Before you begin: This is a big topic, and big topics beget big slide-sets. There’s a natural break at slide 267ish; I placed a *break time!* slide at that point to mark it.
In a nutshell, what is OIS?
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A constellation of signs and symptoms owing to chronic ocular
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A constellation of signs and symptoms owing to chronic ocular hypoperfusion
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The vessel most commonly implicated is the ipsilateral internal carotid artery (a distant second is the ipsilateral ophthalmic artery).
Blood flow in the ophthalmic artery and its branches. (A) Normal unobstructed flow.
Blood flow in the ophthalmic artery and its branches. (A) Normal unobstructed flow. (B) In a patient with ICA occlusion and collateral circulation via the circle of Willis.
Blood flow in the ophthalmic artery and its branches. (A) Normal unobstructed flow. (B) In a patient with ICA occlusion and collateral circulation via the circle of Willis. (C) In a patient with ICA occlusion and collaterals via the ophthalmic artery.
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If the ophthalmic artery is the occluded vessel, what disease process is implicated?
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If the ophthalmic artery is the occluded vessel, what dz process is implicated?
Giant cell arteritis (GCA). Always bear GCA in mind when you evaluate an OIS pt!
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How occluded does the internal carotid artery (ICA) have to be for OIS to occur?

Very—at least 90%

In one word, what process is responsible for occluding the ICA in these pts?

Atherosclerosis

Atherosclerosis is an affliction of vasculopaths—is vasculopathy a risk factor for OIS?

Very much so.
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Current slide: Ocular Ischemic Syndrome

The internal carotid artery.
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How occluded does the internal carotid artery (ICA) have to be for OIS to occur?
Very—at least 90%
High-grade stenosis of the internal carotid artery origin (arrow) in two pts
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With what nonocular atherosclerotic conditions is OIS associated?
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--PAD

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How common are these conditions in OIS pts?
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--CVA?
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**Atherosclerosis**

How occluded does the **internal carotid artery (ICA)** have to be for OIS to occur?
Very—at least 90%

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**Atherosclerosis**

With what nonocular atherosclerotic conditions is OIS associated? How common are these conditions in OIS pts?

--CAD is present in % of OIS pts
--CVA?
--PAD?
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Atherosclerosis

With what nonocular atherosclerotic conditions is OIS associated?
How common are these conditions in OIS pts?
--CAD is present in half of OIS pts
--CVA has occurred previously in 25% of them
--PAD?

Atherosclerosis is an affliction of vasculopaths—is vasculopathy a risk factor for OIS?
Very much so
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--CAD is present in half of OIS pts
--CVA has occurred previously in 25% of them
--PAD sig enough to have required surgical intervention in %
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Does it present unilaterally, or bilaterally?
**Q/A**

**Ocular Ischemic Syndrome**

*In a nutshell, what is OIS?*
A constellation of signs and symptoms owing to chronic ocular hypoperfusion

*Does it present unilaterally, or bilaterally?*
Unilaterally (in about [ ] % of cases)
In a nutshell, what is OIS?
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Does it present unilaterally, or bilaterally?
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Is there a gender predilection?
Q/A

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Yes, M v F are twice as likely to have it
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Is there a relationship with age?
In a nutshell, what is OIS?
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Unilaterally (in about 80% of cases)

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Yes, men are twice as likely to have it

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Yes, OIS is a dz of older individuals—average age is about 65; and it's rare before 55

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**Ocular Ischemic Syndrome**

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<table>
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Intraretinal hemorrhages in OIS: Midperipheral, medium-large, dot-blots
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Note: Inconsistencies exist among the BCSC books regarding the location of retinal hemorrhages in OIS:
--Location per the Neuro book: “Midperipheral”

No question—proceed at your own pace
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Ocular Ischemic Syndrome
In a nutshell, what is OIS?
A constellation of signs and symptoms owing to chronic ocular hypoperfusion

**Signs and symptoms**

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- Location per the *Neuro* book: “Midperipheral”
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- Per the *Uveitis* book: “The midperiphery and far periphery”

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FWIW, *EyeWiki* indicates they’re mid-peripheral. I was ‘raised’ to believe they’re mid-peripheral myself, so that’s how I roll. Caveat emptor.

(FYI, this is not the last such inconsistency we will encounter re OIS.)
In a nutshell, what is OIS?
A constellation of signs and symptoms owing to chronic ocular hypoperfusion.

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There is another classic configuration for intraretinal hemorrhages, one not expected in OIS. What is it?

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Ocular Ischemic Syndrome

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There is another classic configuration for intraretinal hemorrhages, one not expected in OIS. What is it?
Elongated and streaky

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There is another classic configuration for intraretinal hemorrhages, one not expected in OIS. What is it? Elongated and streaky.

What descriptive term is used to label such hemorrhages?

