What are the four basic anatomic locations for uveitis?
What are the four basic anatomic locations for uveitis?
Uveitis: *Anterior*

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated

Key distinction *(not uni- vs bilateral)*
Uveitis: **Anterior**

1. The uveitis is profiled
2. The profiled case is meshed
3. A differential diagnosis list is generated
4. Studies are obtained to identify the etiology
5. Treatment appropriate for the etiology is initiated

**Key distinction**

*not uni- vs bilateral*

Granulomatous  |  Nongranulomatous
Uveitis: **Anterior**

1. The uveitis is profiled
2. The profiled case is meshed
3. A differential diagnosis list is generated
4. Studies are obtained to identify the etiology
5. Treatment appropriate for the etiology is initiated

**Granulomatous**

**Nongranulomatous**

Key distinction

? ?
Acute Chronic

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated

Uveitis: **Anterior**

- Granulomatous
  - Acute
- Nongranulomatous
  - Chronic

Key distinction
Uveitis: **Anterior**

- Granulomatous
- Nongranulomatous
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Key distinction

1) The uveitis is profiled
2) The profiled case is meshed
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4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated
Uveitis: **Anterior**

- Granulomatous
  - Unilateral
  - Bilateral
- Nongranulomatous
  - Acute
  - Chronic

Key distinction

1) The uveitis is profiled
2) The profiled case is meshed
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Acute Chronic Uveitis:

1) The uveitis is profiled
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5) Treatment appropriate for the etiology is initiated

Granulomatous

Nongranulomatous

Acute

Chronic

Unilateral

Bilateral

These three causes are in the DDx for every case of uveitis, including acute bilateral nongranulomatous uveitis. What are they?
Uveitis: Anterior

Granulomatous

Nongranulomatous

Acute

Chronic

Unilateral

Bilateral

These three causes are in the DDx for every case of uveitis, including acute bilateral nongranulomatous uveitis. What are they?
Uveitis: **Anterior**

- Granulomatous
- Nongranulomatous

**Acute**
- Unilateral
- Bilateral
  - ?
  - ?
  - ?
  - ?
  - Sarcoid
  - Syphilis
  - ?
  - TB

**Chronic**

What are the others?

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated
Uveitis: **Anterior**

- Granulomatous
- Nongranulomatous
  - Acute
  - Bilateral
  - Unilateral
  - Bilateral
    - TINU
    - Behçet
    - Drug rxn
    - Leptospirosis
    - Sarcoid
    - Syphilis
    - IBD/PA
    - TB

What are the others?
Uveitis: **Anterior**

Granulomatous → Non-granulomatous

Acute → Chronic

Unilateral → Bilateral

**TINU**

*What does TINU stand for?*

Tubulointerstitial nephritis and uveitis (syndrome)

Who is the typical TINU pt?

A female age 16-30

TINU typically presents in three phases—what are they?

---

First is a **systemic** phase: Fever, weight loss, fatigue, abdominal pain; this is followed by...

---

The **nephropathy** phase: Proteinuria, hypergammaglobulinemia, anemia; followed by...

---

The **uveitis** phase: A bilateral nongranulomatous anterior uveitis

(Note that because not all pts read the book, some will present in the 'wrong' order)

What is the etiology of TINU?

It is unknown at this time
Uveitis: Anterior

Granulomatous

Nongranulomatous

Acute

Bilateral

Chronic

Unilateral

What does TINU stand for? Tubulointerstitial nephritis and uveitis (syndrome)
Uveitis: **Anterior**

- Granulomatous
- Nongranulomatous
  - Acute
  - Chronic
    - Unilateral
    - Bilateral
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Uveitis: **Anterior**

Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

TINU

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Granulomatous

Nongranulomatous

Acute

Chronic

Unilateral

Bilateral

**TINU**

What does TINU stand for’?
Tubulointerstitial nephritis and uveitis (syndrome)

Who is the typical TINU pt?
A female age 16-30

What is the average age of onset?

It is unknown at this time

The average age of onset is 21 (it skews younger)
Uveitis: Anterior

Granulomatous  Nongranulomatous

Acute  Chronic

Unilateral  Bilateral

What does TINU stand for? Tubulointerstitial nephritis and uveitis (syndrome)

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What is the average age of onset? 21 (the point: It skews younger)
What does TINU stand for? Tubulointerstitial nephritis and uveitis (syndrome)

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TINU typically presents in three phases—what are they?
--First is a ?
--
--
**Uveitis: Anterior**

- Granulomatous
- Nongranulomatous

**Acute**
- Unilateral
- Bilateral

**Chronic**

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**TINU**

*What does TINU stand for?*
Tubulointerstitial nephritis and uveitis (syndrome)

*Who is the typical TINU pt?*
A female age 16-30

*TINU typically presents in three phases--what are they?*
--First is a **systemic** phase:
  -- [describe its manifestations]
Acute Chronic Uveitis:

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Uveitis: **Anterior**

Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

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[describe its manifestations]
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Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

**Granulomatous**

**Nongranulomatous**

**Acute**

**Chronic**

**Unilateral**

**Bilateral**

**TINU**

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[describe its manifestations]
Acute Chronic

Uveitis: **Anterior**

Granulomatous  Nongranulomatous

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Unilateral Bilateral

Acute  Chronic

**Anterior**

Granulomatous  Nongranulomatous

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[describe its manifestations]
Uveitis: **Anterior**

