?
‘Blocks early, stains late’

Does FA in ASPPC demonstrate the same pattern?
Yes

Are there any factors in the clinical history to push you toward one or the other?
Yes—ASPPC patients are immunocompromised, whereas APMPPE patients aren’t
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

Eye
- Anterior segment
  -- KCS
  -- Infectious keratitis
  -- Iridocyclitis
- Posterior segment
  Secondary to opportunistic infection
    -- Infectious chorioretinitis
    -- Necrotizing retinitis
  Not 2° to opportunistic infection

Infectious chorioretinitis
- Viral
  -- CMV
  -- VZV/HSV
- Bacterial
  -- Syphilis
  -- TB
- Fungal
  --?
  -- Name two specific fungi
- Parasitic
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

Conj
--Conj microvasculopathy
--SCC

Eye

Anterior segment
--KCS
--Infectious keratitis
--Iridocyclitis

Posterior segment

Secondary to opportunistic infection
--Infectious chorioretinitis
--Necrotizing retinitis

Not 2° to opportunistic infection

Infectious chorioretinitis

Viral
--CMV
--VZV/HSV

Bacterial
--Syphilis
--TB

Fungal
--Histoplasmosis
--Pneumocystis

Parasitic
Ophthalmic HIV manifestations

Adnexa
- Eyelids
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conj
- Conj microvasculopathy
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Eye
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  - KCS
  - Infectious keratitis
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Infectious chorioretinitis
- Viral
  - CMV
  - VZV/HSV
- Bacterial
  - Syphilis
  - TB
- Fungal
  - Histoplasmosis
- Parasitic
  - Pneumocystis

Is histoplasma chorioretinitis common?

Secondary to opportunistic infection
- Infectious chorioretinitis
- Necrotizing

Not 2° to opportunistic infection
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma

- Conj
  -- Conj microvasculopathy
  -- SCC

Eye

Anterior segment

- KCS
- Infectious keratitis
- Iridocyclitis

Posterior segment

Secondary to opportunistic infection

- Infectious chorioretinitis
  -- Necrotizing

Not 2º to opportunistic infection

Infectious chorioretinitis

- Viral
  -- CMV
  -- VZV/HSV

- Bacterial
  -- Syphilis
  -- TB

- Fungal
  -- Histoplasmosis

- Parasitic
  -- Pneumocystis

Is histoplasma chorioretinitis common?
No
Ophthalmic HIV manifestations

Adnexa
- Eyelids
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  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
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- Viral
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  -- Syphilis
  -- TB
- Fungal
  -- Histoplasmosis
  -- Pneumocystis

How does pneumocystis choroiditis present on DFE?
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

Eye
- Conic Posterior segment
  -- KCS
  -- Infectious keratitis
  -- Iridocyclitis
- Anterior segment
  -- Secondary to opportunistic infection
  -- Infectious keratitis
  -- Bacterial
  -- Syphilis
  -- TB
  -- Fungal
  -- Histoplasmosis
  -- Pneumocystis

How does pneumocystis chorioiditis present on DFE?
With deep, creamy-yellow choroidal lesions

Not 2o to opportunistic infection

Secondary to opportunistic infection
**HIV and the Eye**

Ophthalmic HIV manifestations

- **Adnexa**
  - Eyelids
    - HZO
    - Molluscum
    - Kaposi sarcoma
  - Conj
    - Conj microvasculopathy
    - SCC

- **Eye**
  - Anterior segment
    - KCS
    - Infectious keratitis
    - Iridocyclitis
  - Posterior segment
    - Secondary to opportunistic infection
    - Not 2° to opportunistic infection

Infectious chorioretinitis

- Viral
  - CMV
  - VZV/HSV
- Bacterial
  - Syphilis
  - TB
- Fungal
  - Histoplasmosis
  - Pneumocystis

**How does pneumocystis chorioiditis present on DFE?**
With deep, creamy-yellow choroidal lesions

**Why is it critical to correctly diagnose this condition?**
**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - Eyelids
    - HZO
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    - Kaposi sarcoma
  - Conj
    - Conj microvasculopathy
    - SCC

- **Eye**
  - Anterior segment
    - KCS
    - Infectious keratitis
    - Iridocyclitis
  - Posterior segment
    - Secondary to opportunistic infection
    - Not 2° to opportunistic infection

**Infectious chorioretinitis**

- **Viral**
  - CMV
  - VZV/HSV

- **Bacterial**
  - Syphilis
  - TB

- **Fungal**
  - Histoplasmosis
  - *Pneumocystis*

**How does pneumocystis chorioiditis present on DFE?**
With deep, creamy-yellow choroidal lesions

**Why is it critical to correctly diagnose this condition?**
Ocular dz is indicative of systemic infection, which is potentially life-threatening
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma

Conj
- Conj microvasculopathy
- SCC

Eye
- Anterior segment
  -- KCS
  -- Infectious keratitis
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Posterior segment
- Secondary to opportunistic infection
- Not 2° to opportunistic infection

Infectious chorioretinitis
- Viral
  -- CMV
  -- VZV/HSV
- Bacterial
  -- Syphilis
  -- TB
- Fungal
  -- Histoplasmosis
  -- Pneumocystis
- Parasitic
  -- ?