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There is another classic configuration for intraretinal hemorrhages, one not expected in OIS. What is it?
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What descriptive term is used to label such hemorrhages?
They are known as ‘flame hemorrhages’ (FH)

Indeed it does—the 5-year mortality rate of OIS is 40%!
Ocular Ischemic Syndrome

Flame vs DB hemorrhages (and a CWS for lulz)
Flame vs DB hemorrhages (and a CWS for lulz)

Are CWS expected in OIS?
Flame vs DB hemorrhages (and a CWS for lulz)

Are CWS expected in OIS? No
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**Why causes some intraretinal hemorrhages to be DBHs and others to be FHs?**

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*Why causes some intraretinal hemorrhages to be DBHs and others to be FHs? It’s a function of the two words in which the blood is located*
In a nutshell, what is OIS? A constellation of signs and symptoms owing to chronic ocular hypoperfusion.

What are the signs/symptoms of OIS?

**Signs:**
- Intraretinal hemorrhages
- NVI/NVA
- AC cell/flare
- Retinal vascular changes

Intraretinal hemorrhages in OIS don’t present rando, rather, there’s a classic appearance they tend to display. What is it?
The hemorrhages typically have a particular…

**Size:** Medium to large

**Configuration (shape):** Dot/blot (DBH)

**Location:** The mid- periphery

There is another classic configuration for intraretinal hemorrhages, one not expected in OIS. What is it? Elongated and streaky

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Indeed it does—the 5-year mortality rate of OIS is 40%!
**In a nutshell, what is OIS?**

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Does it present unilaterally, or bilaterally?
Unilaterally (in about 80% of cases)

Is there a gender predilection?
Yes, men are twice as likely to have it

Is there a relationship with age?
Yes, OIS is a disease of older individuals—average age is about 65; and it's rare before 55

How common is it?
Estimates vary, but fair to say it's an uncommon condition—vastly less common than diabetic retinopathy and/or CRVO, certainly

What is the long-term visual prognosis for eyes with OIS?
This is uncertain, but it is often poor. One sign in particular portends poor vision (this sign will be identified shortly).

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Are NVI/NVA common in OIS?
Yes—roughly 2/3 of pts will manifest one or both

When you hear 'NVI/NVA,' one condition should come to mind first—what is it?
Diabetes. Diabetic retinopathy is by far the most common cause of NVI/NVA

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NVI/NVA often leads to what dreaded ocular condition?
Neovascular glaucoma (NVG).

How does NVA lead to NVG?
The NVA vessels don't ride solo; rather, they are accompanied by contractile elements (eg, fibroblasts). Along with the neo vessels, these elements cross from the peripheral iris to the peripheral cornea. Once established, contractile elements gonna contract, and when they do, they pull the iris up against the angle, closing it.

What one word describes the underlying cause of most cases of NVG?
'Ischemia.'

How does ischemia lead to NVI and NVA?
In a desperate attempt to acquire the oxygen they're lacking, ischemic cells release the signaling molecule VEGF, a potent inducer of new blood vessel formation. VEGF induces the NVI/NVA process.
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**Why is NVG “dreaded”?**

Because it is difficult to control, and carries a high risk of loss of vision or even the eye.

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--Retinal vascular changes

**Symptoms:**
--Decreased vision
--Pain
--Prolonged photostress recovery time

What are the signs/symptoms of OIS?

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**NVI/NVA often leads to what dreaded ocular condition?**
Neovascular glaucoma (NVG)

*How does NVA lead to NVG?*

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**What do NVI and NVA stand for in this context?**
Neovascularization of the iris (NVI) and the angle (NVA)

Are NVI/NVA common in OIS?
Yes—roughly 2/3 of patients will manifest one or both

When you hear ‘NVI/NVA,’ what should come to mind first—what is it?
Diabetes. Diabetic retinopathy is by far the most common cause of NVI/NVA

Other than DBR, what should come to mind before OIS when contemplating NVI/NVA? (Remember, OIS is an uncommon condition.)
CRVO is most definitely next on the list. The list after that is more difficult to order, with entities like uveitis, tumors, CRAO, sickle-cell, etc.

Does OIS carry implications for the general health of the afflicted individual?
Indeed it does—the 5-year mortality rate of OIS is 40%!
In a nutshell, what is OIS?
A constellation of signs and symptoms owing to chronic ocular hypoperfusion

Does it present unilaterally, or bilaterally?
Unilaterally (in about 80% of cases)

Is there a gender predilection?
Yes, men are twice as likely to have it

Is there a relationship with age?
Yes, OIS is a dz of older individuals—average age is about 65; and it's rare before 55

How common is it?
Estimates vary, but fair to say it's an uncommon condition—vastly less common than diabetic retinopathy and/or CRVO, certainly

What is the long-term visual prognosis for eyes with OIS?
This is uncertain, but it is often poor. One sign in particular portends poor vision (this sign will be identified shortly).

