Unilateral ↑ IOP associated with:

- Intraocular inflammation
- Corneal endothelial abnormality
- Increased episcleral venous pressure
- Secondary glaucoma

We are going to look at unilateral elevated IOP in each of these clinical scenarios
Unilateral \( \uparrow \) IOP associated with:

--Intraocular inflammation

Generally speaking, do you expect an inflamed eye to be **hypertensive**, or **hypotensive**?

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--CCF

--SVC syndrome

--Orbital inflammation

--Cellulitis

--Pseudotumor

--TED

--Secondary glaucoma
Generally speaking, do you expect an inflamed eye to be hypertensive, or hypotensive? Hypotensive
Unilateral \( \uparrow \) IOP associated with:

--Intraocular inflammation

\textbf{Generally speaking, do you expect an inflamed eye to be hypertensive, or hypotensive?}  
\textbf{Hypotensive}

--Corneal endothelial abnormality

--PPMD

--ICE

--Increased episcleral venous pressure

--CCF

--SVC syndrome

--Sturge-Weber

--Orbital inflammation

--Cellulitis

--Pseudotumor

--TED

--Secondary glaucoma


\textbf{Why hypotensive?}
Unilateral ↑ IOP associated with:

--Intraocular inflammation

Generally speaking, do you expect an inflamed eye to be **hypertensive**, or **hypotensive**?

**Hypotensive**

--Corneal endothelial abnormality

Why hypotensive?
Ciliary-body inflammation leads to decreased aqueous production, with subsequent low IOP.

--Secondary glaucoma
Unilateral ↑ IOP associated with:

--Intraocular inflammation

**Generally speaking, do you expect an inflamed eye to be hypertensive, or hypotensive?**

**Hypotensive**

--Ciliary-body inflammation leads to decreased aqueous production, with subsequent low IOP. That said, certain uveitic entities are notorious for elevated IOP, thus rendering it an important clue re the etiology of the inflammation.

--Secondary glaucoma
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  -- A very general condition
  -- A somewhat specific condition
  -- A specific eponymous condition
  -- Another specific eponymous condition

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman
--Corneal endothelial abnormality

Both of these present with unilateral AC cell and ↑ IOP. How does one differentiate between them?

--Increased episcleral venous pressure

--Secondary glaucoma
Both of these present with unilateral AC cell and ↑ IOP. How does one differentiate between them? The severity of the AC reaction is an important clue. In order for a ‘simple’ anterior uveitis to cause ↑ IOP, the inflammatory reaction must be quite severe.
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

Both of these present with unilateral AC cell and ↑ IOP. How does one differentiate between them? The severity of the AC reaction is an important clue. In order for a ‘simple’ anterior uveitis to cause ↑ IOP, the inflammatory reaction must be quite severe. In contrast, the cell associated with trabeculitis can be quite mild.

--Secondary glaucoma
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  ---Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

What etiology should come to mind with this? Herpesvirus infection, especially HSV and VZV
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
    --Trabeculitis
    --Fuchs heterochromic iridocyclitis
    --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

What four anterior uveitis etiologies are notorious for elevating IOP?

1) Herpesvirus (all forms)
2) Toxoplasmosis
3) Sarcoidosis
4) Syphilis

(hints soon forthcoming…)

(Etiologies other than these two, that is)
What four anterior uveitis etiologies are notorious for elevating IOP?
1) this one is a family of infectious agents
2) 
3) 
4) 

Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma
Unilateral ↑ IOP associated with:

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  --Anterior uveitis
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--Corneal endothelial abnormality

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--Secondary glaucoma

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  --Anterior uveitis
    --Trabeculitis
    --Fuchs heterochromic iridocyclitis
    --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

What four anterior uveitis etiologies are notorious for elevating IOP?
1) Herpesvirus (all forms)
2) this one is a specific bug
3)
4)
Unilateral ↑ IOP associated with:

- Intraocular inflammation
  - Anterior uveitis
    - Trabeculitis
    - Fuchs heterochromic iridocyclitis
    - Posner-Schlossman
- Corneal endothelial abnormality
- Increased episcleral venous pressure

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3) 
4)
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- Intraocular inflammation
  - Anterior uveitis
    - Trabeculitis
    - Fuchs heterochromic iridocyclitis
    - Posner-Schlossman
  - Corneal endothelial abnormality
- Increased episcleral venous pressure
- Secondary glaucoma

What four anterior uveitis etiologies are notorious for elevating IOP?
1) Herpesvirus (all forms)
2) Toxoplasmosis
3) this one is a common noninfectious entity
4)
Unilateral ↑ IOP associated with:

- Intraocular inflammation
  - Anterior uveitis
    - Trabeculitis
    - Fuchs heterochromic iridocyclitis
    - Posner-Schlossman
  - Corneal endothelial abnormality

- Increased episcleral venous pressure

- Secondary glaucoma

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2) Toxoplasmosis
3) Sarcoidosis
4)
Unilateral ↑ IOP associated with:

- Intraocular inflammation
  - Anterior uveitis
    - Trabeculitis
    - Fuchs heterochromic iridocyclitis
    - Posner-Schlossman
  - Corneal endothelial abnormality
- Increased episcleral venous pressure
- Secondary glaucoma

**What four anterior uveitis etiologies are notorious for elevating IOP?**

1. Herpesvirus (all forms)
2. Toxoplasmosis
3. Sarcoidosis
4. *this one is another specific bug*
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

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What four anterior uveitis etiologies are notorious for elevating IOP?
1) Herpesvirus (all forms)
2) Toxoplasmosis
3) Sarcoidosis
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Which of these can present with granulomatous-appearing KP?
All of them

Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
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--Increased episcleral venous pressure

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    - Trabeculitis
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    - Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

What four anterior uveitis etiologies are notorious for elevating IOP?
1) Herpesvirus (all forms)
2) Toxoplasmosis
3) Sarcoidosis
4) Syphilis

Which can present with stellate KP?
All but sarcoid (and don’t forget about FHI)
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

What four anterior uveitis etiologies are notorious for elevating IOP?

1) Herpesvirus (all forms)
2) Toxoplamosis
3) Syphilis
4) Sarcoidosis

Which can present with stellate KP?
All but sarcoid (and don’t forget about FHI)

FHI causes stellate KP too
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

What is the usual treatment regimen for anterior uveitis accompanied by increased IOP?

--Topical steroids
--Cycloplegia
--Anti-infectives if bug is known
--/+ ocular hypotensives
Unilateral ↑ IOP associated with:

- Intraocular inflammation
  - Anterior uveitis
  - Trabeculitis
  - Fuchs heterochromic iridocyclitis
  - Posner-Schlossman
- Corneal endothelial abnormality
- PPMD
- ICE
- Increased episcleral venous pressure
- CCF
- SVC syndrome
- Sturge-Weber
- Orbital inflammation

What is the usual treatment regimen for anterior uveitis accompanied by increased IOP?