Name one specific parasite
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

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  -- Syphilis
  -- TB
- Fungal
  -- Histoplasmosis
  -- Pneumocystis
- Parasitic
  -- Toxoplasmosis
Ophthalmic HIV manifestations

**Adnexa**
- Eyelids
- Conj

**Eye**
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- Posterior segment
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    - Infectious chorioretinitis
    - Necrotizing retinitis
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---

**How common is ocular toxoplasmosis in HIV+ pts?**

The classic description regarding the DFE appearance of toxoplasma retinitis is of a...

- 'Headlight in the fog'

What aspect of the infection correlates with...

- The large yellow retinal lesion
- A dense overlying vitritis

In what way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic description?

By the absence of 'fog'—a pt who is profoundly immunocompromised might be unable to generate a significant vitritis.
How common is ocular toxoplasmosis in HIV+ pts? Not very—only ~1% of HIV+ individuals will develop it.
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The classic description regarding the DFE appearance of toxoplasma retinitis (in non-HIV pts) is of a…

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--the 'fog':
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‘Headlight in the fog’
Ophthalmic HIV manifestations

**HIV and the Eye**

**Adnexa**

- Eyelids
- Coni

**Eye**

**Anterior segment**
- KCS
- Infectious keratitis
- Iridocyclitis

**Posterior segment**

- Secondary to opportunistic infection
  - Infectious chorioretinitis
  - Necrotizing retinitis

**Parasitic**
- Toxoplasmosis

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Ophthalmic HIV manifestations

HIV and the Eye

Adnexa

Eyelids

Conj

Eye

Anterior segment

--KCS
--Infectious keratitis
--Iridocyclitis

Posterior segment

Secondary to opportunistic infection

--Infectious chorioretinitis
--Necrotizing retinitis

Not 2° to opportunistic infection

Parasitic

--Toxoplasmosis

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**HIV and the Eye**

Ophthalmic HIV manifestations

- **Adnexa**
  - Eyelids
  - Conj

**Eye**

- **Anterior segment**
  - KCS
  - Infectious keratitis
  - Iridocyclitis

- **Posterior segment**
  - Secondary to opportunistic infection
    - Infectious chorioretinitis
    - Necrotizing retinitis
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What aspect of the infection correlates with…

-- the ‘headlight’: The large yellow retinal lesion
-- the ‘fog’: A dense overlying vitritis

In what way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic description?
By the absence of ‘fog’—a pt who is profoundly immunocompromised might be unable to generate a significant vitritis.
Ophthalmic HIV manifestations

In what ways does the management of toxo retinitis differ in the immunocompromised population? -- In immunocompetent pts, toxo retinitis needs treatment only if the lesion is threatening the macula, ONH or a major vessel, or in cases of severe vitritis. In immunocompromised pts, lesions are treated regardless of location and severity of vitritis.

Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

In what way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic description? By the absence of ‘fog’—a pt who is profoundly immunocompromised might be unable to generate a significant vitritis.
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Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

In what way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic description?
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What aspect of the infection correlates with…
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Infectious chorioretinitis
--Necrotizing retinitis

Secondary to opportunistic infection
--Infectious chorioretinitis
--Necrotizing retinitis

Parasitic
--Toxoplasmosis

Not 2° to opportunistic infection

Viral
--CMV
--VZV/HSV
--Syphilis

Bacterial
--TB

Fungal
--Histoplasmosis
--Pneumocystis

HIV and the Eye
Ophthalmic HIV manifestations

Adnexa Eye
Eyelids
Anterior segment
Conj
Posterior segment--HZO
--Molluscum
--Kaposi sarcoma

HIV and the Eye
--KCS
--Infectious keratitis
--Iridocyclitis

Secondary to opportunistic infection

Not 2° to opportunistic infection
**Ophthalmic HIV manifestations**

*In what ways does the management of toxo retinitis differ in the immunocompromised population?*

---In immunocompetent pts, toxo retinitis needs treatment only if the lesion is threatening the macula, ONH or a major vessel, or in cases of severe vitritis; whereas in immunocompromised pts, lesions are treated.

*In what way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic description?*

By the absence of ‘fog’—a pt who is profoundly immunocompromised might be unable to generate a significant vitritis.

---

Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

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In what common is ocular toxoplasmosis in HIV+ pts?

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---

**HIV and the Eye**

--CMV
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Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…
HIV and the Eye

Ophthalmic HIV manifestations

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--In immunocompetent pts, toxo retinitis does not prompt imaging; whereas in immunocompromised pts, a finding of toxo retinitis should prompt

Evelyn
How common is ocular toxoplasmosis in HIV+ pts?
Not very—only ~1% of HIV+ individuals will develop it

The classic description regarding the DFE appearance of toxoplasmosis retinitis
"Headlight in the fog"

What aspect of the infection correlates with...
--the 'headlight': The large yellow retinal lesion
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In what way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic description?
By the absence of 'fog'—a pt who is profoundly immunocompromised might be unable to generate a significant vitritis

Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

Infectious chorioretinitis
--Toxoplasmosis

Secondary to opportunistic infection

Toxoplasmosis
--Necrotizing retinitis

Not 2° to opportunistic infection

Viral
--CMV
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Parasitic
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--In immunocompetent pts, toxo retinitis does not prompt imaging; whereas in immunocompromised pts, a finding of toxo retinitis should prompt MR imaging of the brain.

Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

In what way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic description?

By the absence of 'fog'—a pt who is profoundly immunocompromised might be unable to generate a significant vitritis.
Why do immunocompromised pts with toxo retinitis need brain imaging?

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Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

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MR imaging of the brain

Secondary to opportunistic infection

--Infectious chorioretinitis
--Necrotizing retinitis

Parasitic

--Toxoplasmosis

In what way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic description?

By the absence of ‘fog’—a pt who is profoundly immunocompromised might be unable to generate a significant vitritis

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By the absence of ‘fog’—a pt who is profoundly immunocompromised might be unable to generate a significant vitritis.

Why do immunocompromised pts with toxo retinitis need brain imaging?
To assess for CNS involvement.

What aspect of the infection correlates with…
--the ‘headlight’: The large yellow retinal lesion
--the ‘fog’: A dense overlying vitritis.

Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

In what way does the management of toxo retinitis differ in the immunocompromised population?
--In immunocompromised pts, toxo retinitis needs treatment regardless of location, or severity of vitritis.
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Why do immunocompromised pts with toxo retinitis need brain imaging?
To assess for CNS involvement.

Is there a strong correlation between ocular and CNS toxo?
Yes—up to 50% of toxo retinitis pts will be found to have CNS involvement.

Is contrast needed?
Yes.

What is the classic neuroimaging finding?
'Renge-enhancing lesions'.

May the lesions show up on CT with contrast?
Yes, but MR is the preferred modality.

Parasitic
--Toxoplasmosis

Secondary to opportunistic infection
--Infectious chorioretinitis
--Necrotizing retinitis

Viral
--CMV
--VZV/HSV

Bacterial
--Syphilis
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Fungal
--Histoplasmosis
--Pneumocystis

Infectious keratitis
Iridocyclitis
KCS
Why do immunocompromised pts with toxo retinitis need brain imaging?
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Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

MR imaging of the brain

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To assess for CNS involvement

Is there a strong correlation between ocular and CNS toxo?

Yes—up to 50% of toxo retinitis pts will be found to have CNS involvement

Is contrast needed?
Yes

What is the classic neuroimaging finding?
'Ring-enhancing lesions'

Will the lesions show up on CT with contrast?
Yes, but MR is the preferred modality

Toxoplasmosis

Infectious keratitis

Iridocyclitis

KOC

Infectious chorioretinitis

Necrotizing retinitis

Secondary to opportunistic infection

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Parasitic

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Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts...
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Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

MR imaging of the brain

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MR imaging of the brain

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Is contrast needed?

In what way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic description?
By the absence of ‘fog’—a pt who is profoundly immunocompromised might be unable to generate a significant vitritis

Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

MR imaging of the brain

Why do immunocompromised pts with toxo retinitis need brain imaging?
To assess for CNS involvement

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Speaking of comparing/contrastini...
Ophthalmic HIV manifestations

Adnexa Eye

Eyelids
Anterior segment

Conj
Posterior segment

HZO
Molluscum
Kaposi sarcoma

Conj microvasculopathy

HIV and the Eye

KCS
Infectious keratitis
Iridocyclitis

Secondary to opportunistic infection

Viral
Bacterial
Fungal
Parasitic

--CMV
--VZV/HSV
--Syphilis
--TB
--Toxoplasmosis
--Histoplasmosis
--Pneumocystis

How common is ocular toxoplasmosis in HIV+ pts?
Not very—only ~1% of HIV+ individuals will develop it

The classic description regarding the DFE appearance of toxoplasma retinitis is of a...
'Headlight in the fog'

What aspect of the infection correlates with...
--the 'headlight': The large yellow retinal lesion
--the 'fog': A dense overlying vitritis

In what way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic description?
By the absence of 'fog': A pt who is profoundly immunocompromised might be unable to generate a significant vitritis

Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts...

Why do immunocompromised pts with toxo retinitis need brain imaging?
To assess for CNS involvement

Is there a strong correlation between ocular and CNS toxo?
Yes—up to 50% of toxo retinitis pts will be found to have CNS involvement

Is contrast needed?
Yes

In what way does the management of toxo retinitis differ in the immunocompromised population?
--In immunocompetent pts, toxo retinitis needs treatment only if the lesion is threatening the macula, ONH or a major vessel, or in cases of severe vitritis; whereas in immunocompromised pts, lesions are treated regardless of location, or severity of vitritis
--In immunocompetent pts, toxo retinitis does not prompt imaging, whereas in immunocompromised pts, a finding of toxo retinitis should prompt MR imaging of the brain

Secondary to opportunistic infection

--Infectious chorioretinitis
--Iridocyclitis

--Toxoplasmosis

MR imaging of the brain

In what way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic description?
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Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

In what ways does the management of toxo retinitis differ in the immunocompromised population? --In immunocompetent pts, toxo retinitis does not prompt imaging; whereas in immunocompromised pts, a finding of toxo retinitis should prompt MR imaging of the brain.

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Is contrast needed? Yes.

What is the classic neuroimaging finding? 'Ring-enhancing lesions'.

Will the lesions show up on CT with contrast? Yes, but MR is the preferred modality.