Does OIS carry implications for the general health of the afflicted individual?
Indeed it does—the 5-year mortality rate of OIS is 40%!

---

**Signs:**
--Intraretinal hemorrhages
--NVI/NVA
--AC cell/flare
--Retinal vascular changes

**Symptoms:**
--Decreased vision
--Pain
--Prolonged photostress recovery time

What do NVI and NVA stand for in this context?
Neovascularization of the iris (NVI) and the angle (NVA)

Are NVI/NVA common in OIS?
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When you hear 'NVI/NVA,' one condition should come to mind first—what is it?
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**NVI/NVA often leads to what dreaded ocular condition?**
Neovascular glaucoma (NVG)

How does NVA lead to NVG?
The NVA vessels don't ride solo; rather, they are accompanied by contractile elements (eg, fibroblasts). Along with the neo vessels, these elements cross from the peripheral iris to the peripheral cornea.

Ocular Ischemic Syndrome
In a nutshell, what is OIS?
A constellation of signs and symptoms owing to chronic ocular hypoperfusion

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What do NVI and NVA stand for in this context?
Neovascularization of the iris (NVI) and the angle (NVA)

Are NVI/NVA common in OIS?
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When you hear 'NVI/NVA,' one condition should come to mind first—what is it?
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Other than DBR, what should come to mind before OIS when contemplating NVI/NVA? (Remember, OIS is an uncommon condition.)
CRVO is mos def next on the list. The list after that is more difficult to order, with entities like uveitis, tumors, CRAO, sickle-cell, etc.

Does OIS carry implications for the general health of the afflicted individual?
Indeed it does—the 5-year mortality rate of OIS is 40%!
Ocular Ischemic Syndrome

Closed angle in NVG
In a nutshell, what is OIS? A constellation of signs and symptoms owing to chronic ocular hypoperfusion.

Does it present unilaterally, or bilaterally? Unilaterally (in about 80% of cases).

Is there a gender predilection? Yes, men are twice as likely to have it.

Is there a relationship with age? Yes, OIS is a disease of older individuals—average age is about 65; and it's rare before 55.

How common is it? Estimates vary, but fair to say it's an uncommon condition—vastly less common than diabetic retinopathy and/or CRVO, certainly.

What is the long-term visual prognosis for eyes with OIS? This is uncertain, but it is often poor. One sign in particular portends poor vision (this sign will be identified shortly).

Does OIS carry implications for the general health of the afflicted individual? Indeed it does—the 5-year mortality rate of OIS is 40%!

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**Ocular Ischemic Syndrome**

**Signs:**
- Intraretinal hemorrhages
- NVI/NVA
- AC cell/flare
- Retinal vascular changes

**Symptoms:**
- Decreased vision
- Pain
- Prolonged photostress recovery time

What do NVI and NVA stand for in this context? Neovascularization of the iris (NVI) and the angle (NVA).

Are NVI/NVA common in OIS? Yes—roughly 2/3 of pts will manifest one or both.

When you hear 'NVI/NVA,' one condition should come to mind first—what is it? Diabetes. Diabetic retinopathy is by far the most common cause of NVI/NVA.

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How does NVI/NVA often lead to what dreaded ocular condition? Neovascular glaucoma (NVG).

Given this description, into what general class of glaucoma does NVG fall?

How does NVA lead to NVG? The NVA vessels don't ride solo; rather, they are accompanied by contractile elements (eg, fibroblasts). Along with the neo vessels, these elements cross from the peripheral iris to the peripheral cornea. Once established, contractile elements gonna contract, and when they do, they **pull the iris up against the angle, closing it.**

'Ischemia' is the one word that describes the underlying cause of most cases of NVG.

How does ischemia lead to NVI and NVA? In a desperate attempt to acquire the oxygen they're lacking, ischemic cells release the signaling molecule VEGF, a potent inducer of new blood vessel formation. VEGF induces the NVI/NVA process.

Given this description, into what general class of glaucoma does NVG fall?
**In a nutshell, what is OIS?**

A constellation of signs and symptoms owing to chronic ocular hypoperfusion.