- Topical steroids
- Cycloplegia
- Anti-infectives if bug is known
- +/- ocular hypotensives

Unilateral ↑ IOP associated with:

- Secondary glaucoma
--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

--- What is the usual treatment regimen for anterior uveitis accompanied by increased IOP?
  --Topical steroids
  --Cycloplegia
  --Anti-infectives if bug is known
  -- +/- ocular hypotensives

--- What two classes of topical hypotensives should probably be avoided?
  --Miotics
  --Prostaglandin analogues/prostamides

--- Both are potentially inflammogenic
Unilateral ↑ IOP associated with:

--- Intraocular inflammation
  -- Anterior uveitis
  -- Trabeculitis
  -- Fuchs heterochromic iridocyclitis
  -- Posner-Schlossman

--- Corneal endothelial abnormality

--- Increased episcleral venous pressure

--- Secondary glaucoma

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--- Topical steroids
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--- Anti-infectives if bug is known
--- +/- ocular hypotensives

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Unilateral ↑ IOP associated with:
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

**What is the usual treatment regimen for anterior uveitis accompanied by increased IOP?**

--Topical steroids
--Cycloplegia
--Anti-infectives if bug is known
--+/− ocular hypotensives

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--Prostaglandin analogues

**Why should these be avoided?**

Both are potentially inflammogenic
Unilateral ↑ IOP associated with:

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--Secondary glaucoma

What is the usual treatment regimen for anterior uveitis accompanied by increased IOP?

--Topical steroids
--Cycloplegia
--Anti-infectives if bug is known
--/+/- ocular hypotensives

In what way might steroid therapy complicate the IOP issue?

Recall that some pts are steroid responders, meaning their IOP increases secondary to steroid therapy. Thus, when a uveitis pt (under treatment) develops increased IOP, it could mean either:

a) their uveitis is not well controlled, and therefore the steroid should be increased;

b) they are a steroid responder, and their steroid should be decreased (or stopped).
Unilateral \( \uparrow \) IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman
  --Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

What is the usual treatment regimen for anterior uveitis accompanied by increased IOP?

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a)

b)
Unilateral ↑ IOP associated with:

--- Intraocular inflammation

-- Anterior uveitis
-- Trabeculitis
-- Fuchs heterochromic iridocyclitis
-- Posner-Schlossman

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--- Increased episcleral venous pressure

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What is the usual treatment regimen for anterior uveitis accompanied by increased IOP?

-- Topical steroids
-- Cycloplegia
-- Anti-infectives if bug is known
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a) their uveitis is not well controlled, and therefore the steroid should be increased; or
b)
Unilateral \( \uparrow \) IOP associated with:

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  - Anterior uveitis
  - Trabeculitis
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- Increased episcleral venous pressure

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- Intraocular inflammation
  - Anterior uveitis
  - Trabeculitis
  - Fuchs heterochromic iridocyclitis
  - Posner-Schlossman

- Corneal endothelial abnormality

- Increased episcleral venous pressure

- CCF

- SVC syndrome

- Sturge-Weber

- Orbital inflammation
  - Cellulitis
  - Pseudotumor
  - TED

- Secondary glaucoma

---

**What is the usual treatment regimen for anterior uveitis accompanied by increased IOP?**

- **Topical steroids**
- Cycloplegia
- Anti-infectives if bug is known
- +/- ocular hypotensives

---

**In what way might steroid therapy complicate the IOP issue?**

Recall that some pts are **steroid responders**, meaning their IOP increases secondary to steroid therapy. Thus, when a uveitis pt (under treatment) develops increased IOP, it could mean either:

a) their uveitis is not well controlled, and therefore the steroid should be **increased**; or

b) they are a steroid responder, and their steroid should be **decreased** (or even stopped).

---

**So how do you know whether steroids are the solution to, or the cause of, ocular hypertension in uveitis?**

As a rule, it takes at least 3 weeks before steroid-induced ocular hypertension occurs. Thus, elevated IOP within this time frame indicates inadequate uveitis control, and the steroid dose should be increased. On the other hand, if IOP spikes after the uveitis is controlled, consideration should be given to tapering the steroid and/or adding an aqueous suppressant to the treatment regimen.
Unilateral ↑ IOP associated with:

- Intraocular inflammation
  - Anterior uveitis
  - Trabeculitis
  - Fuchs heterochromic iridocyclitis
  - Posner-Schlossman
- Corneal endothelial abnormality
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- Cycloplegia
- Anti-infectives if bug is known
- +/- ocular hypotensives

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a) their uveitis is not well controlled, and therefore the steroid should be increased; or

b) they are a steroid responder, and their steroid should be decreased (or even stopped)

---

So how do you know whether steroids are the solution to, or the cause of, ocular hypertension in uveitis?

As a rule, it takes at least 2 weeks before steroid-induced ocular hypertension occurs. Thus, elevated IOP within this time frame indicates inadequate uveitis control, and the steroid dose should be increased.
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

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  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)

Heterochromia iridis, cataract, and stellate KP

How common is glaucoma in FHI?
It develops in about 25-50% of cases

What is the etiology?
Unknown. Some experts think it’s infectious (various viruses as well as toxoplasmosis have been proposed as the inciting agent), but this has yet to be proven

Who is the typical pt?
A middle-aged adult

Is there a gender predilection?
No
Unilateral ↑ IOP associated with:

- Intraocular inflammation
  - Anterior uveitis
  - Trabeculitis
  - **Fuchs heterochromic iridocyclitis**
  - Posner-Schlossman
- Corneal endothelial abnormality

*What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)*

Heterochromia iridis, cataract, and stellate KP

- Increased episcleral venous pressure
- CCF
- SVC syndrome
- Sturge-Weber
- Orbital inflammation
- Cellulitis
- Pseudotumor
- TED

- Secondary glaucoma
  - Lens-related: Phacolytic, phacomorphic
- PXS
- PDS
Unilateral ↑ IOP associated with:

FHI: Heterochromia
Unilateral ↑ IOP associated with:

FHI: Note the cataract
Unilateral ↑ IOP associated with:

FHI: Stellate KP
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --**Fuchs heterochromic iridocyclitis**
  --Posner-Schlossman

--Corneal endothelial abnormality

What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)

**Heterochromia iridis**, cataract, and stellate KP

Is the affected eye the **darker** eye or the **lighter** eye?
Unilateral ↑ IOP associated with:

- Intraocular inflammation
  - Anterior uveitis
  - Trabeculitis
  - Fuchs heterochromic iridocyclitis
  - Posner-Schlossman

- Corneal endothelial abnormality

What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)

**Heterochromia iridis**, cataract, and stellate KP

Is the affected eye the **darker** eye or the **lighter** eye?