Is there a strong correlation between ocular and CNS toxo? Yes—up to 50% of toxo retinitis pts will be found to have CNS involvement.

Is contrast needed? Yes.

What is the classic neuroimaging finding? MR imaging of the brain.
Ophthalmic HIV manifestations

Adnexa Eye

Eyelids Anterior segment

Conj Posterior segment--HZO

--Molluscum--Kaposi sarcoma

HIV and the Eye

--KCS

--Infectious keratitis--Iridocyclitis

Secondary to opportunistic infection

Not 2o to opportunistic infection

Infectious chorioretinitis

Viral

Bacterial

Fungal

Parasitic

--CMV

--VZV/HSV

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--TB

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Why do immunocompromised pts with toxo retinitis need brain imaging?

To assess for CNS involvement

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Is contrast needed?

Yes

What is the classic neuroimaging finding?

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Speaking of comparing/contrasting toxo retinitis in immunocompetent vs -compromised hosts…

MR imaging of the brain

In what way does the management of toxo retinitis differ in the immunocompromised population?

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Secondary to opportunistic infection

--Infectious chorioretinitis

--Toxoplasmosis

Parasitic

--Toxoplasmosis

Secondary to opportunistic infection

Not 2o to opportunistic infection

Infectious chorioretinitis

--Necrotizing retinitis

Viral

Bacterial

Fungal

Parasitic

--CMV

--VZV/HSV

--Syphilis

--TB

--Toxoplasmosis

--Histoplasmosis

--Pneumocystis
254

Why do immunocompromised pts with toxo retinitis need brain imaging?
To assess for CNS involvementHIV and the Eye

Ophthalmic HIV
manifestations

Is there a strong correlation between ocular and CNS toxo?
Yes—up to 50% of toxo retinitis pts will be found to have CNS involvement
Is contrast needed?
Yes

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macula,Will
ONH
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contrast?
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of location,
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Posterior
Conj
Anterior
Eyelids
pts, a finding of toxo
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of the brain
How
common is ocular toxoplasmosis
in HIV+ pts?
segment
segment
--Conj microvasculopathy
--HZO
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Adnexa

Eye

--Molluscum
--Kaposi sarcoma
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of toxoplasma
retinitis
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Speaking
of is
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‘Headlight in
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hosts…
chorioretinitis
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--the ‘headlight’: The large yellow retinal lesion
Bacterial
Fungal
--the ‘fog’: AViral
dense overlying
vitritis
--CMV
way--VZV/HSV
might the

--Syphilis
--TB
presentation

--Histoplasmosis
toxo--Pneumocystis
retinitis in

In what
of
an HIV+ pt deviate from the classic description?
By the absence of ‘fog’—a pt who is profoundly
immunocompromised might be unable to generate a
significant vitritis

--KCS
--Infectious keratitis
--Iridocyclitis
Secondary to
opportunistic
infection

--Infectious
chorioretinitis

Parasitic
--Toxoplasmosis

--Necrotizing
retinitis

Not 2o to
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MR imaging of the brain

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--Iridocyclitis

Secondary to opportunistic infection
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--Necrotizing retinitis

Parasitic
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--Toxoplasmosis
--Histoplasmosis
--Pneumocystis
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

Conj
--Conj microvasculopathy
--SCC

Eye

Anterior segment
--KCS
--Infectious keratitis
--Iridocyclitis

Posterior segment

Secondary to opportunistic infection
--Infectious chorioretinitis
--Necrotizing retinitis

Not secondary to opportunistic infection

Necrotizing retinitis

What manifestations are these?
Ophthalmic HIV manifestations

HIV and the Eye

Adnexa

Eyelids
--HZO
--Molluscum
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--Conj microvasculopathy
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Anterior segment
--KCS
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Necrotizing retinitis

Eye

Posterior segment

Secondary to opportunistic infection
--Infectious chorioretinitis
--Necrotizing retinitis

Not 2\textsuperscript{o} to opportunistic infection

PORN
(Progressive outer retinal necrosis)

ARN
(Acute retinal necrosis)
How, specifically, are HSV and VZV causally related to ARN and PORN?
**HIV and the Eye**

**Ophthalmic HIV manifestations**

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma

** Conj**
- Conj microvasculopathy
- SCC

**Anterior segment**
- KCS
- Infectious keratitis
- Iridocyclitis

**Eye**

**Posterior segment**

**Necrotizing retinitis**
- ARN: VZV or HSV
- PORN: VZV only

How, specifically, are HSV and VZV causally related to ARN and PORN?

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With which is ARN more likely to be associated?
Ophthalmic HIV manifestations

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

**Eye**
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment
  - Secondary to opportunistic infection
    - Infectious chorioretinitis
    - Necrotizing retinitis

Not 2° to opportunistic infection

**HIV and the Eye**

**Necrotizing retinitis**
- ARN: VZV or HSV
- PORN: VZV only

**How, specifically, are HSV and VZV causally related to ARN and PORN?**
PORN is causally related to VZV, whereas ARN has been linked to both VZV and HSV.