**NVI/NVA often leads to what dreaded ocular condition?**

Neovascular glaucoma (NVG)

**How does NVA lead to NVG?**

The NVA vessels don't ride solo; rather, they are accompanied by contractile elements (eg, fibroblasts). Along with the neo vessels, these elements cross from the peripheral iris to the peripheral cornea. Once established, contractile elements gonna contract, and when they do, they **pull the iris up against the angle, closing it.**

**Given this description, into what general class of glaucoma does NVG fall?**

It is a form of **secondary** glaucoma (and an important one at that)

**Does OIS carry implications for the general health of the afflicted individual?**

Indeed it does—the 5-year mortality rate of OIS is 40%!
In a nutshell, what is OIS?
A constellation of signs and symptoms owing to chronic ocular hypoperfusion

Does it present unilaterally, or bilaterally?
Unilaterally (in about 80% of cases)

Is there a gender predilection?
Yes, men are twice as likely to have it

Is there a relationship with age?
Yes, OIS is a disease of older individuals—average age is about 65; and it's rare before 55

How common is it?
Estimates vary, but fair to say it's an uncommon condition—vastly less common than diabetic retinopathy and/or CRVO, certainly

What is the long-term visual prognosis for eyes with OIS?
This is uncertain, but it is often poor. One sign in particular portends poor vision (this sign will be identified shortly).

Does OIS carry implications for the general health of the afflicted individual?
Indeed it does—the 5-year mortality rate of OIS is 40%!

What are the signs/symptoms of OIS?
Signs:
--Intraretinal hemorrhages
--NVI/NVA
--AC cell/flare
--Retinal vascular changes

Symptoms:
--Decreased vision
--Pain
--Prolonged photostress recovery time

What do NVI and NVA stand for in this context?
Neovascularization of the iris (NVI) and the angle (NVA)

Are NVI/NVA common in OIS?
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When you hear 'NVI/NVA,' one condition should come to mind first—what is it?
Diabetes. Diabetic retinopathy is by far the most common cause of NVI/NVA

Other than DBR, what should come to mind before OIS when contemplating NVI/NVA? (Remember, OIS is an uncommon condition.)
CRVO is mos def next on the list. The list after that is more difficult to order, with entities like uveitis, tumors, CRAO, sickle-cell, etc.

Given this description, into what general class of glaucoma does NVG fall?
It is a form of secondary angle-closure glaucoma (and an important one at that)

Neovascular glaucoma (NVG)

How does NVA lead to NVG?
The NVA vessels don't ride solo; rather, they are accompanied by contractile elements (eg, fibroblasts). Along with the neo vessels, these elements cross from the peripheral iris to the peripheral cornea. Once established, contractile elements gonna contract, and when they do, they pull the iris up against the angle, closing it.

NVI/NVA often leads to what dreaded ocular condition?
Neovascular glaucoma (NVG)

How does ischemia lead to NVI and NVA?
In a desperate attempt to acquire the oxygen they're lacking, ischemic cells release the signaling molecule VEGF, a potent inducer of new blood vessel formation. VEGF induces the NVI/NVA process.

Given this description, into what general class of glaucoma does NVG fall?
It is a form of secondary angle-closure glaucoma (and an important one at that)
**Ocular Ischemic Syndrome**

**In a nutshell, what is OIS?**
A constellation of signs and symptoms owing to chronic ocular hypoperfusion.

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Unilaterally (in about 80% of cases).

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**What is the long-term visual prognosis for eyes with OIS?**
This is uncertain, but it is often poor. One sign in particular portends poor vision (this sign will be identified shortly).

**Does OIS carry implications for the general health of the afflicted individual?**
Indeed it does—the 5-year mortality rate of OIS is 40%!

---

**Signs:**

--- Intraretinal hemorrhages

--- NVI/NVA

--- AC cell/flare

--- Retinal vascular changes

**Symptoms:**

--- Decreased vision

--- Pain

--- Prolonged photostress recovery time

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--- Given this description, into what general class of glaucoma does NVG fall?
It is a form of secondary angle-closure glaucoma (and an important one at that).

--- We divide the 2ndry angle-closure glaucomas into two groups—what are they?

--- Other than DBR, what should come to mind before OIS when contemplating NVI/NVA? (Remember, OIS is an uncommon condition.)
CRVO is mos def next on the list (the list after that is more difficult to order, with entities like uveitis, tumors, CRAO, sickle-cell, etc)

--- NVI/NVA often leads to what dreaded ocular condition?
Neovascular glaucoma (NVG)

--- How does NVI/NVA often lead to what dreaded ocular condition?
Neovascular glaucoma (NVG)

--- Other than DBR, what should come to mind before OIS when contemplating NVI/NVA? (Remember, OIS is an uncommon condition.)
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Ocular Ischemic Syndrome

What are the signs/symptoms of OIS?