The lighter (with one exception)
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  **Fuchs heterochromic iridocyclitis**
  --Posner-Schlossman

--Corneal endothelial abnormality

*What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)*

**Heterochromia iridis**, cataract, and stellate KP

*Is the affected eye the darker eye or the lighter eye?*

**The lighter (with one exception)**

*What is the exception; ie, under what circumstances is the darker eye the one with FHI?*

*In individuals with light-blue eyes…*
Unilateral ↑ IOP associated with:

--Intraocular inflammation
   --Anterior uveitis
   --Trabeculitis
   --**Fuchs heterochromic iridocyclitis**
   --Posner-Schlossman

--Corneal endothelial abnormality

*What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)*

**Heterochromia iridis**, cataract, and stellate KP

*Is the affected eye the darker eye or the lighter eye?*

The lighter (with one exception)

*What is the exception; ie, under what circumstances is the darker eye the one with FHI?*

In individuals with light-blue eyes…the iris atrophy stemming from the FHI process will make visible the darkly-pigmented epithelium of the posterior iris, thus making the eye appear darker
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --**Fuchs heterochromic iridocyclitis**
  --Posner-Schlossman

--Corneal endothelial abnormality

*What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)*

**Heterochromia iridis**, cataract, and stellate KP

**In addition to heterochromia, the atrophic changes give the iris an appearance that has been likened to damage caused by an insect. What is the two-word description for this appearance?**

*The iris atrophy stemming from the FHI process*

*What is the exception; ie, under what circumstances is the darker eye the one with FHI?*

In individuals with light-blue eyes, the **iris atrophy stemming from the FHI process** will make visible the darkly-pigmented epithelium of the posterior iris, thus making the eye appear darker.
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --**Fuchs heterochromic iridocyclitis**
  --Posner-Schlossman

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*What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)*
**Heterochromia iridis**, cataract, and stellate KP

*In addition to heterochromia, the atrophic changes give the iris an appearance that has been likened to damage caused by an insect. What is the two-word description for this appearance? ‘Moth eaten’*

*Is the iris atrophy stemming from the FHI process*

*What is the exception; i.e., under what circumstances is the darker eye the one with FHI? In individuals with light-blue eyes the iris atrophy stemming from the FHI process will make visible the darkly-pigmented epithelium of the posterior iris, thus making the eye appear darker*
Unilateral ↑ IOP associated with:

FHI: ‘Moth eaten’ iris. Note the smooth stromal architecture and loss of iris crypts
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --**Fuchs heterochromic iridocyclitis**
  --Posner-Schlossman

--Corneal endothelial abnormality

**What exam findings comprise the ‘classic triad’ of FHI?** (Hint: Elevated IOP is not one of them.)

Heterochromia iridis, cataract, and **stellate KP**

*The KP in FHI have a couple of other notable characteristics—what are they?*

--

--
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)
Heterochromia iridis, cataract, and stellate KP

The KP in FHI have a couple of other notable characteristics—what are they?
--They may be interconnected by lines described as ‘lacy tendrils’
--They are diffusely scattered (as opposed to being concentrated in Arlt’s triangle, as they tend to be in most anterior uveitides)
Unilateral ↑ IOP associated with:

-- Intraocular inflammation
  -- Anterior uveitis
  -- Trabeculitis
  -- **Fuchs heterochromic iridocyclitis**
  -- Posner-Schlossman

-- Corneal endothelial abnormality

What exam findings comprise the 'classic triad' of FHI? (Hint: Elevated IOP is not one of them.)

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The KP in FHI have a couple of other notable characteristics—what are they?
--They may be interconnected by lines described as 'lacy tendrils'
--They are diffusely scattered (as opposed to being concentrated in Arlt's triangle, as is the case in most anterior uveitides)
Unilateral ↑ IOP associated with:

FHI: Stellate KP. Note the diffuse distribution
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --**Fuchs heterochromic iridocyclitis**
  --Posner-Schlossman

--Corneal endothelial abnormality

What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)
Heterochromia iridis, cataract, and **stellate KP**

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Where/what is Arlt’s triangle?
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
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The KP in FHI have a couple of other notable characteristics—what are they?
--They may be interconnected by lines described as ‘lacy tendrils’
--They are diffusely scattered (as opposed to being concentrated in **Arlt’s triangle**, as is the case in most anterior uveitides)

Where/what is Arlt’s triangle?
It’s an equilateral triangle with its apex at the corneal center and base near the inferior border of the cornea
Unilateral ↑ IOP associated with:

KP (in sarcoidosis) concentrated in Arlt’s triangle
Unilateral ↑ IOP associated with:

--- Intraocular inflammation
  -- Anterior uveitis
  -- Trabeculitis
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What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)
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How common is glaucoma in FHI?
Unilateral ↑ IOP associated with:

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What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)
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How common is glaucoma in FHI?
It develops in about 25-50% of cases
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Is the angle in FHI glaucoma open, or is it closed?
Unilateral ↑ IOP associated with:

--Intraocular inflammation
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Open
Unilateral ↑ IOP associated with:

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Speaking of the angle in FHI...It has two characteristics that are unusual, and may aid in making the diagnosis:
--Despite the chronic nature of the iridocyclitis in FHI, **three words (and an abb.)** never develop
Unilateral ↑ IOP associated with:

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- Despite the chronic nature of the iridocyclitis in FHI, **peripheral anterior synechiae (PAS)** never develop
- **Neovascularization of the angle (NVA)** is common, but does not lead to angle closure
Fuchs heterochromic iridocyclitis. Fine vessels (arrows) are seen crossing the TM. This NVA is not accompanied by a fibrovascular membrane and does not result in PAS formation and subsequent secondary angle closure.
Unilateral ↑ IOP associated with:

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The NVA vessels in FHI rupture easily, and it not uncommon for FHI pts to develop a small hyphema after the paracentesis wound is made at the start of cataract surgery. What is the eponymous name for this classic finding?
Unilateral ↑ IOP associated with:

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**Amsler’s sign**
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What is the eponymous name for this classic finding? **Amsler’s sign**

Is Amsler’s sign pathognomonic for FHI?
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Can other clinical maneuvers cause these vessels to bleed?
Yes—hyphema in FHI can occur subsequent to gonioscopy, and even after applanation tonometry

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*Who is the typical pt?*
Intraocular inflammation

- Anterior uveitis
- Trabeculitis
- **Fuchs heterochromic iridocyclitis**
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Who is the typical pt?
A middle-aged adult
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Is there a gender predilection?
Unilateral ↑ IOP associated with:

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**What exam findings comprise the ‘classic triad’ of FHI? (Hint: Elevated IOP is not one of them.)**
Heterochromia iridis, cataract, and stellate KP

**How well does FHI respond to steroid therapy?**

- Rather poorly--AC cell is notoriously difficult to eradicate in FHI (as is the vitreous cell which frequently occurs)
- If the inflammation fails to respond to topical steroids, should more aggressive therapies be pursued? Generally no. In fact, most pts require no anti-inflammatory tx of any sort (including steroids). Instead, the pt should be monitored for the development of glaucoma (first-line treatment: aqueous suppressants) and cataract, which should be removed when visually or medically significant. In rare cases, vitrectomy is required to clear significant vitreous opacities.