Granulomatous  →  Nongranulomatous

Acute  →  Chronic

Unilateral  →  Bilateral

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--?
**Uveitis:** *Anterior*

- **Granulomatous**
- **Nongranulomatous**
  - **Acute**
  - **Chronic**
    - **Unilateral**
    - **Bilateral**

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-- the **uveitis** phase:

[which is characterized by…]
Uveitis: Anterior

Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

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Nongranulomatous

Acute

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[which is characterized by…]
Uveitis: **Anterior**

Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

TINU

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(Note: Not all pts read the book, so some will present in the ‘wrong’ order)

---

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Acute Chronic Uveitis:

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Unilateral Bilateral

Granulomatous Nongranulomatous

TINU

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(Note: **Not all pts read the book**, so some will present in the ‘wrong’ order)

Speaking of TINU pts not reading the book…Can they present with posterior-segment findings?
**Uveitis: Anterior**

*Granulomatous* → *Nongranulomatous* → *Acute* → *Bilateral* → *TINU*

---

1) The uveitis is profiled
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---

**What does TINU stand for**?
Tubulointerstitial nephritis and uveitis (syndrome)

**Who is the typical TINU pt?**
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**TINU typically presents in three phases---what are they?**
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(Note: **Not all pts read the book**, so some will present in the ‘wrong’ order)

---

**Speaking of TINU pts not reading the book…Can they present with posterior-segment findings?**
Yes—vitritis, chorioretinitis, macular edema, and ONH edema have all been reported, but are mos def atypical for the condition. *Remember the bilateral nongranulomatous anterior uveitis!*
Uveitis: Anterior

Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

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--the nephropathy phase: Proteinuria, hypergammaglobulinuria, glycosuria; followed by…
--the uveitis phase: A bilateral nongranulomatous anterior uveitis
(Note: Not all pts read the book, so some will present in the ‘wrong’ order)

How much time typically elapses between phases?
Uveitis: \textit{Anterior}

Granulomatous \quad \text{Nongranulomatous}

Unilateral \quad \text{Bilateral}

Acute \quad \text{Chronic}

\begin{itemize}
  \item 1) The uveitis is profiled
  \item 2) The profiled case is meshed
  \item 3) A differential diagnosis list is generated
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\end{itemize}

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\textit{TINU typically presents in three phases--what are they?}
--First is a \textbf{systemic phase}: Fever, weight loss, fatigue, abdominal pain; this is followed by…
--the \textbf{nephropathy phase}: Proteinuria, hypergammaglobulinuria, glycosuria; followed by…
--the \textbf{uveitis phase}: A bilateral nongranulomatous anterior uveitis
(Note: Not all pts read the book, so some will present in the ‘wrong’ order)

\textit{How much time typically elapses between phases? A few weeks to a couple of months}
Acute Chronic Uveitis:

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5) Treatment appropriate for the etiology is initiated

Granulomatous → Nongranulomatous

- Acute
  - Unilateral
  - Bilateral

- Chronic

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(Note: Not all pts read the book, so some will present in the ‘wrong’ order)

What is the etiology of TINU?
Uveitis: *Anterior*

Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

**What does TINU stand for?**
Tubulointerstitial nephritis and uveitis (syndrome)

**Who is the typical TINU pt?**
A female age 16-30

**TINU typically presents in three phases—what are they?**
--First is a **systemic** phase: Fever, weight loss, fatigue, abdominal pain; this is followed by…
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(Note: Not all pts read the book, so some will present in the ‘wrong’ order)

**What is the etiology of TINU?**
It is unknown at this time
**Uveitis: Anterior**

1. The uveitis is profiled
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**TINU**

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(Note: Not all pts read the book, so some will present in the ‘wrong’ order)

What is the etiology of TINU?
It is unknown at this time

Urine levels of what specific gammaglobulin is usually elevated?
**β2-microglobulin**. (This is a ‘buzzword’ for TINU, so try to remember it)

Do TINU pts spill glucose because their serum glucose is elevated?
No, it is a normoglycemia glycosuria; ie, they spill glucose not because serum levels are high (like poorly-controlled diabetics do), but rather because the nephritis impairs glucose filtration/reclamation.
Uveitis: **Anterior**

Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

**TINU**

---

**Urine levels of what specific gammaglobulin is usually elevated?**

\(\beta_2\)-microglobulin

---

**Who is the typical TINU pt?**

A female age 16-30

**TINU typically presents in three phases**--

---

**First** is a *systemic* phase: Fever, weight loss, fatigue, abdominal pain; this is followed by…

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**Nephropathy** phase: Proteinuria, hypergammaglobulinuria, glycosuria; followed by…

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**Uveitis** phase: A bilateral nongranulomatous anterior uveitis

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**What is the etiology of TINU?**

It is unknown at this time
Uveitis: **Anterior**

Granulomatous  →  Nongranulomatous

Acute  →  Chronic

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Granulomatous Nongranulomatous

**TINU**

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**TINU**

- Tubulointerstitial nephritis and uveitis (syndrome)

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**Acute**

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- Granulomatous
- Nongranulomatous

**Acute**

- Unilateral
- Bilateral
  - TINU

**Chronic**

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**What is the etiology of TINU?**