Signs:
-- Intraretinal hemorrhages
-- NVI/NVA
-- AC cell/flare
-- Retinal vascular changes

Symptoms:
-- Decreased vision
-- Pain
-- Prolonged photostress recovery time

What do NVI and NVA stand for in this context?
Neovascularization of the iris (NVI) and the angle (NVA)

Are NVI/NVA common in OIS?
Yes—roughly 2/3 of pts will manifest one or both

When you hear 'NVI/NVA,' one condition should come to mind first—what is it?
Diabetes. Diabetic retinopathy is by far the most common cause of NVI/NVA

Other than DTR, what should come to mind before OIS when contemplating NVI/NVA? (Remember, OIS is an uncommon condition.)
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How does NVA lead to NVG?
The NVA vessels don't ride solo; rather, they are accompanied by contractile elements (eg, fibroblasts). Along with the neo vessels, these elements cross from the peripheral iris to the peripheral cornea. Once established, contractile elements gonna contract, and when they do, they pull the iris up against the angle, closing it.

Given this description, into what general class of glaucoma does NVG fall?
It is a form of secondary angle-closure glaucoma (and an important one at that)

With pupillary block

Without pupillary block

We divide the 2ndry angle-closure glaucomas into two groups—what are they?

Does OIS carry implications for the general health of the afflicted individual?
Indeed it does—the 5-year mortality rate of OIS is 40%!
In a nutshell, what is OIS?
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Ocular Ischemic Syndrome

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Neovascularization of the iris (NVI) and the angle (NVA)

Are NVI/NVA common in OIS?
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What do you think when you hear “NVI/NVA”? Diabetes. Diabetic retinopathy is by far the most common cause of NVI/NVA

Other than DBR, what should come to mind before OIS when contemplating NVI/NVA? (Remember, OIS is an uncommon condition.)
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NVI/NVA often leads to what dreaded ocular condition?
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How does NVA lead to NVG?
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Given this description, into what general class of glaucoma does NVG fall?
It is a form of secondary angle-closure glaucoma (and an important one at that)

With pupillary block

Without pupillary block

NVG?

NVG?

We divide the 2ndry angle-closure glaucomas into two groups—what are they?

To which group does NVG belong?

Ischemia

‘Ischemia’

How does ischemia lead to NVI and NVA?
In a desperate attempt to acquire the oxygen they’re lacking, ischemic cells release the signaling molecule VEGF, a potent inducer of new blood vessel formation. VEGF induces the NVI/NVA process.

Given this description, into what general class of glaucoma does NVG fall?
It is a form of secondary angle-closure glaucoma (and an important one at that)
What is OIS?

A constellation of signs and symptoms owing to chronic ocular hypoperfusion.

Does it present unilaterally, or bilaterally?

Unilaterally (in about 80% of cases).

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Does OIS carry implications for the general health of the afflicted individual?

Indeed it does—the 5-year mortality rate of OIS is 40%.

What are the signs/symptoms of OIS?

**Signs:**

-- Intraretinal hemorrhages
-- NVI/NVA
-- AC cell/flare
-- Retinal vascular changes

**Symptoms:**

-- Decreased vision
-- Pain
-- Prolonged photostress recovery time

What do NVI and NVA stand for in this context?

Neovascularization of the iris (NVI) and the angle (NVA).

Are NVI/NVA common in OIS?

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When you hear 'NVI/NVA,' one condition should come to mind first—what is it?

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Other than DBR, what should come to mind before OIS when contemplating NVI/NVA? (Remember, OIS is an uncommon condition.)

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NVI/NVA often leads to what dreaded ocular condition?

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How does NVA lead to NVG?

The NVA vessels don't ride solo; rather, they are accompanied by contractile elements (e.g., fibroblasts). Along with the neo vessels, these elements cross from the peripheral iris to the peripheral cornea. Once established, contractile elements gonna contract, and when they do, they pull the iris up against the angle, closing it.

Given this description, into what general class of glaucoma does NVG fall?

It is a form of secondary angle-closure glaucoma (and an important one at that).

With pupillary block

Without pupillary block

We divide the secondary angle-closure glaucomas into two groups—what are they?

To which group does NVG belong? Without pupillary block

NVG!
In a nutshell, what is OIS?
A constellation of **signs and symptoms** owing to chronic ocular hypoperfusion

Does it present unilaterally, or bilaterally?
Unilaterally (in about 80% of cases)

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**Signs:**
- Intraretinal hemorrhages
- NVI/NVA
- AC cell/flare
- Retinal vascular changes

**Symptoms:**
- Decreased vision
- Pain
- Prolonged photostress recovery time

What do NVI and NVA stand for in this context?
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Are NVI/NVA common in OIS?
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When you hear ‘NVI/NVA,’ one condition should come to mind first—what is it?
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Other than DBR, what should come to mind before OIS when contemplating NVI/NVA? (Remember, OIS is an uncommon condition.)
CRVO is mos def next on the list (the list after that is more difficult to order, with entities like uveitis, tumors, CRAO, sickle-cell, etc)

NVI/NVA often leads to what dreaded ocular condition?
Neovascular glaucoma (NVG)

How does NVA lead to NVG?
The NVA vessels don’t ride solo; rather, they are accompanied by contractile elements (eg, fibroblasts). Along with the neo vessels, these elements cross from the peripheral iris to the peripheral cornea. Once established, contractile elements gonna contract, pulling the iris up against the angle, closing it.