**Who is the typical pt?**
A middle-aged adult

**Is there a gender predilection?**
No

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Is there a gender predilection?

No

Is cataract surgery in FHI associated with an increased risk of intraoperative complications?

No
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Heterochromia iridis, cataract, and stellate KP

**How well does FHI respond to steroid therapy?**

Rather poorly--AC cell is notoriously difficult to eradicate in FHI (as is the vitreous cell which frequently occurs)

**If the inflammation fails to respond to topical steroids, should more aggressive therapies be pursued?**

Generally no. In fact, most pts require no anti-inflammatory tx of any sort (including steroids). Instead, the pt should be monitored for the development of glaucoma (first-line treatment: aqueous suppressants) and **cataract, which should be removed when visually or medically significant**. In rare cases, vitrectomy is required to clear significant vitreous opacities.

**A middle-aged adult**

**Is there a gender predilection?**

No

**Is cataract surgery in FHI associated with an increased risk of intraoperative complications?**

No
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma
  --Lens-related: Phacolytic, phacomorphic

---What is the noneponymous name for Posner-Schlossman?

---Increased episcleral venous pressure

---Secondary glaucoma
  --Lens-related: Phacolytic, phacomorphic
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--SVC syndrome

--Sturge-Weber

--Orbital inflammation

-What is the noneponymous name for Posner-Schlossman?
  Glaucomatocyclitic crisis

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--Increased episcleral venous pressure

Who is the typical pt?

--Secondary glaucoma
Unilateral ↑ IOP associated with:

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  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
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--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

**What is the noneponymous name for Posner-Schlossman?**
Glaucomatocyclitic crisis

**Who is the typical pt?**
An adult age 20-50
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
-What is the noneponymous name for Posner-Schlossman?
  Glaucomatocyclitic crisis

--Increased episcleral venous pressure
Who is the typical pt?
  An adult age 20-50

  Does the inflammatory component tend to be mild, or severe?

--Secondary glaucoma
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  --Anterior uveitis
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--Corneal endothelial abnormality

--Increased episcleral venous pressure
  --ICE
  --CCF
  --SVC syndrome

--Orbital inflammation

--Cellulitis
--Pseudotumor

--TED

--Secondary glaucoma

1. What is the noneponymous name for Posner-Schlossman?
   - Glaucomatocyclitic crisis

2. Who is the typical pt?
   - An adult age 20-50

3. Does the inflammatory component tend to be mild, or severe?
   - Mild
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

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    Glaucomatocyclitic crisis

--Increased episcleral venous pressure
  Who is the typical pt?
  An adult age 20-50
  Does the inflammatory component tend to be mild, or severe?
    Mild
  Does the IOP elevation tend to be mild, or severe?
Unilateral ↑ IOP associated with:

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  --CCL
  --SVC syndrome

--Orbital inflammation
  --cellulitis
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--Increased episcleral venous pressure

---Secondary glaucoma

*Who is the typical pt?*
An adult age 20-50

*Does the inflammatory component tend to be mild, or severe?*
Mild

*Does the IOP elevation tend to be mild, or severe?*
Severe

*How severe?*
IOP in the 40-60 range is typical
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
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Who is the typical pt?
An adult age 20-50

Does the inflammatory component tend to be mild, or severe?
Mild

Does the IOP elevation tend to be mild, or severe?
Severe

--Secondary glaucoma

Is the angle open, or closed?
Unilateral ↑ IOP associated with:

--Intraocular inflammation
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  --Trabeculitis
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**Does the IOP elevation tend to be mild, or severe?**
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**Is the angle open, or closed?**
Open
Unilateral ↑ IOP associated with:

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An adult age 20-50

Does the inflammatory component tend to be mild, or severe?
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Does the IOP elevation tend to be mild, or severe?
Severe

Is the angle open, or closed?
Open

How long do the crises last?
Yes
Unilateral ↑ IOP associated with:

--Intraocular inflammation
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--Increased episcleral venous pressure
  --**CCF**
  --**SVC syndrome**

--Orbital inflammation
  --cellulitis
  --pseudotumor
  --**TED**

--Secondary glaucoma

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  Glaucomatocyclitic crisis

---Who is the typical pt?
  An adult age 20-50

---Does the inflammatory component tend to be mild, or severe?
  Mild

---Does the IOP elevation tend to be mild, or severe?
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---Is the angle open, or closed?
  Open

---How long do the crises last?
  Hours to weeks
### Unilateral ↑ IOP associated with:

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- Anterior uveitis
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- Fuchs heterochromic iridocyclitis
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--- **Corneal endothelial abnormality**
- What is the noneponymous name for Posner-Schlossman?
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--- **Increased episcleral venous pressure**
- Who is the typical pt?
  - An adult age 20-50

- Does the inflammatory component tend to be mild, or severe?
  - Mild

- Does the IOP elevation tend to be mild, or severe?
  - Severe

--- **Secondary glaucoma**
- Is the angle open, or closed?
  - Open

- How long do the crises last?
  - Hours to weeks

- Do they recur?