It is unknown at this time
Acute Chronic Uveitis:

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated

Unilateral Bilateral
Granulomatous Nongranulomatous

Acute

TINU

How is the diagnosis of TINU made?
Formally, it can be made only via renal biopsy

If TINU is suspected, what steps should the ophtho take?
1) Treat the uveitis with topical steroids and cycloplegia
2) Order labs:
   ----Serum creatinine and BUN (will indicate impaired renal function)
   ----ESR (will be significantly elevated)
   ----H/H (anemia will be present)
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3) Refer to Nephrology

What does TINU stand for?
Tubulointerstitial nephritis and uveitis (syndrome)

Who is the typical TINU pt?
A female age 16-30

TINU typically presents in three phases—what are they?
First is a systemic phase: Fever, weight loss, fatigue, abdominal pain; this is followed by...
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What is the etiology of TINU?
It is unknown at this time
Acute Chronic Uveitis: Anterior

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Unilateral Bilateral

Granulomatous

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Acute

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Uveitis: Anterior

Granulomatous

Nongranulomatous

Acute

Bilateral

TINU

Chronic

Unilateral

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Uveitis: **Anterior**

Granulomatous ➔ Nongranulomatous

Acute ➔ Chronic

Unilateral ➔ Bilateral

**TINU**

---

**What does TINU stand for?**
- Tubulointerstitial nephritis and uveitis (syndrome)

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- Granulomatous
- Nongranulomatous

**Acute**
- Unilateral
- Bilateral

**Chronic**

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**Granulomatous**

**Nongranulomatous**

**Acute**

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Granulomatous → Nongranulomatous

Unilateral → Bilateral

Acute → Chronic

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**TINU has a very strong HLA association—what is it?**
HLA-DRB1*0102
Uveitis: *Anterior*

Granulomatous ➔ Nongranulomatous

Acute ➔ Chronic

Unilateral ➔ Bilateral

---

**How is the diagnosis of TINU made?**
Formally, it can be made only via renal biopsy.

**Who is the typical TINU pt?**
A female age 16-30.

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**TINU has a very strong HLA association—what is it?** HLA-DRB1*0102

**What is the etiology of TINU?**
It is unknown at this time.
Uveitis: **Anterior**

- Granulomatous
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TINU has a **very strong HLA association**—what is it? HLA-DRB1*0102

How strong is very strong?
It is the strongest of all known HLA---uveitis associations

(Note that the text is cut off and some parts are not clearly visible.)
**Uveitis: Anterior**

- **Granulomatous**
- **Nongranulomatous**
  - **Acute**
  - **Chronic**
  - **Unilateral**
  - **Bilateral**

**TINU**

What does TINU stand for?
Tubulointerstitial nephritis and uveitis (syndrome)

Who is the typical TINU patient?
A female age 16-30

TINU typically presents in three phases:
1. **Systemic** phase: Fever, weight loss, fatigue, abdominal pain
2. **Nephropathy** phase: Proteinuria, hypergammaglobulinuria, glycosuria
3. **Uveitis** phase: A bilateral nongranulomatous anterior uveitis

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   ----ESR (will be significantly elevated)
   ----H/H (anemia will be present)
   ----Urinalysis (will be abnormal as described previously)
3) Refer to Nephrology

What is the first-line systemic treatment for TINU?
PO steroids
**Uveitis: Anterior**

- **Granulomatous**
  - **Acute**
    - **Unilateral**
    - **Bilateral**
- **Nongranulomatous**
  - **Acute**
  - **Chronic**

---

**What is the first-line systemic treatment for TINU?** **PO steroids**

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**What does TINU stand for?**
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Uveitis: **Anterior**

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**Granulomatous**

- **Acute**
  - Unilateral
  - Bilateral
    - TINU
    - **Behçet**
      - Behçet disease is addressed in its own slide-set (U17)
    - Drug rxn
  - Sarcoid
  - Syphilis
  - IBD/PA
  - TB

**Nongranulomatous**

- **Chronic**

---

**Unilateral**

**Bilateral**
Uveitis: **Anterior**

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- Granulomatous
- Nongranulomatous
  - Acute
  - Chronic
    - Unilateral
    - Bilateral
      - TINU
      - Behçet
      - Drug rxn
        - Systemic? **yes/no**
        - Topical? **yes/no**
        - Intravitreal? **yes/no**

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**

- Systemic? **yes/no**
- Topical? **yes/no**
- Intravitreal? **yes/no**
Uveitis: Anterior

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Granulomatous

Nongranulomatous

Acute

Unilateral

Bilateral

- TINU
- Behçet
- Drug rxn
- Syphilis
- Sarcoid
- IBD/PA
- TB

Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?

- Systemic
- Topical
- Intravitreal

All of them!
Uveitis: **Anterior**

Granulomatous → Nongranulomatous

Acute

- Unilateral
- Bilateral
  - TINU
  - Behçet
  - **Drug rxn**

Chronic

Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
- Systemic?
- Topical?
- Intravitreal?

For each route, does it cause a unilateral, or a bilateral uveitis?
1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
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Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
- Systemic? Can be **either**
- Topical? **Unilateral**
- Intravitreal? **Unilateral**

**For each route, does it cause a unilateral, or a bilateral uveitis?**
Uveitis: **Anterior**

Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

- TINU
- Behçet
- **Drug rxn**

Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?