What one word describes the underlying cause of most cases of NVG?
‘Ischemia’

How does ischemia lead to NVI and NVA?
In a desperate attempt to acquire the oxygen they’re lacking, ischemic cells release the signaling molecule VEGF, a potent inducer of new blood vessel formation. VEGF induces the NVI/NVA process.

Given this description, into what general class of glaucoma does NVG fall?
It is a form of **secondary angle-closure glaucoma** (and an important one at that)

We divide the 2ndry angle-closure glaucomas into two groups—what are they?
- With pupillary block
- Without pupillary block

To which group does NVG belong? **Without** pupillary block

For (lots) more on secondary angle-closure glaucoma, see slide-set G16
In a nutshell, what is OIS?
A constellation of signs and symptoms owing to chronic ocular hypoperfusion

Does it present unilaterally, or bilaterally?
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**Ocular Ischemic Syndrome**

**Signs:**
- Intraretinal hemorrhages
- NVI/NVA
- AC cell/flare
- Retinal vascular changes

**Symptoms:**
- Decreased vision
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**NVI/NVA often leads to what dreaded ocular condition?**
Neovascular glaucoma (NVG)

**How does NVA lead to NVG?**
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Ischemia

**How does ischemia lead to NVI and NVA?**
In a desperate attempt to acquire the oxygen they're lacking, ischemic cells release the signaling molecule VEGF, a potent inducer of new blood vessel formation. VEGF induces the NVI/NVA process.

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**Q**

Does OIS carry implications for the general health of the afflicted individual?
Indeed it does—the 5-year mortality rate of OIS is 40%!
In a nutshell, what is OIS?
A constellation of signs and symptoms owing to chronic ocular hypoperfusion

Does it present unilaterally, or bilaterally?
Unilaterally (in about 80% of cases)

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How common is it?
Estimates vary, but fair to say it's an uncommon condition—vastly less common than diabetic retinopathy and/or CRVO, certainly

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This is uncertain, but it is often poor. One sign in particular portends poor vision (this sign will be identified shortly).

Does OIS carry implications for the general health of the afflicted individual?
Indeed it does—the 5-year mortality rate of OIS is 40%!

**Ocular Ischemic Syndrome**

Signs:
--Intraretinal hemorrhages
--NVI/NVA

Symptoms:
--Decreased vision
--Pain
--Prolonged photostress recovery time

What do NVI and NVA stand for in this context?
Neovascularization of the iris (NVI) and the angle (NVA)

Are NVI/NVA common in OIS?
Yes—roughly 2/3 of pts will manifest one or both

When you hear 'NVI/NVA,' one condition should come to mind first—what is it?
Diabetes. Diabetic retinopathy is by far the most common cause of NVI/NVA

Other than DBR, what should come to mind before OIS when contemplating NVI/NVA? (Remember, OIS is an uncommon condition.)
CRVO is mos def next on the list. The list after that is more difficult to order, with entities like uveitis, tumors, CRAO, sickle-cell, etc.

What one word describes the underlying cause of most cases of NVG?
‘Ischemia’

How does NVA lead to NVG?
The NVA vessels don't ride solo; rather, they are accompanied by contractile elements (eg, fibroblasts). Along with the neo vessels, these elements cross from the peripheral iris to the peripheral cornea. Once established, contractile elements gonna contract, and when they do, they pull the iris up against the angle, closing it.

NV/NA often leads to what dreaded ocular condition?
Neovascular glaucoma (NVG)

How does ischemia lead to NVI and NVA?
In a desperate attempt to acquire the oxygen they're lacking, ischemic cells release the signaling molecule VEGF, a potent inducer of new blood vessel formation. VEGF induces the NVI/NVA process.
In a nutshell, what is OIS?
A constellation of signs and symptoms owing to chronic ocular hypoperfusion.

Unilaterally (in about 80% of cases)

Yes, men are twice as likely to have it

Yes, OIS is a disease of older individuals—average age is about 65; and it's rare before 55

Estimates vary, but fair to say it's an uncommon condition—vastly less common than diabetic retinopathy and/or CRVO, certainly.

This is uncertain, but it is often poor. One sign in particular portends poor vision (this sign will be identified shortly).

Indeed it does—the 5-year mortality rate of OIS is 40%!

**Q**
What are the signs/symptoms of OIS?

- Intraretinal hemorrhages
- NVI/NVA
- AC cell/flare
- Retinal vascular changes

**Symptoms:**
- Decreased vision
- Pain
- Prolonged photostress recovery time

**What do NVI and NVA stand for in this context?**
Neovascularization of the iris (NVI) and the angle (NVA)

**Are NVI/NVA common in OIS?**
Yes—roughly 2/3 of pts will manifest one or both

**When you hear 'NVI/NVA,' one condition should come to mind first—what is it?**
Diabetes. Diabetic retinopathy is by far the most common cause of NVI/NVA.