---
Unilateral ↑ IOP associated with:

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  --Anterior uveitis
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**What is the noneponymous name for Posner-Schlossman?**
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An adult age 20-50

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Mild

**Does the IOP elevation tend to be mild, or severe?**
Severe

**Is the angle open, or closed?**
Open

**How long do the crises last?**
Hours to weeks

**Do they recur?**
Yes
Unilateral ↑ IOP associated with:

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  ---Anterior uveitis
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  An adult age 20-50

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---Does the IOP elevation tend to be mild, or severe?
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---How long do the crises last?
  Hours to weeks

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  Yes
Unilateral $\uparrow$ IOP associated with:

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--Anterior uveitis
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--Posner-Schlossman

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

**What is/are the noneponymous name for Posner-Schlossman?**
Glucomatocyclitic crisis

**Who is the typical pt?**
An adult age 20-50

**Does the inflammatory component tend to be mild, or severe?**
Mild

**Does the IOP elevation tend to be mild, or severe?**
Severe

**Is the angle open, or closed?**
Open

**How long do the crises last?**
Hours to weeks

**Do they recur?**
Yes

Unilateral pain, blurred vision, haloes around lights
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --**Posner-Schlossman**

--Corneal endothelial abnormality

--Increased episcleral venous pressure

--Secondary glaucoma

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---Who is the typical pt?
An adult age 20-50

---Does the inflammatory component tend to be mild, or severe?
Mild

---Does the IOP elevation tend to be mild, or severe?
Severe

---Is the angle open, or closed?
Open

---How long do the crises last?
Hours to weeks

---Do they recur?
Yes

---What is/are the presenting complaint(s)?
Unilateral pain, **blurred vision, haloes around lights**

---What is the cause of the blurred vision/haloes?
Corneal edema secondary to the high IOP
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
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---Does the IOP elevation tend to be mild, or severe?
  Severe

---Is the angle open, or closed?
  Open

---How long do the crises last?
  Hours to weeks

---Do they recur?
  Yes

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--Increased episcleral venous pressure
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  --SVC syndrome

--Orbital inflammation
  --cellulitis
  --pseudotumor
  --TED

--Secondary glaucoma

**What is the noneponymous name for Posner-Schlossman?**
Glaucomatocyclitic crisis

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**Does the inflammatory component tend to be mild, or severe?**
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**Does the IOP elevation tend to be mild, or severe?**
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**Is the angle open, or closed?**
Open

**How long do the crises last?**
Hours to weeks

**Do they recur?**
Yes
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --**Posner-Schlossman**

--Corneal endothelial abnormality
  -What is the noneponymous name for Posner-Schlossman?
    Glaucomatocyclitic crisis

Infection with what entity has been implicated in the pathogenesis of P-S syndrome?
**CMV**, a member of the **Herpesvirus** family

- Does the inflammatory component tend to be mild, or severe?
  Mild

- Does the IOP elevation tend to be mild, or severe?
  Severe

- Is the angle open, or closed?
  Open

- How long do the crises last?
  Hours to weeks

- Do they recur?
  Yes
Unilateral ↑ IOP associated with:

- Intraocular inflammation
  - Anterior uveitis
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  - Posner-Schlossman

- Corneal endothelial abnormality
  - Unilateral ↑ IOP associated with:
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        - CMV, a member of the Herpesvirus family

- Secondary glaucoma
  - Does the inflammatory component tend to be mild, or severe?
    - Mild
  - Does the IOP elevation tend to be mild, or severe?
    - Severe
  - Is the angle open, or closed?
    - Open
  - How long do the crises last?
    - Hours to weeks
  - Do they recur?
    - Yes

- What four anterior uveitis etiologies are notorious for elevating IOP?
  - 1) Herpesvirus (all forms)
  - 2) Toxoplasmosis
  - 3) Sarcoidosis
  - 4) Syphilis
Unilateral $\uparrow$ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --a dystrophy
  --several syndromes

- Increased episcleral venous pressure

--Secondary glaucoma
Unilateral ↑ IOP associated with:

--- Intraocular inflammation
   --- Anterior uveitis
   --- Trabeculitis
   --- Fuchs heterochromic iridocyclitis
   --- Posner-Schlossman

--- Corneal endothelial abnormality
   --- PPMD (posterior polymorphous dystrophy)
   --- ICE (iridocorneal endothelial syndrome)

- Increased episcleral venous pressure

--- Secondary glaucoma
Unilateral ↑ IOP associated with:

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  --Anterior uveitis
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--Corneal endothelial abnormality
  --PPMD

In a nutshell, what is abnormal about the endothelial cells in PPMD?

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--Corneal endothelial abnormality
  --PPMD

In a nutshell, what is abnormal about the endothelial cells in PPMD?
They ‘behave’ like epithelial cells and/or fibroblasts.

--Increased episcleral venous pressure
--CCF
--SVC syndrome

--Orbital inflammation
  --cellulitis
  --pseudotumor
  --TED

--Secondary glaucoma

In the majority of pts, PPMD is a stable, painless and visually insignificant condition. However, severe cases can be associated with glaucoma, stromal edema, and significant vision loss.
Intraocular inflammation
- Anterior uveitis
- Trabeculitis
- Fuchs heterochromic iridocyclitis
- Posner-Schlossman

Corneal endothelial abnormality
- PPMD

Unilateral ↑ IOP associated with:

In a nutshell, what is abnormal about the endothelial cells in PPMD? They ‘behave’ like epithelial cells and/or fibroblasts. Specifically and problematically, the endothelial cells proliferate, form multiple layers, and migrate—none of which normal endothelial cells do.

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Unilateral ↑ IOP associated with:

**Normal cornea.** Note the single-cell-thick nature of the endothelial cells.
Unilateral ↑ IOP associated with:

**Normal cornea.** Note the single-cell-thick nature of the endothelial cells.

**Posterior polymorphous corneal dystrophy.** Instead of being lined by cells with the attributes of corneal endothelium, the posterior cornea is covered by cells with *epithelial/fibroblast-like* features.
Unilateral ↑ IOP associated with:

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PPMD presents with three posterior-K slit-lamp findings. What are they?

--

--

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  - TED
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**PPMD presents with three posterior-K slit-lamp findings. What are they?**
- Linear band-shaped opacities
- Vesicular lesions
- Diffuse opacities

In the majority of pts, PPMD is a stable, painless and visually insignificant condition. However, severe cases can be associated with glaucoma, stromal edema, and significant vision loss.
Unilateral ↑ IOP associated with:

- Diffuse opacities
- Linear band-shaped opacities
- Vesicular lesions

PPMD
Unilateral ↑ IOP associated with:

- Intraocular inflammation
  - Anterior uveitis
  - Trabeculitis
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  - Posner-Schlossman

- Corneal endothelial abnormality
  - PPMD

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Hol up—as a dystrophy, PPMD must by definition be bilateral, yes?

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associated with glaucoma
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Corneal endothelial abnormality
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Given this, how can it cause **unilateral** IOP elevation?

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Given this, how can it cause **unilateral IOP elevation**? Because it can be highly asymmetric.

Is PPMD painful? Does it affect vision?
In the majority of pts, PPMD is a stable, painless and visually insignificant condition. However, severe cases can be associated with glaucoma, stromal edema, and significant vision loss.