--- Systemic
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Many systemic drugs have been implicated in causing uveitis, but four are notorious for doing so. What are they?

---
---
---
---

*Hints forthcoming…*
Acute Chronic

Uveitis: **Anterior**

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Unilateral

Bilateral

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Chronic

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-- Rifabutin
-- ?
-- ?
-- ?

the most notorious of all—if you only remember one, make it this one
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Uveitis: **Anterior**

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- Rifabutin
- ?
- ?
- ?

---

- a class of drugs used most often in elderly women
Uveitis: **Anterior**

- Granulomatous
- Nongranulomatous
  - Acute
    - Unilateral
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**Many systemic drugs have been implicated in causing uveitis, but four are notorious for doing so. What are they?**
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  - Acute
  - Chronic
    - Bilateral
      - TINU
      - Behçet
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-- Topical
-- Intravitreal

Many systemic drugs have been implicated in causing uveitis, but four are notorious for doing so. What are they?

-- Rifabutin
-- Bisphosphonates

--- another drug class; of the four, is the most commonly Rx'd, but the least likely to cause uveitis.
Acute Chronic

Uveitis: **Anterior**

Granulomatous

Nongranulomatous

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-- Bisphosphonates
-- Sulfonamides
-- ?
Uveitis: **Anterior**

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- Nongranulomatous
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**Many systemic drugs have been implicated in causing uveitis, but four are notorious for doing so. What are they?**
- Rifabutin
- Bisphosphonates
- Sulfonamides
- Cidofovir

of the four, the only one that is also delivered intravitreally
Acute Chronic

Uveitis: **Anterior**

Granulomatous

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Uveitis: **Anterior**

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      - TINU
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      - **Drug rxn**
        - Syphilis
        - Sarcoid
        - IBD/PA

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**
- **Systemic**
- **Topical**
- **Intravitreal**

**What is rifabutin used to treat?**
- **Mycobacterium avium** complex infections in AIDS pts

**How long after initiation of treatment does the uveitis typically occur?**
- Weeks to months

**Is it associated with development of a hypopyon?**
- Yes! Always consider rifabutin when evaluating hypopyon uveitis

**Many systemic drugs have been implicated in causing uveitis, but four are notorious for doing so.**
- **Rifabutin**
- Bisphosphonates
- Sulfonamides
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**Uveitis: Anterior**

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- Nongranulomatous
  - Acute
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- **Nongranulomatous**
  - **Acute**
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    - **Bilateral**
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- Yes! Always consider rifabutin when evaluating hypopyon uveitis
Uveitis: Anterior

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated

Granulomatous

Nongranulomatous

Acute

Chronic

Unilateral

Bilateral

- TINU
- Behçet
- Drug rxn

Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
- Systemic
- Topical
- Intravitreal

Many systemic drugs have been implicated in causing uveitis, but four are notorious for doing so.

- Rifabutin
- Bisphosphonates
- Sulfonamides
- Cidofovir

What is rifabutin used to treat?
Mycobacterium avium complex infections in AIDS pts

How long after initiation of treatment does the uveitis typically occur?
Weeks to months
Uveitis: **Anterior**

**Granulomatous**

**Nongranulomatous**

**Acute**

**Chronic**

**Unilateral**

**Bilateral**

- TINU
- Behçet
- **Drug rxn**
- Syphilis
- Sarcoid
- IBD/PA

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Uveitis: **Anterior**

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Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

- TINU
- Behçet
- Drug rxn
- Hypopyon uveitis

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**
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- Rifabutin
- Bisphosphonates
- Sulfonamides
- Cidofovir

**What are bisphosphonates used to treat?**

- The most common indication is osteoporosis prevention. They are used also to treat hypercalcemia associated with various conditions.

- **IV pamidronate** is most strongly associated with uveitis.

- No. But it is associated with conjunctivitis, episcleritis and scleritis.
Acute Chronic Uveitis:

1) The uveitis is profiled
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Granulomatous

Nongranulomatous

1) Acute
2) Chronic

Unilateral

Bilateral

- TINU
- Behçet
- Drug rxn

Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?

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--Topical
--Intravitreal

What are bisphosphonates used to treat?
The most common indication is one word prevention

Many systemic drugs have

What are they?
--Rifabutin
--Bisphosphonates
--Sulfonamides
--Cidofovir
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- Granulomatous
- Nongranulomatous
  - Acute
  - Bilateral: TINU, Behçet, Drug rxn
  - Unilateral

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The most strongly associated bisphosphonate with uveitis is IV pamidronate. Is it associated with development of a hypopyon? No, but it is associated with conjunctivitis, episcleritis, and scleritis.
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Uveitis: **Anterior**

- **Granulomatous**
- **Nongranulomatous**
  - **Acute**
  - **Chronic**
    - **Unilateral**
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**Is it associated with development of a hypopyon?**
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Uveitis: **Anterior**

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Uveitis: Anterior

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Unilateral

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What are sulfonamides?

Most are antimicrobials. They are commonly used to treat bacterial UTIs, but have efficacy against toxoplasmosis, pneumocystis and other bugs. Some have been found to be effective anti-seizure meds. At least one is a diuretic.

Which sulfonamide is the most infamous for its ability to induce significant ophthalmic side effects?

**Trimethoprim-sulfamethoxazole**

What is the name for the syndrome of these significant side effects?