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**Does OIS carry implications for the general health of the afflicted individual?**
Indeed it does—the 5-year mortality rate of OIS is 40%!

**NVI/NVA often leads to what dreaded ocular condition?**
Neovascular glaucoma (NVG)

**How does NVA lead to NVG?**
The NVA vessels don't ride solo; rather, they are accompanied by contractile elements (eg, fibroblasts). Along with the neo vessels, these elements cross from the peripheral iris to the peripheral cornea. Once established, contractile elements gonna contract, and when they do, they pull the iris up against the angle, closing it.

**What one word describes the underlying cause of most cases of NVG?**
‘Ischemia’

**How does ischemia lead to NVI and NVA?**
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In a nutshell, what is OIS?

A constellation of signs and symptoms owing to chronic ocular hypoperfusion.

Does it present unilaterally, or bilaterally?

Unilaterally (in about 80% of cases).

Is there a gender predilection?

Yes, men are twice as likely to have it.

Is there a relationship with age?

Yes, OIS is a disease of older individuals—average age is about 65; and it’s rare before 55.

How common is it?

Estimates vary, but fair to say it’s an uncommon condition—vastly less common than diabetic retinopathy and/or CRVO, certainly.

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**Q/A**

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You'd think so, but no. While a few OIS pts will have elevated IOP, most will not, instead presenting with normal or even low IOP.

Other than DBR, what induces the NVI/NVA process?

VEGF induces the NVI/NVA process.

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Low IOP??!! How is that possible? Why doesn’t NVI/NVA in OIS consistently lead to NVG?
In a word—hypoperfusion. The same lack of blood flow that resulted in ocular ischemia leads to shutdown of the ciliary body. This result in a dramatic reduction in the rate of aqueous-humor formation, which in turn precludes the development of high IOP.

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Ocular Ischemic Syndrome
In a nutshell, what is OIS?
A constellation of signs and symptoms owing to chronic ocular hypoperfusion

Does it present unilaterally, or bilaterally?
Unilaterally (in about 80% of cases)

Is there a gender predilection?
Yes, men are twice as likely to have it

Is there a relationship with age?
Yes, OIS is a dz of older individuals—average age is about 65; and it’s rare before 55

How common is it?
Estimates vary, but fair to say it’s an uncommon condition—vastly less common than diabetic retinopathy and/or CRVO, certainly

What is the long-term visual prognosis for eyes with OIS?
This is uncertain, but it is often poor. One sign in particular portends poor vision (this sign will be identified shortly).

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Q/A

What are the signs/symptoms of OIS?

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**Neovascular glaucoma (NVG)**

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What specific component of the ciliary body creates aqueous?
The nonpigmented epithelial layer of the pars plicata

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In a nutshell, what is OIS?
A constellation of **signs and symptoms** owing to chronic ocular hypoperfusion.

Does it present unilaterally, or bilaterally?
Unilaterally (in about 80% of cases).

Is there a gender predilection?
Yes, men are twice as likely to have it.

Is there a relationship with age?
Yes, OIS is a disease of older individuals—average age is about 65; and it's rare before 55.

How common is it?
Estimates vary, but fair to say it's an uncommon condition—vastly less common than diabetic retinopathy and/or CRVO, certainly.

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Does OIS carry implications for the general health of the afflicted individual?
Indeed it does—the 5-year mortality rate of OIS is 40%!

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**Signs:**
--Intraretinal
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**NVI/NVA often leads to what dreaded ocular condition?**
Neovascular glaucoma (NVG)

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**How does NVA lead to NVG?**
The NVA vessels don't ride solo; rather, they are accompanied by contractile elements (eg, fibroblasts). Along with the neo vessels, these elements cross from the peripheral iris into the peripheral cornea. Once established, contractile elements gonna contract, and when they do, they pull the iris up against the angle, closing it.

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**Symptoms:**
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What do NVI and NVA stand for in this context?
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Are NVI/NVA common in OIS?
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**Neovascular glaucoma (NVG)**

If an eye has a zipped-up angle secondary to NVA from OIS, what can happen to IOP if/when blood flow to the ciliary body is re-established—say, by successful CEA for an occluded ICA?

In such cases, IOP can spike precipitously when the CB ‘wakes up’ and resumes producing aqueous at a normal rate. If this occurs, the pt may be thrown into NVG severe enough to threaten vision or even the eye. Because of this possibility, it is vital that you 1) are looped in on plans to operate on your OIS pt, and 2) have a plan in place to intervene acutely if the above scenario comes to pass!