---

**Unilateral ↑ IOP associated with:**

- Intraocular inflammation
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  - Trabeculitis
  - Fuchs heterochromic iridocyclitis
  - Posner-Schlossman
- Corneal endothelial abnormality
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- CCF
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- Sturge-Weber
- Orbital inflammation
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Increased episcleral venous pressure

Briefly, what is ICE?

Demographically speaking, who is the typical patient?
A young-to-middle-aged adult female

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Increased episcleral venous pressure

_Briefly, what is ICE?_
A progressive, nonfamilial, unilateral disorder characterized by abnormalities of the corneal endothelium and iris, as well as PAS formation
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The BCSC books recognize three ICE variants—what are they?
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Increased episcleral venous pressure

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What is the classic metal-related description of the endothelium?

[Description: 'Hammered silver']

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One variant is less likely than the others to manifest elevated IOP—which one?

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Unilateral ↑ IOP associated with:

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---Unilateral ↑ IOP associated with:

**The BCSC books recognize three ICE variants**—what are they? *All have three findings in common*—what are they? *Each has a predominant finding*—what is it?

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How common is glaucoma in each?
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How common is glaucoma in each?

--ICE: Very common—80 to 100% of cases
--PPMD: Not that common—25% of cases

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What is the take-home message regarding PPMD/ICE and unilateral elevated IOP?

--ICE: Angle closure via PAS and/or a membrane
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What is the take-home message regarding PPMD/ICE and unilateral elevated IOP?

It is incumbent upon you to do a thorough slit-lamp examination of the posterior corneal surface in all pts with unilateral elevated IOP!
Unilateral \text{↑} IOP associated with:

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For more on PPMD, see slide-set K45
For more ICE, see slide-set K26
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Recall that the Goldmann equation for IOP contains two terms:
--The first term…

--Secondary glaucoma

$IOP = \text{First term} + \text{Second term}$
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
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--Increased episcleral venous pressure

Recall that the Goldmann equation for IOP contains two terms:
--The first term...quantifies the balance between aqueous formation and aqueous egress

--Secondary glaucoma

\[ IOP = \frac{\text{Aqueous Formation Rate (µL/min)}}{\text{Outflow Facility (µL/min/mmHg)}} + \text{EVP} \]
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Recall that the Goldmann equation for IOP contains two terms:
--The first term…quantifies the balance between aqueous formation and aqueous egress
--The second term in the equation is…

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\[
IOP = \frac{\text{Aqueous Formation Rate (µL/min)}}{\text{Outflow Facility (µL/min/mmHg)}} + \text{Episcleral Venous Pressure (mmHg)}
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Recall that the Goldmann equation for IOP contains two terms:
--The first term...quantifies the balance between aqueous formation and aqueous egress
--The second term in the equation is...EVP.
Thus, any ocular and/or systemic conditions that lead to a persistent increase in EVP can produce a persistent elevation in IOP and thus glaucoma. And if this condition affects only one eye, it can produce unilateral elevated IOP.

--Secondary glaucoma

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-- Increased episcleral venous pressure
  -- a specific intracranial problem
  -- a general intrathoracic problem
  -- a phakomatosis
  -- a very general ophthalmic problem

-- Secondary glaucoma

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  --Anterior uveitis
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  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF (carotid-cavernous sinus fistula)
  --SVC syndrome (SVC = superior vena cava)
  --Sturge-Weber
  --Orbital inflammation

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IOP = \frac{\text{Aqueous Formation Rate (µL/min)}}{\text{Outflow Facility (µL/min/mmHg)}} + \text{Episcleral Venous Pressure (mmHg)}
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What is the fundamental anatomical abnormality in CCF?

A channel forms that allows direct communication between the carotid artery (or one of its dural branches) and the cavernous sinus (CS).

What important effect does this have on the CS?

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When the blood pressure within the CS exceeds that of the venous structures that drain into it (including the superior ophthalmic vein), venous drainage is impeded. Retrograde transmission of this impedance ultimately results in increased EVP, which results in turn in elevated IOP.

What two classes of mechanism account for the formation of CCF?

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Demographically speaking, who gets:
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Demographically speaking, who gets:
-- Traumatic CCF? Young persons
-- Spontaneous CCF? Middle-aged to elderly females

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A dilated and tortuous superior ophthalmic vein.

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Unilateral ↑ IOP associated with:

Carotid cavernous fistula in a 20-year-old man s/p motor vehicle collision. CT angiography shows asymmetric enlargement of the left cavernous sinus (arrowheads) and left superior ophthalmic vein (arrow).
Unilateral ↑ IOP associated with:

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What two classes of mechanism account for the formation of CCF?

They can be traumatic or spontaneous.

In addition to unilateral increased IOP, what other signs/symptoms are commonly associated with a CCF?

- A chronically red eye (beware of the little old lady with 'chronic conjunctivitis' that never seems to get any better!)
- Chemosis
- Proptosis (in high-flow CCF)
- Tinnitus

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A 55 year old woman with a history of HTN presented with a 1-day history of periorbital discomfort, inferior chemosis, and conjunctival injection of the left eye (Panel A). IOP OS was 48. Exam OD was unremarkable. She reported a 2-year history of episodic headache and pulsatile tinnitus in the left ear. Contrast-enhanced computed tomography of the orbit showed proptosis and a dilated left superior ophthalmic vein (Panel B, arrow), suggesting the presence of a carotid–cavernous sinus fistula.
Unilateral \( \uparrow \) IOP associated with:

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What slit-lamp finding concerning the appearance of the conj vessels is a tipoff that you’re dealing with a CCF?

The vessels have a kinked or ‘corkscrew’ appearance.

What causes this corkscrewing?

Arterialization of blood flow in the vessels (think about how a garden hose will twist and kink when the water is turned on but is held in by a closed nozzle on the end of the hose).

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The normal pressure within the CS is about the same as central venous pressure (CVP; ~9-12 mmHg). When a CCF forms, arterial-pressure blood enters the CS. Thus, a CCF can raise pressure within the CS to as high as mean arterial pressure (MAP).

How does a CCF lead to unilateral increased IOP?
When the blood pressure within the CS exceeds that of the venous structures that drain into it (including the superior ophthalmic vein), venous drainage is impeded. Retrograde transmission of this impedance ultimately results in increased EVP, which results in turn in elevated IOP.

What two classes of mechanism account for the formation of CCF?
They can be traumatic or spontaneous.

In addition to unilateral increased IOP, what other signs/symptoms are commonly associated with a CCF?
--A chronically red eye (beware of the little old lady with ‘chronic conjunctivitis’ that never seems to get any better!)