**Stevens-Johnson syndrome (SJS)**
Uveitis: **Anterior**

- Granulomatous
- Nongranulomatous

**Acute**
- Unilateral
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  - **Drug rxn**

**Chronic**

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Acute

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**SJS is also known as…**

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Uveitis: Anterior

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Granulomatous

Nongranulomatous

Acute

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Unilateral

Bilateral

TINU

Leptospirosis

Behçet

Drug rxn

Syphilis

Sarcoid

IBD/PA

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SJS is also known as...erythema multiforme major

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Acute

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Severe cases may meet the definition of...

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Uveitis: **Anterior**

- Granulomatous
- Nongranulomatous
  - Acute
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    - Bilateral
      - TINU
      - Behçet
      - Drug rxn
  - Chronic

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*What is the name for the syndrome of these significant side effects?*

**Stevens-Johnson syndrome (SJS)**

*SJS is also known as…**erythema multiforme major***

**Severe cases may meet the definition of…**toxic epidermal necrolysis (TEN)**
Uveitis: *Anterior*

- Symblephara
- Membranous conjunctivitis
- Corneal epithelial defect and diffuse conjunctival injection
- Oral lesions
- Stevens-Johnson syndrome
Acute Chronic Uveitis:

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What are sulfonamides?
Most are antimicrobials. They are commonly used to treat bacterial UTIs, toxoplasmosis, pneumocystis and other bugs. At least one is an antiepileptic. Some have been found to be effective anti-seizure meds. At least one is a diuretic.

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What are they?
- Rifabutin
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- Cidofovir

What are sulfonamides?

Three other drugs/drug classes are most commonly implicated.

What are they?
- NSAIDs
- Anticonvulsants
- Sulfonamides
- Allopurinol within 8 weeks of the start of drug use

Mnemonic forthcoming…

Severe cases may meet the definition of…toxic epidermal necrolysis (TEN)

What is the name for the syndrome of these significant side effects?
Stevens-Johnson syndrome (SJS)
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What is the name for the syndrome of these significant side effects?

**Stevens-Johnson syndrome (SJS)**

Severe cases may meet the definition of... **toxic epidermal necrolysis (TEN)**

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- **N**
- **A**
- **Sulfonamides**
- **A**

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Of the following drug classes, which have been associated with drug reaction uveitis?

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- **Bisphosphonates**
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- **Cidofovir**

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**Acute**

- Unilateral
- Granulomatous
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- Bilateral
- TINU
- Behçet
- Drug rxn

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- Anticonvulsants
- Sulfonamides
- Allopurinol

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- Systemic
- Topical
- Intravitreal

Many systemic drugs have been implicated in causing uveitis, but four are notorious for doing so.

- Rifabutin
- Bisphosphonates
- Sulfonamides
- Cidofovir

What are sulfonamides?
Most are antimicrobials. They are commonly used to treat bacterial UTIs, but have efficacy against toxoplasmosis, pneumocystis and other bugs. At least one is a diuretic.

What is the name for the syndrome of these significant side effects?

**Stevens-Johnson syndrome (SJS)**

For more on SJS, see slide-set K8
Uveitis: **Anterior**

Granulomatous → Non-granulomatous

Acute

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated

Unilateral Bilateral

Granulomatous

Nongranulomatous

TINU

Leptospirosis

Behçet

Drug rxn

Syphilis

Sarcoid

IBD/PA

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**

---Systemic
---Topical
---Intravitreal

Many systemic drugs have been implicated in causing uveitis, but four are notorious for doing so.

---Rifabutin
---Bisphosphonates
---Sulfonamides
---Cidofovir

Because of its potential nonocular side f/x, cidofovir is rarely given systemically anymore. (For this reason, we will cover it with the Intravitreals)
1) The uveitis is profiled
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Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
-- Systemic
-- Topical
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Many systemic drugs have been implicated in causing uveitis, but four are notorious for doing so. What are they?
-- Rifabutin
-- Bisphosphonates
-- Sulfonamides
-- Cidofovir

Because of its potential nephrotoxicity, cidofovir is rarely given systemically anymore. (For this reason, we will cover it with the Intravitreals)
Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
- Systemic
- Topical
- Intravitreal

Many topical drugs have been implicated in causing uveitis, but two are notorious for doing so. What are they?
- ?
- ?

Hints forthcoming...
Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
--Systemic
--Topical
--Intravitreal

Many topical drugs have been implicated in causing uveitis, but two are notorious for doing so. What are they?
-- a glaucoma drug not commonly prescribed in the US
--?
Uveitis: **Anterior**

- Granulomatous
- Nongranulomatous
  - Acute
    - Unilateral
    - Bilateral
      - TINU
      - Behçet
      - Drug rxn
- Chronic

1. The uveitis is profiled
2. The profiled case is meshed
3. A differential diagnosis list is generated
4. Studies are obtained to identify the etiology
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**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**
- Systemic
- Topical
- Intravitreal

**Many topical drugs have been implicated in causing uveitis, but two are notorious for doing so. What are they?**
- Metipranolol
- ?
Uveitis: **Anterior**

- Granulomatous
- Nongranulomatous
  - Acute
  - Chronic
    - Unilateral
    - Bilateral
      - TINU
      - Behçet
      - **Drug rxn**