**With which is ARN more likely to be associated?** VZV
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  --HZO
  --Molluscum
  --Kaposi sarcoma
- Conj
  --Conj microvasculopathy
  --SCC

Eye
- Anterior segment
  --KCS
  --Infectious keratitis
  --Iridocyclitis
- Posterior segment
  Secondary to opportunistic infection
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Necrotizing retinitis
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Ophthalmic HIV manifestations

**Adnexa**
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

**Eye**
- Anterior segment
  - KCS
  - Infectious keratitis docyclitis
- Posterior segment
  - Secondary to opportunistic infection
    - Infectious chorioretinitis
    - Necrotizing retinitis
  - Not 2° to opportunistic infection

**HIV and the Eye**

**How, specifically, are HSV and VZV causally related to ARN and PORN?**
- PORN is causally related to VZV, whereas ARN has been linked to both VZV and HSV.

**With which is ARN more likely to be associated?**
- VZV

**VZV, HSV-1, HSV-2—is there any pattern regarding which is more likely in a given pt?**
- Both

**ARN, VZV or HSV-1 and HSV-2**
- PORN: VZV only

**VZV-1, -2, or both?**
- Both
**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - Eyelids
    - HZO
    - Molluscum
    - Kaposi sarcoma
  - Conj
    - Conj microvasculopathy
    - SCC

- **Eye**
  - Posterior segment
    - Secondary to opportunistic infection
      - Infectious chorioretinitis
        - Necrotizing retinitis
    - Not 2\textsuperscript{o} to opportunistic infection
  - Anterior segment
    - KCS
  - Infectious keratitis
    - Docyclitis

**How, specifically, are HSV and VZV causally related to ARN and PORN?**

VZV, HSV-1, HSV-2—is there any pattern regarding which is more likely in a given pt?

VZV and HSV-1 tend to cause ARN in older pts, whereas HSV-2 is more likely in a younger pt.

**ARN:** VZV or HSV-1 and HSV-2

**PORN:** VZV only

**OLDER pts**

**YOUNGER pts**

How, specifically, are HSV and VZV causally related to ARN and PORN?

PORN is causally related to VZV, whereas ARN has been linked to both VZV and HSV.

**With which is ARN more likely to be associated?** VZV

**HSV-1, -2, or both?** Both
Both conditions present with a necrotizing retinitis. In what key way do the presentations differ?
Both conditions present with a necrotizing retinitis. In what key way do the presentations differ? ARN is a **panuveitis**, and thus presents with a severe AC reaction and dense vitritis. In contrast, PORN demonstrates little (or no) AC and/or vitreous cell.
**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - Eyelids
    - HZO
    - Molluscum
    - Kaposi sarcoma
  - Conj
    - Conj microvasculopathy
    - SCC

- **Anterior segment**
  - KCS
  - Infectious keratitis
  - Iridocyclitis

- **Posterior segment**
  - Secondary to opportunistic infection
    - Infectious chorioretinitis
  - Not 2º to opportunistic infection

**Necrotizing retinitis**

- ARN
- PORN

Both conditions present with a necrotizing retinitis. In what key way do the presentations differ?

**ARN is a panuveitis** and thus presents with a severe AC reaction and dense vitritis. In contrast, PORN demonstrates little (or no) AC and/or vitreous cell.

Other reported findings in ARN include vasculitis, choroiditis and papillitis.
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conj microvasculopathy
  -- SCC

Eye

Anterior segment
- KCS
- Infectious keratitis
- Iridocyclitis

Posterior segment
- Secondary to opportunistic infection
  -- Infectious chorioretinitis
  -- Necrotizing retinitis
- Not 2° to opportunistic infection

Necrotizing retinitis
- ARN
- PORN

How do ARN and PORN present ophthalmoscopically?
**How do ARN and PORN present ophthalmoscopically?**

*Both present in a broadly similar fashion. In early stages, focal areas of inflamed retina can be seen. In short time, these areas expand and coalesce into large areas of necrotic retina. Later, multiple posterior retinal breaks may develop, and rhegmatogenous RD soon follows.*
In what fundamental way do the early-stage lesions in ARN and PORN differ?

Early retinal lesions in ARN are full-thickness, whereas early lesions in PORN involve the outer retina only—the inner retina is spared until late in the disease process.
**HIV and the Eye**

**Ophthalmic HIV manifestations**

- **Adnexa**
  - **Eyelids**
    - HZO
    - Molluscum
    - Kaposi sarcoma
  - **Conj**
    - Conj microvasculopathy
    - SCC

- **Eye**
  - **Anterior segment**
    - KCS
    - Infectious keratitis
    - Iridocyclitis
  - **Posterior segment**
    - Secondary to opportunistic infection
    - Infectious chorioretinitis
    - Necrotizing retinitis
    - Not 2° to opportunistic infection

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**How do ARN and PORN present ophthalmoscopically?**

Both present in a broadly similar fashion. In early stages, focal areas of inflamed retina can be seen. The area expands and coalesces into large areas of necrotic retina. In short time, these areas expand and coalesce into large areas of necrotic retina. Later, multiple posterior retinal breaks may develop, and rhegmatogenous RD soon follows.
**HIV and the Eye**

**Ophthalmic HIV manifestations**

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  - Eyelids
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    - Conj microvasculopathy
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- **Eye**
  - Anterior segment
    - KCS
    - Infectious keratitis
    - Iridocyclitis
  - Posterior segment
    - Secondary to opportunistic infection
      - Infectious chorioretinitis
      - Necrotizing retinitis
    - Not 2° to opportunistic infection

**Necrotizing retinitis**

- **ARN**
- **Progressive outer retinal necrosis**

---

*In what fundamental way do the early-stage lesions in ARN and PORN differ?*

Early retinal lesions in ARN are full-thickness, whereas early lesions in PORN involve the outer retina only—the inner retina is spared until late in the disease process.