What slit-lamp finding concerning the appearance of the conj vessels is a tipoff that you’re dealing with a CCF?
The vessels have a kinked or ‘corkscrew’ appearance.

What causes this corkscrewing?
Arterialization of blood flow in the vessels (think about how a garden hose will twist and kink when the water is turned on but is held in by a closed nozzle on the end of the hose).

IOP = \[
\frac{\text{Aqueous Formation Rate (µL/min)}}{\text{Outflow Facility (µL/min/mmHg)}} + \text{Episcleral Venous Pressure (mmHg)}
\]
Unilateral ↑ IOP associated with:

Corkscrewing of conj vessels 2ndry to CCF
Unilateral ↑ IOP associated with:

- Intraocular inflammation
  - Anterior uveitis
  - Trabeculitis
  - Fuchs heterochromic iridocyclitis
  - Posner-Schlossman
  - Corneal endothelial abnormality
  - PPMD
  - ICE
  - Increased episcleral venous pressure
  - CCF
  - SVC syndrome
  - Sturge-Weber

- Orbital inflammation

What is the fundamental anatomical abnormality in CCF?
A channel forms that allows direct communication between the carotid artery (or one of its dural branches) and the cavernous sinus (CS).

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- Chemosis
- Proptosis (in high-flow CCF)
- Tinnitus

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  --ICE
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--Sturge-Weber
--Orbital inflammation
  --cellulitis
  --pseudotumor
  --TED
--Secondary glaucoma

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A bruit

How should one check for a bruit in cases of suspected CCF?
By auscultating the globe (through closed lids of course), and at the temporal region.

What is the formula for IOP?
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IOP = Aqueous Formation Rate (µL/min) + Episcleral Venous Pressure (mmHg)
### Unilateral ↑ IOP associated with:

- **Intraocular inflammation**
  - Anterior uveitis
  - Trabeculitis
  - Fuchs heterochromic iridocyclitis
  - Posner-Schlossman

- **Corneal endothelial abnormality**
  - PPMD
  - ICE

- **Increased episcleral venous pressure**
  - CCF
  - SVC syndrome
  - Sturge-Weber
  - Orbital inflammation

- **Secondary glaucoma**

\[
\text{IOP} = \frac{\text{Aqueous Formation Rate (µL/min)}}{\text{Outflow Facility (µL/min/mmHg)}} + \text{Episcleral Venous Pressure (mmHg)}
\]
Unilateral $\uparrow$ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman
--Corneal endothelial abnormality
  --PPMD
  --ICE
--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED (Thyroid eye disease)
--Secondary glaucoma

$$IOP = \frac{\text{Aqueous Formation Rate (µL/min)}}{\text{Outflow Facility (µL/min/mmHg)}} + \text{Episcleral Venous Pressure (mmHg)}$$
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
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--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED
--Secondary glaucoma

By what two mechanisms do these raise EVP?
1) Inflammation near the vortex veins causes them to swell, decreasing lumen diameter and thereby impeding drainage
2) Orbital congestion mechanically compresses the vortex veins

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  --Anterior uveitis
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  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma

By what two mechanisms do these raise EVP?
1) Inflammation near the vortex veins causes them to swell, decreasing lumen diameter and thereby impeding drainage and/or
2)

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  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma

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  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma

*Before we proceed, a note…It is misleading to have a section labeled ‘secondary glaucoma.’*
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma

Before we proceed, a note…It is misleading to have a section labeled ‘secondary glaucoma.’ Why? Because every etiology above also qualifies as a secondary glaucoma (assuming the elevated IOP results in glaucomatous damage, that is). The term here is used as a catch-all for conditions that didn’t fit easily into other categories.

No question—proceed when ready
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma

These are bilateral, but can be so asymmetric as to seem unilateral

- a general sort of condition
- a specific condition
- another specific condition
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma
  These are bilateral, but can be so asymmetric as to seem unilateral

    --Lens-related:
      --PXS  pseudoexfoliation syndrome
      --PDS  pigment dispersion syndrome

Two specific conditions
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma
  These are bilateral, but can be so asymmetric as to seem unilateral
  --Lens-related: Phacolytic, phacomorphic
    --PXS
    --PDS
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  -- Anterior uveitis
  -- Trabeculitis
  -- Fuchs heterochromic iridocyclitis
  -- Posner-Schlossman

--Corneal endothelial abnormality
  -- PPMD
  -- ICE

--Increased episcleral venous pressure
  -- CCF
  -- SVC syndrome
  -- Sturge-Weber
  -- Orbital inflammation
    -- cellulitis
    -- pseudotumor
    -- TED

--Secondary glaucoma
  These are bilateral, but can be so asymmetric as to seem unilateral
  -- Lens-related: Phacolytic
    -- PXS
    -- PDS

To make the diagnosis of phacolytic glaucoma, what two clinical features must be present?
  -- Elevated IOP (duh)
Unilateral $\uparrow$ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma
  These are bilateral, but can be so asymmetric as to seem unilateral
  --Lens-related: Phacolytic
    --PXS
    --PDS

To make the diagnosis of phacolytic glaucoma, what two clinical features must be present?
--Elevated IOP (duh)
--A mature or hypermature cataract
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma

These are bilateral, but can be so asymmetric as to seem unilateral

--Lens-related: Phacolytic
  --PXS
  --PDS

To make the diagnosis of phacolytic glaucoma, what two clinical features must be present?

--Elevated IOP (duh)
--A mature or hypermature cataract

What is a mature cataract?
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma
  These are bilateral, but can be so asymmetric as to seem unilateral
  --Lens-related: Phacolytic
    --PXS
    --PDS

To make the diagnosis of phacolytic glaucoma, what two clinical features must be present?
--Elevated IOP (duh)
--A **mature or hypermature cataract**

**What is a mature cataract?**
A cortical cataract that has advanced to the point that the entire lens is opaque
Unilateral ↑ IOP associated with:

Mature cataract
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma
  These are bilateral, but can be so asymmetric as to seem unilateral
  --Lens-related: Phacolytic
    --PXS
    --PDS

To make the diagnosis of phacolytic glaucoma, what two clinical features must be present?