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**

- Systemic
- **Topical**
- Intravitreal

**Many topical drugs have been implicated in causing uveitis, but two are notorious for doing so.**

*What are they?*

- Metipranolol
- a class of glaucoma drugs VERY commonly prescribed in the US
Uveitis: **Anterior**

Granulomatous → Nongranulomatous

Acute → Bilateral
- TINU
- Behçet
- **Drug rxn**

Unilateral

Of the following drug-delivery routes, which have been associated with *drug-reaction* uveitis?
- Systemic
- **Topical**
- Intravitreal

Many topical drugs have been implicated in causing uveitis, but two are notorious for doing so. *What are they?*
- Metipranolol
- Prostaglandin analogues
Uveitis: **Anterior**

- **Granulomatous**
- **Nongranulomatous**
  - **Acute**
  - **Chronic**
    - **Unilateral**
    - **Bilateral**
      - TINU
      - Behçet
      - Drug rxn

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**
- Systemic
- Topical
- Intravitreal

**Many topical drugs have been implicated in anterior uveitis, but four are notorious for doing so.**

- Metipranolol
- Prostaglandin analogues

**Is anterior uveitis common among metipranolol pts?**

No, it is quite uncommon. Further, it was associated with a formulation no longer commercially available in the US.

**What is unusual about the uveitis it induces?**

It is granulomatous, complete with mutton-fat KP and posterior synechiae.
Uveitis: **Anterior**

Granulomatous → Nongranulomatous

**Acute**
- Unilateral
- Bilateral
  - TINU
  - Behçet
  - **Drug rxn**
  - Syphilis
  - Sarcoid
  - IBD/PA

**Chronic**

---

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**
- Systemic
- Topical
- Intravitreal

---

Many topical drugs have been implicated in causing uveitis. What are they?
- **Metipranolol**
- Prostaglandin analogs

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No, it is quite uncommon. Further, it was associated with a formulation no longer commercially available in the US.
Acute Chronic Uveitis:

1) The uveitis is profiled
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Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
--Systemic
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What are they?
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Acute Chronic

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Unilateral Bilateral

Granulomatous Nongranulomatous

Acute

Bilateral

TINU
Behçet
Drug rxn
Syphilis
Sarcoid
IBD/PA

Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
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--Intravitreal

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Uveitis: *Anterior*

**Granulomatous**

**Nongranulomatous**

**Acute**

**Chronic**

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**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**
- Systemic
- Topical
- Intravitreal

**Many topical drugs have been implicated in causing ocular toxicity, but four are notorious for doing so.**

---

**Is anterior uveitis common among metipranolol pts?**
No, it is quite uncommon. Further, it was associated with a formulation no longer commercially available in the US.

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It is granulomatous, complete with mutton-fat KP and posterior synechiae.
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Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
--Systemic
--Topical
--Intravitreal

Many topical drugs have been implicated in causing drug-reaction uveitis.

What are they?
--Metipranolol
--Prostaglandin analogues

Is anterior uveitis uncommon in metipranolol users?
No, it is quite uncommon. Further, it was associated with a formulation no longer commercially available in the US.

What is unusual about the uveitis it induces?
It is granulomatous, complete with mutton-fat KP and posterior synechiae.

What other topical glaucoma med also causes a granulomatous uveitis (It’s not on the list above)?
Brimonidine
Uveitis: **Anterior**

**Granulomatous**

**Nongranulomatous**

**Acute**

**Chronic**

**Unilateral**

**Bilateral**

1) The uveitis is profiled
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**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**

- Systemic
- Topical
- Intravitreal

Many topical drugs have been implicated in drug-reaction uveitis, but four are notorious for doing so.

**What are they?**

- Metipranolol
- Prostaglandin analogues

**Is anterior uveitis common among metipranolol pts?**

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**What is unusual about the uveitis it induces?**

It is **granulomatous**, complete with mutton-fat KP and posterior synechiae.

**What other topical glaucoma med also causes a granulomatous uveitis (It’s not on the list above)?**

Brimonidene
**Uveitis: Anterior**

- **Granulomatous**
- **Nongranulomatous**
  - **Acute**
  - **Chronic**
    - **Unilateral**
    - **Bilateral**
      - TINU
      - Behçet
      - Drug rxn

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**
- Systemic
- Topical
- Intravitreal

**Is anterior uveitis a common complication of PGA use?**
No; it occurs in only ~1% of pts

**Is it associated with development of a hypopyon?**
No

**Does it resolve rapidly upon cessation of the PGA?**
Yes

**Many topical drugs have been implicated in causing uveitis, but four are notorious for doing so. What are they?**
- Metipranolol
- Prostaglandin analogues
Uveitis: **Anterior**

Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

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Does it resolve rapidly upon cessation of the PGA? Yes
Uveitis: **Anterior**

- **Granulomatous**
- **Nongranulomatous**

1) The uveitis is profiled
2) The profiled case is meshed
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- **Acute**
  - Unilateral
  - Bilateral
    - TINU
    - Behçet
    - Drug rxn

- **Chronic**

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- **Nongranulomatous**
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      - Drug rxn

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- Systemic
- Topical
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Uveitis: **Anterior**

Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

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- Intravitreal

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Acute Chronic

Uveitis: **Anterior**

Granulomatous

Nongranulomatous

Acute

Chronic

Unilateral

Bilateral

- TINU
- Behçet
- Drug rxn

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Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

- TINU
- Behçet
- Drug rxn

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--Topical
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No; it occurs in only \(~1\%\) of pts

**Is it associated with development of a hypopyon?**

No

**Does it resolve rapidly upon cessation of the PGA?**

Yes
Uveitis: **Anterior**

**Granulomatous**

**Nongranulomatous**

**Acute**

**Chronic**

**Unilateral**

**Bilateral**

- TINU
- Behçet
- Drug rxn

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**

--Systemic
--Topical
--**Intravitreal**

**Many intravitreal drugs have been implicated in causing uveitis, but two are notorious for doing so. What are they?**

--?
--?