Hence the name...

**focal areas of inflamed retina** can coalesce into large areas of necrotic retina.

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*273*
How do ARN and PORN present ophthalmoscopically?

Both present in a broadly similar fashion. In early stages, focal areas of inflamed retina can be seen. In short time, these areas expand and coalesce into large areas of necrotic retina.

Later, multiple posterior retinal breaks may develop, and rhegmatogenous RD soon follows.

In what fundamental way do the early-stage lesions in ARN and PORN differ?

Early retinal lesions in ARN are full-thickness, whereas early lesions in PORN involve the outer retina only—the inner retina is spared until late in the disease process.

In differentiating between ARN and PORN clinically, this distinction is not terribly useful. What are some clues to help distinguish between the two?

---

ARN and PORN differ.

Early retinal lesions in ARN are full-thickness, whereas early lesions in PORN involve the outer retina only—the inner retina is spared until late in the disease process.
How do ARN and PORN present ophthalmoscopically? Both present in a broadly similar fashion. In early stages, focal areas of inflamed retina can be seen. In short time, these areas expand and coalesce into large areas of necrotic retina. Later, multiple posterior retinal breaks may develop, and rhegmatogenous RD soon follows.

In what fundamental way do the early-stage lesions in ARN and PORN differ? Early retinal lesions in ARN are full-thickness, whereas early lesions in PORN involve the outer retina only—the inner retina is spared until late in the disease process. In differentiating between ARN and PORN clinically, this distinction is not terribly useful. What are some clues to help distinguish between the two? --ARN is much more likely to be associated with an overlying vitritis, whereas PORN tends to spare them. --ARN is more likely to involve the retinal vessels, whereas PORN tends to spare them. --ARN and PORN differ in their presentation. In ARN, focal areas of inflamed retina can expand into large areas of necrotic retina, whereas in PORN, early lesions involve only the outer retina.
How do ARN and PORN present ophthalmoscopically? Both present in a broadly similar fashion. In early stages, focal areas of inflamed retina can be seen. In short time, these areas expand and coalesce into large areas of necrotic retina. Later, multiple posterior retinal breaks may develop, and rhegmatogenous RD soon follows.

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Infectious HIV manifestations

- **Adnexa**
  - Eyelids
    - HZO
    - Molluscum
    - Kaposi sarcoma
  - Conj
    - Conj microvasculopathy
    - SCC
- **Eye**
  - Anterior segment
    - KCS
    - Infectious keratitis
    - Iridocyclitis
  - Posterior segment
    - Secondary to opportunistic infection
    - Not 2o to opportunistic infection

**Ophthalmic HIV manifestations**

- Necrotizing retinitis
**HIV and the Eye**

**Ophthalmic HIV manifestations**

**Adnexa**
- Eyelids
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**Necrotizing retinitis**
- ARN
- PORN

**Is prophylactic laser retinopexy effective in reducing the risk of RD?**

Both present in a pattern that can be seen. In short time, these areas expand and coalesce into large areas of necrotic retina. Later, multiple posterior retinal breaks may develop, and rhegmatogenous RD soon follows.
HIV and the Eye

Ophthalmic HIV manifestations

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Necrotizing retinitis
- ARN
- PORN

Is prophylactic laser retinopexy effective in reducing the risk of RD?
Generally no

How do ARN and PORN present ophthalmoscopically?
Both present in a similar fashion. In early stages, focal areas of inflamed retina can be seen. In short time, these areas expand and coalesce into large areas of necrotic retina. Later, multiple posterior retinal breaks may develop, and rhegmatogenous RD soon follows.
HIV and the Eye

Ophthalmic HIV manifestations

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- Eyelids
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Conj
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- SCC

Anterior segment
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Eye

Posterior segment
- Secondary to opportunistic infection
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  -- Necrotizing retinitis
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Necrotizing retinitis
- ARN
- PORN

What is the treatment for ARN?
Ophthalmic HIV manifestations

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Necrotizing retinitis
- ARN
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What is the treatment for ARN?
Intravenous acyclovir

HIV and the Eye
Ophthalmic HIV manifestations

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Posterior segment

Secondary to opportunistic infection

- Infectious chorioretinitis
  -- Necrotizing retinitis

Not 2° to opportunistic infection

Necrotizing retinitis

ARN

What is the treatment for ARN?
Intravenous acyclovir

What is the treatment for PORN?
PORN

PORN is notoriously treatment-resistant. High-dose IV acyclovir + intravitreal ganciclovir is one option. Progression to NLP is a common outcome. Bilateral involvement is the rule, even in the face of attempted maintenance therapy.
What is the treatment for ARN?
Intravenous acyclovir

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PORN is notoriously treatment-resistant. High-dose IV acyclovir + intravitreal ganciclovir is one option. Progression to NLP is a common outcome. Bilateral involvement is the rule, even in the face of attempted maintenance therapy.
Which of these diseases can occur in immunocompetent pts?
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Which of these diseases can occur in immunocompetent pts?
ARN

Who is the typical immunocompetent ARN pt?
Ophthalmic HIV manifestations

HIV and the Eye

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Which of these diseases can occur in immunocompetent pts?
ARN

Who is the typical immunocompetent ARN pt?
An otherwise healthy older adult
Which of these diseases can occur in immunocompetent ARN:

- Ophthalmic HIV manifestations

Who is the typical immunocompetent ARN pt?