--Elevated IOP (duh)
--A mature or hypermature cataract

What is a mature cataract?
A cortical cataract that has advanced to the point that the entire lens is opaque

What is a hypermature cataract?
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
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  --Sturge-Weber
  --Orbital inflammation
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--Secondary glaucoma
  These are bilateral, but can be so asymmetric as to seem unilateral
    --Lens-related: Phacolytic
      --PXS
      --PDS

To make the diagnosis of phacolytic glaucoma, what two clinical features must be present?
  --Elevated IOP (duh)
  --A mature or hypermature cataract

What is a mature cataract?
A cortical cataract that has advanced to the point that the entire lens is opaque

What is a hypermature cataract?
A mature cataract in which the cortical material has partially liquefied
Unilateral ↑ IOP associated with:

Hypermature cataract
Unilateral ↑ IOP associated with:

--Intraocular inflammation
--- Anterior uveitis
--- Trabeculitis
--- Fuchs heterochromic iridocyclitis
--- Posner-Schlossman

--Corneal endothelial abnormality
--- PPMD
--- ICE

--Increased episcleral venous pressure
--- CCF
--- SVC syndrome
--- Sturge-Weber
--- Orbital inflammation
   --- cellulitis
   --- pseudotumor
   --- TED

--Secondary glaucoma
--- Lens-related: Phacolytic
   - PXS
   - PDS

These are bilateral, but can be so asymmetric as to seem unilateral

To make the diagnosis of phacolytic glaucoma, what two clinical features must be present?
--- Elevated IOP (duh)
--- A mature or hypermature cataract

What is a mature cataract?
A cortical cataract that has advanced to the point that the entire lens is opaque

What is a hypermature cataract?
A mature cataract in which the cortical material has partially liquefied

Once the cortical component has liquefied enough to allow the nuclear component to move freely, what is the cataract called?
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
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--Secondary glaucoma
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  --Lens-related: Phacolytic
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A mature cataract in which the cortical material has partially liquefied

Once the cortical component has liquefied enough to allow the nuclear component to move freely, what is the cataract called?
A morgagnian cataract
Unilateral ↑ IOP associated with:

Morgagnian cataract
Unilateral ↑ IOP associated with:

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  --Anterior uveitis
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--Secondary glaucoma
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  --Lens-related: Phacolytic
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To make the diagnosis of phacolytic glaucoma, what two clinical features must be present?
  --Elevated IOP (duh)
  --A mature or hypermature cataract

What is the classic presentation and history?

The pt will complain of the acute onset of pain in an eye that has had poor vision for an extended period of time.

Is the angle open or closed?
  Open

Is an anterior-chamber inflammatory reaction present?
  Yes

What is the underlying pathophysiology?

Liquefaction of the cataract leads to lens proteins leaching across the capsule into the AC, where they prompt an inflammatory reaction; the protein + inflammatory cells clog the trabecular meshwork, leading to the IOP rise.
Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
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To make the diagnosis of phacolytic glaucoma, what two clinical features must be present?
--Elevated IOP (duh)
--A mature or hypermature cataract

What is the classic presentation and history?
The pt will complain of the one complaint in an eye that has had a different complaint

These are bilateral, but can be so asymmetric as to seem unilateral
Unilateral ↑ IOP associated with:

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Unilateral ↑ IOP associated with:

--Intraocular inflammation
  --Anterior uveitis
  --Trabeculitis
  --Fuchs heterochromic iridocyclitis
  --Posner-Schlossman

--Corneal endothelial abnormality
  --PPMD
  --ICE

--Increased episcleral venous pressure
  --CCF
  --SVC syndrome
  --Sturge-Weber
  --Orbital inflammation
    --cellulitis
    --pseudotumor
    --TED

--Secondary glaucoma

These are bilateral, but can be so asymmetric as to seem unilateral

To make the diagnosis of phacolytic glaucoma, what two clinical features must be present?
  --Elevated IOP (duh)
  --A mature or hypermature cataract

What is the classic presentation and history?
The pt will complain of the acute onset of pain in an eye that has had poor vision for an extended period of time

Is the angle open or closed?

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Liquefaction of the cataract leads to lens proteins leaching across the capsule into the AC, where they prompt an inflammatory reaction; the protein + inflammatory cells clog the trabecular meshwork, leading to the IOP rise.
Unilateral ↑ IOP associated with:

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What will cytologic evaluation of an aqueous aspirate reveal?
(This is another classic feature of phacolytic glaucoma.)

\[
\text{protein} + \text{inflammatory cells}
\]
Unilateral ↑ IOP associated with:

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What will cytologic evaluation of an aqueous aspirate reveal?
(This is another classic feature of phacolytic glaucoma.)
Big fat macrophages loaded down with phagocytized lens proteins
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--Lens-related: Phacolytic, phacomorphic
  --PXS
  --PDS

Is phacomorphic glaucoma a form of open-angle, or angle-closure glaucoma?

In phacolytic glaucoma, cataractous lens proteins in the AC are the culprit. What is the culprit in phacomorphic glaucoma?

Cataractous increase in lens size

How does cataractous increase in lens size lead to elected IOP?

1) It alters the anatomic relationship between the anterior lens surface and the pupil margin in a manner that leads to pupillary block and subsequent angle closure; and
2) it pushes the peripheral iris forward, narrowing the angle, thereby reducing the magnitude of the PC-AC pressure gradient needed to induce angle closure.
Unilateral ↑ IOP associated with:

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--Secondary glaucoma
  --Lens-related: Phacolytic, phacomorphic
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What is the status of the lens capsule in these conditions?
Unilateral ↑ IOP associated with:

--- Intraocular inflammation
  --- Anterior uveitis
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  --- Posner-Schlossman

--- Corneal endothelial abnormality
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--- Increased episcleral venous pressure
  --- CCF
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  --- Orbital inflammation
    --- cellulitis
    --- pseudotumor
    --- TED

--- Secondary glaucoma
  --- Lens-related: Phacolytic, phacomorphic
    --- PXS
    --- PDS

What is the status of the lens capsule in these conditions? By definition, intact
Unilateral ↑ IOP associated with:

- Intraocular inflammation
  - Anterior uveitis
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    - cellulitis
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    - TED

- Secondary glaucoma
  - Lens-related: Phacolytic, phacomorphic
  - PXS
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What lens condition associated with uveitis has, by definition, a capsule that has been traumatically or surgically breached?

What is the status of the lens capsule in these conditions? By definition, intact
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What lens condition associated with uveitis has, by definition, a capsule that \textbf{has} been traumatically or surgically breached?

\textbf{Phacoantigenic uveitis}

What is the status of the lens capsule in these conditions?

By definition, \textbf{intact}
Unilateral ↑ IOP associated with:

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**PXS and PDS are compared and contrasted in detail in slide-set G4**
Unilateral ↑ IOP associated with:

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There are many other causes of secondary glaucoma—see both G13 (2ndry open-angle glaucoma) and G16 (2ndry angle-closure glaucoma)

--Secondary glaucoma
  --Lens-related: Phacolytic, phacomorphic
    --PXS
    --PDS