**Hints forthcoming…**
Uveitis: **Anterior**

- **Granulomatous**
  - Acute
    - Unilateral
  - Bilateral
    - TINU
    - Behçet
    - Drug rxn
  - Chronic

**Nongranulomatous**

- Acute
  - Unilateral
  - Bilateral
  - TINU
  - Behçet
  - Drug rxn

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**
- Systemic
- Topical
- Intravitreal

**Many intravitreal drugs have been implicated in causing uveitis, but two are notorious for doing so. What are they?**
- Anti-VEGF agents
- ?

we already mentioned this one…
Acute Chronic Uveitis:

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated

Unilateral Bilateral

Granulomatous Nongranulomatous

Acute

Unilateral

Bilateral

- TINU
- Behçet
- Drug rxn

Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
--Systemic
--Topical
--Intravitreal

Many intravitreal drugs have been implicated in causing uveitis, but two are notorious for doing so. What are they?
--Cidofovir
--?
Uveitis: Anterior

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4. Studies are obtained to identify the etiology
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Granulomatous

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Acute

Chronic

Unilateral

Bilateral

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Many intravitreal drugs have been implicated in causing uveitis, but two are notorious for doing so. What are they?
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a category of IVit drugs VERY commonly employed in the US
Uveitis: *Anterior*

- Granulomatous
- Nongranulomatous

Nongranulomatous:
- Acute
- Chronic

Acute:
- Unilateral
- Bilateral
  - TINU
  - Behçet
  - Drug rxn

Chronic:

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**
- Systemic
- Topical
- Intravitreal

**Many intravitreal drugs have been implicated in causing uveitis, but two are notorious for doing so. What are they?**
- Cidofovir
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Unilateral Bilateral

Granulomatous

Nongranulomatous

Acute

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- TINU
- Behçet
- Drug rxn

Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
- Systemic
- Topical
- Intravitreal

What is cidofovir?

Many intravitreal drugs have been implicated in causing uveitis, but two are notorious for doing so.

- Cidofovir
- Anti-VEGF agents

What are they?

Very—it occurs after roughly 25% of injections

No, but it is associated with hypotony, which can, rarely, be severe
**Uveitis: Anterior**

- Granulomatous
- Nongranulomatous

**Acute**
- Unilateral
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  - Drug rxn

**Chronic**

---

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**
- Systemic
- Topical
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**What is cidofovir?**
An antiviral used to treat CMV retinitis in AIDS

**What are they?**
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  - Unilateral
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- Topical
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An antiviral used to treat CMV retinitis in AIDS

**Is anterior uveitis common after intravitreal cidofovir?**
Very—it occurs after roughly 25% of injections

**Is it associated with hypopyon?**
No, but it is associated with hypotony, which can, rarely, be severe

**Many intravitreal agents are notorious for doing so.**
- Cidofovir
- Anti-VEGF agents

**What are they?**
- TINU
- Behçet
- **Drug rxn**
Uveitis: **Anterior**

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**Granulomatous**

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**Acute**

- Unilateral
- Bilateral
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**Chronic**

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Uveitis: **Anterior**

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Unilateral

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- Behçet
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Granulomatous

Nongranulomatous

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- TINU
- Behçet
- Drug rxn
- IBD/PA

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    - Behçet

- **Chronic**

**Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?**

- Systemic
- Topical
- Intravitreal

**Many intravitreal drugs have been implicated in causing uveitis, but two are notorious for doing so. What are they?**

- Cidofovir
- Anti-VEGF agents

**Which anti-VEGF agents have been implicated as causing uveitis?**

- Pretty much all of them: Ranibizumab, bevacizumab and aflibercept (pegaptanib too)

**What is the rate of anterior uveitis after intravitreal?**

- **Ranibizumab:** Between .1% and 1%
- **Bevacizumab:** Same
- **Aflibercept:** Much less data available; what's there suggests the rate is lower than that of ranibizumab and bevacizumab

**Is the uveitis usually mild, or severe?**

- Mild

**Are anti-VEGF agents associated with development of a hypopyon?**

- In rare cases only (and these likely represent contaminants)
Uveitis: **Anterior**

Granulomatous:  
- Unilateral
- Bilateral
  - TINU
  - Behçet

Nongranulomatous:  
- Acute
- Chronic

1) The uveitis is profiled  
2) The profiled case is meshed  
3) A differential diagnosis list is generated  
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4) Studies are obtained to identify the etiology
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Unilateral Bilateral

Granulomatous
Nongranulomatous

Acute

TINU
Behçet

Bilateral

Which anti-VEGF agents have been implicated as causing uveitis?
Pretty much all of them: Ranibizumab, bevacizumab and aflibercept (pegaptanib too)

What is the rate of anterior uveitis after intravitreal:
--Ranibizumab?
--Bevacizumab?
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Many intravitreal drugs have been implicated in causing uveitis.