- An otherwise healthy older adult
HIV and the Eye

Ophthalmic HIV manifestations

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Necrotizing retinitis
- ARN
- PORN

Which of these diseases can occur in immunocompetent pts?
ARN

Who is the typical immunocompetent ARN pt?
An otherwise healthy older adult

How does the presentation of ARN differ between the immunocompetent and immunocompromised populations?
In brief: It tends to be worse in immunocompromised pts:
-- More likely to be bilateral
-- Tends to be more severe
-- Tends to have a less robust response to treatment
Ophthalmic HIV manifestations

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What manifestations are these?
Ophthalmic HIV manifestations

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    - HIV retinopathy
    - ONH problems
Ophthalmic HIV manifestations

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  -- Molluscum
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- SCC

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- Posterior segment
  -- Not secondary to opportunistic infection
  -- Secondary to opportunistic infection
    -- Infectious
      -- HIV retinopathy
      -- ONH problems

What is the appearance of HIV retinopathy?

Cotton-wool spots in the posterior pole. Occasionally, retinal heme is seen as well.

How common is it?
Prior to HAART, it was very common (50-75% of HIV+ pts). It is less common now.

What is the pathophysiology?
Arteriolar occlusion → focal ischemia → disruption of axoplasmic flow → CWS
What is the appearance of HIV retinopathy?
Cotton-wool spots in the posterior pole. Occasionally, retinal heme is seen as well.
**HIV and the Eye**

**Ophthalmic HIV manifestations**

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    - Kaposi sarcoma
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    - Conj microvasculopathy
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**Ophthalmic HIV manifestations**

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Infectious chorioretinitis
Necrotizing retinitis

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Arteriolar occlusion → focal ischemia → disruption of axoplasmic flow → CWS

Fundamentally, HIV retinopathy is a **retinal microvasculopathy**.
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**What is the appearance of HIV retinopathy?**
Cotton-wool spots in the posterior pole. Occasionally, retinal heme is seen as well.

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Prior to HAART, it was very common (50-75% of HIV+ pts). It is less common now.

**What is the pathophysiology?**
Arteriolar occlusion $\rightarrow$ focal ischemia $\rightarrow$ disruption of axoplasmic flow $\rightarrow$ CWS
Infectious chorioretinitis
Necrotizing retinitis

What is the appearance of HIV retinopathy?
Cotton-wool spots in the posterior pole. Occasionally, retinal heme is seen as well.

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Arteriolar occlusion → focal ischemia → disruption of axoplasmic flow → CWS

Fundamentally, HIV retinopathy is a retinal microvasculopathy. In other words, it is the retinal equivalent of conj microvasculopathy.
Ophthalmic HIV manifestations

To aid in remembering this fundamental similarity, note that HIV retinopathy is also known as **HIV–Related Retinal Microvasculopathy**.

Fundamentally, HIV retinopathy is a **retinal microvasculopathy**. In other words, it is the retinal equivalent of **conj microvasculopathy**.

- **What is the appearance of HIV retinopathy?**
  - Cotton-wool spots in the posterior pole. Occasionally, retinal heme is seen as well.

- **How common is it?**
  - Prior to HAART, it was very common (50-75% of HIV+ pts). It is less common now.

- **What is the pathophysiology?**
  - Arteriolar occlusion → focal ischemia → disruption of axoplasmic flow → CWS
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa

Eyelids
--HZO
--Molluscum
--Kaposi sarcoma

Conj
--Conj microvasculopathy
--SCC

ONH problems

Eye

Anterior segment
--KCS
--Infectious keratitis
--Iridocyclitis

Posterior segment

Secondary to opportunistic infection
--Infectious chorioretinitis
--Necrotizing retinitis

Not 2° to opportunistic infection

--HIV retinopathy

--ONH problems

What manifestations are these?
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- Herpes zoster ophthalmicus (HZO)
  -- Molluscum
  -- Kaposi sarcoma
- Conj
  -- Conjunctival microvasculopathy
  -- Superficial conjunctival scarring (SCC)

Eye
- Anterior segment
  -- Keratoconjunctivitis sicca (KCS)
  -- Infectious keratitis
  -- Iridocyclitis
- Posterior segment
  -- Secondary to opportunistic infection
    -- Infectious chorioretinitis
    -- Necrotizing retinitis
  -- HIV retinopathy
  -- ONH problems

ONH problems
- Infectious
- Noninfectious
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC

ONH problems
- Infectious
  - Infectious optic neuropathy
- Noninfectious

Eye
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment
  - Secondary to opportunistic infection
    - Infectious chorioretinitis
    - Necrotizing retinitis
  - Not 2° to opportunistic infection
    - HIV retinopathy
    - ONH problems
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- Herpes zoster ocular (HZO)
  -- Molluscum
  -- Kaposi sarcoma

Conj
- Conjunctival microvasculopathy
  -- SCC

ONH problems
- Infectious
  -- Infectious optic neuropathy

Noninfectious
  -- (a sign)
  -- (a vascular event)
  -- (a general condition)

Eye
- Anterior segment
  -- KCS
  -- Infectious keratitis
  -- Iridocyclitis

Posterior segment
- Secondary to opportunistic infection
  -- Infectious chorioretinitis
  -- Necrotizing retinitis

- Not 2o to opportunistic infection
  -- HIV retinopathy
  -- ONH problems
Ophthalmic HIV manifestations

Adnexa
- Eyelids
  - HZO
  - Molluscum
  - Kaposi sarcoma
- Conj
  - Conj microvasculopathy
  - SCC
- ONH problems
  - Infectious
    - Infectious optic neuropathy
  - Noninfectious
    - Papilledema
    - AION
    - Optic atrophy

Eye
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis

Posterior segment
- Secondary to opportunistic infection
  - Infectious chorioretinitis
  - Necrotizing retinitis
- Not 2o to opportunistic infection
  - HIV retinopathy
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HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
  -- HZO
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  -- Kaposi sarcoma
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ONH problems
- Infectious
  -- Infectious optic neuropathy
- Noninfectious
  -- Papilledema
  -- AION

Eye
- Anterior segment
  -- KCS
  -- Infectious keratitis
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Posterior segment
- Secondary to opportunistic infection
  -- Infectious chorioretinitis
  -- Necrotizing retinitis
- Not 2º to opportunistic infection
  -- HIV retinopathy
  -- ONH problems

What are common causes of papilledema in HIV+ pts?
- (Two broad categories)
What are common causes of papilledema in HIV+ pts?
--Neoplasms
--Infectious processes
**HIV and the Eye**

**Ophthalmic HIV manifestations**

**Adnexa**
- Eyelids
  - HZO
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  - Kaposi sarcoma

**Conj**
- Conj microvasculopathy
- SCC

**ONH problems**
- Infectious
  - Infectious optic neuropathy
- Noninfectious
  - Papilledema
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**Eye**
- Anterior segment
  - KCS
  - Infectious keratitis
  - Iridocyclitis
- Posterior segment
  - Secondary to opportunistic infection
  - Noninfectious
  - ONH problems

**Not 2o to opportunistic infection**
- --Infectious chorioretinitis
  - --Necrotizing retinitis
- --HIV retinopathy

**What are common causes of papilledema in HIV+ pts?**
- Neoplasms (e.g.)
- Infectious processes
HIV and the Eye

Ophthalmic HIV manifestations

Adnexa
- Eyelids
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ONH problems
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Posterior segment
- Secondary to opportunistic infection
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- Not 2º to opportunistic infection
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  -- ONH problems

What are common causes of papilledema in HIV+ pts?
- Neoplasms (eg...Primary CNS lymphoma, PCNSL)
- Infectious processes
What are common causes of papilledema in HIV+ pts?
--Neoplasms (e.g., Primary CNS lymphoma, PCNSL)
--Infectious processes, including
  --
  --
**HIV and the Eye**

**Ophthalmic HIV manifestations**

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    - Conj microvasculopathy
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- **Eye**
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    - Not 2\(^o\) to opportunistic infection
      - HIV retinopathy
      -- ONH problems

**ONH problems**

- **Infectious**
  - Infectious optic neuropathy
- **Noninfectious**
  - Papilledema
  - AION

---

**What are common causes of papilledema in HIV+ pts?**
- Neoplasms (e.g., Primary CNS lymphoma, PCNSL)
- Infectious processes, including
  - Toxoplasma encephalitis
  - Cryptococcal meningitis
**HIV and the Eye**

**CD4+ T-cell count and HIV-related eye dz: Divvy the diseases up with respect to their typical CD4 thresholds for occurrence:**

<table>
<thead>
<tr>
<th>CD4+ T-cell count</th>
<th>Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;100 cells/mm³</td>
<td>Kaposi sarcoma, Pneumocystis choroiditis, Toxoplasma chorioretinitis, Conj microvasculopathy, CMV retinitis, Microsporidia keratitis, PORN</td>
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<tr>
<td>&lt;250 cells/mm³</td>
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**HIV and the Eye**

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- **<100 cells/mm³**
  - Toxoplasma chorioretinitis
  - Conj microvasculopathy
  - CMV retinitis
  - Microsporidia keratitis
  - PORN

- **<250 cells/mm³**
  - Pneumocystis choroiditis

- **<500 cells/mm³**
  - Kaposi sarcoma
### HIV and the Eye

**CD4+ T-cell count and HIV-related eye dz: Divvy the diseases up with respect to their typical CD4 thresholds for occurrence:**

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HIV and the Eye
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| PORN | | | *(CMV retinitis is uncommon if CD4 is >50)*
**HIV and the Eye**

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- **< 500 cells/mm³**
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</tr>
<tr>
<td>&lt; 500 cells/mm³</td>
<td>Kaposi sarcoma</td>
</tr>
</tbody>
</table>

*(CMV retinitis is uncommon if CD4 is >50)*