What are they?
--Cidofovir
--Anti-VEGF agents

Mild
Uveitis: **Anterior**

**Granulomatous**

**Nongranulomatous**

**Acute**

- Unilateral
- Bilateral
  - TINU
  - Behçet

**Chronic**

---

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
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---

Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?

- **Systemic**
- **Topical**
- **Intravitreal**

Many intravitreal drugs have been implicated in causing uveitis. What are they?

- Cidofovir
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What is the rate of anterior uveitis after intravitreal:

- Ranibizumab? Between 0.1% and 1%
- Bevacizumab? Same
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Is the uveitis usually mild, or severe?

Mild

Are anti-VEGF agents associated with development of a hypopyon?

In rare cases only (and these likely represent contaminants)
Uveitis: Anterior

Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

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**Granulomatous**

**Nongranulomatous**

**Acute**

**Chronic**

**Unilateral**

**Bilateral**

- TINU
- Behçet

---Systemic
---Topical
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Uveitis: **Anterior**

- Granulomatous
- Nongranulomatous

**Acute**
- Unilateral
- Bilateral
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Uveitis: **Anterior**

- **Granulomatous**
- **Nongranulomatous**
  - **Acute**
  - **Chronic**
    - **Unilateral**
    - **Bilateral**
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      - Behçet

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Uveitis: **Anterior**

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 Granulomatous  

- Unilateral
- Bilateral

 Nongranulomatous  

- Acute
- Chronic

Many intravitreal drugs have been associated with drug-reaction uveitis:
- Cidofovir
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Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?
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- Topical
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Which anti-VEGF agents have been implicated as causing uveitis?
Pretty much all of them: Ranibizumab, bevacizumab and aflibercept (pegaptanib too)
Acute Chronic Uveitis:

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
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5) Treatment appropriate for the etiology is initiated

Granulomatous

Nongranulomatous

Acute

Chronic

Unilateral

Bilateral

TINU

Behçet

Of the following drug-delivery routes, which have been associated with drug-reaction uveitis?

--Systemic
--Topical
--Intravitreal

Many intravitreal drugs have been implicated in causing uveitis, but two are notorious for doing so.

What are they?

--Cidofovir
--Anti-VEGF agents

What are they?

Pretty much all of them: Ranibizumab, bevacizumab and aflibercept (pegaptanib too)

What anti-VEGF agents have been implicated as causing uveitis?

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Uveitis: **Anterior**

Granulomatous -> Nongranulomatous

Acute -> Chronic

Unilateral -> Bilateral

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Uveitis: Anterior

Granulomatous

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Acute

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Bilateral

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Granulomatous Nongranulomatous

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For more on drug-induced uveitis, see slide-set U29
Uveitis: **Anterior**

- Granulomatous
  - Acute
    - Unilateral
  - Bilateral
    - TINU
    - Behçet
    - Drug rxn
    - Leptospirosis
    - IBD/PA
    - TB

- Nongranulomatous
  - Acute
    - Unilateral
  - Chronic

While leptospirosis can present as an acute bilateral anterior uveitis, it is far more likely to present as a panuveitis, and will be covered as such in the review slides.
Uveitis: Anterior

Granulomatous

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Acute

Chronic

Unilateral

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- IBD/PA
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Uveitis: **Anterior**

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Granulomatous → Nongranulomatous

Acute → Chronic

Unilateral → Bilateral

---

**How common is uveitis in inflammatory bowel disease?**

- Syphilis
- IBD/PA
- TB

---

How common is uveitis in psoriatic arthritis?

Only 2-10% of IBD pts develop anterior uveitis. It is somewhat more common in PA, with a rate as high as 25%.

What nonocular findings are common in psoriatic arthritis?

The name of the condition provides a helpful way to remember these:

-- 'Psoriatic': Pts get a scaly, erythematous rash, along with nail changes
-- 'Arthritis': The classic finding is **sausage digits**—swelling of the distal interphalangeal joints
Uveitis: **Anterior**

- **Granulomatous**
  - Acute Unilateral
  - Chronic Bilateral
- **Nongranulomatous**
  - Unilateral
  - Bilateral

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*How common is uveitis in inflammatory bowel disease?*

Only 2-10% of IBD pts develop anterior uveitis.

- Granulomatous
  - TINU
  - Leptospirosis
  - Behçet
  - Drug rxn
  - Posner-Schlossman
- Nongranulomatous
  - Syphilis
  - IBD/PA
  - TB
Acute Chronic

Uveitis: Anterior

Granulomatous

Nongranulomatous

Acute

Unilateral

Bilateral

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How common is uveitis in inflammatory bowel disease? In psoriatic arthritis (PA)?
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**Uveitis: Anterior**

- **Granulomatous**
- **Nongranulomatous**
  - **Acute**
    - **Unilateral**
    - **Bilateral**
  - **Chronic**

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Uveitis: *Anterior*

Psoriatic arthritis: Skin and nail changes
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What nonocular findings are common in psoriatic arthritis? The name of the condition provides a helpful way to remember these:

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Uveitis: **Anterior**

Psoriatic arthritis: Sausage digits