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<tbody>
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Does it present unilaterally, or bilaterally?
Unilaterally (in about 80% of cases)

Is there a gender predilection?
Yes, men are twice as likely to have it

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How common is it?
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- Decreased vision
- Pain
- Prolonged photostress recovery time

Will all OIS pts manifest cell and flare?
No, but a fairly significant minority will (20%)

How severe is the reaction?
Not terrible—certainly nowhere near the ‘hypopyon’ range, say.
Of note, the classic presentation will have cell v flare that is out of proportion to the other one
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In a nutshell, what is OIS?
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Here we encounter another inconsistency among the BCSC books, regarding the appearance of the retinal venules in OIS:
- Appearance per the Neuro book: “dilated (nontortuous)”
- Per the Retina book: “dilated but not very tortuous”
- Per the Uveitis book: “dilated and tortuous”

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Head’s up: We will have much more to say about differentiating between OIS and CRVO later in the slide-set.
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It can be either.

**What is the term of art for intermittent vision loss in one eye?**

Transient monocular vision loss (TMVL)

**What is Uhthoff's phenomenon?**

This is TMVL in optic neuritis secondary to increased body temp.

**Does OIS carry implications for the general health of the afflicted individual?**

Indeed it does—the 5-year mortality rate of OIS is 40%!
In a nutshell, what is OIS?
A constellation of signs and symptoms owing to chronic ocular hypoperfusion

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Unilaterally (in about 80% of cases)

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- Disc edema
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Media issues  
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Vascular issues
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In two words what is the pathologic mechanism underlying subacute angle-closure glaucoma?
Pupillary block

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Pupillary block is the mechanism underlying both subacute and acute angle-closure glaucoma. It also underlies chronic angle-closure glaucoma, and is implicated in some cases of plateau iris syndrome.

If they share a mechanism, how do acute and subacute angle-closure glaucoma differ?
In acute ACG, the entire angle becomes occluded over a short period of time, producing a precipitous rise in IOP. The extremely high IOP causes severe eye pain and HA, N/V, and blurry vision. The event will not resolve without intervention.

In subacute ACG, some portion of the angle occludes episodically, resulting in periods of moderate (not extreme) IOP elevation. This IOP causes moderate eye pain and HA, and blurry vision. The episodes resolve spontaneously, often after sleep. IOP is normal between episodes, which can make diagnosis challenging.
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Ocular Ischemic Syndrome

When you hear 'periocular pain that improves with lying down/sleep,' three conditions should come to mind. What are the other two?
--OIS
--Subacute angle-closure glaucoma
--Migraine

In two words what is the pathologic mechanism underlying subacute angle-closure glaucoma?
Pupillary block

Circling back to the original point: What happens during sleep that provides pain relief in subacute angle-closure glaucoma?
Sleep-induced miosis breaks the pupillary block, thus allowing aqueous outflow to resume (and IOP to drop).

Are you sure about this? I thought pupillary block was the mechanism underlying acute angle-closure glaucoma.
Pupillary block is the mechanism underlying both subacute and acute angle-closure glaucoma. It also underlies chronic angle-closure glaucoma and is implicated in some cases of plateau iris syndrome.

If they share a mechanism, how do acute and subacute angle-closure glaucoma differ?
In acute angle-closure glaucoma (ACG), the entire angle becomes occluded over a short period of time, producing a precipitous rise in IOP. The extremely high IOP causes severe eye pain and headache, nausea, and blurred vision. The event will not resolve without intervention.

In subacute angle-closure glaucoma, some portion of the angle occludes episodically, resulting in periods of moderate (not extreme) IOP elevation. This IOP causes moderate eye pain and headache, and blurred vision. The episodes resolve spontaneously, often after sleep. IOP is normal between episodes, which can make diagnosis challenging.
In a nutshell, what is OIS?
A constellation of signs and symptoms owing to chronic ocular hypoperfusion.

Does it present unilaterally, or bilaterally?
Unilaterally (in about 80% of cases).

Is there a gender predilection?
Yes, men are twice as likely to have it.

Is there a relationship with age?
Yes, OIS is a disease of older individuals—average age is about 65; and it's rare before 55.

How common is it?
Estimates vary, but fair to say it's an uncommon condition—vastly less common than diabetic retinopathy and/or CRVO, certainly.

What is the long-term visual prognosis for eyes with OIS?
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Does OIS carry implications for the general health of the afflicted individual?
Indeed it does—the 5-year mortality rate of OIS is 40%!

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*What is 'photostress recovery time'?*

It refers to the length of time it takes for vision to recover after the retina has been subjected to a very bright light (OIS pts will complain of being 'blind for a long time' in the affected eye after exposure to bright light)

*Why is recovery time prolonged in OIS?*

Because the ischemic retinal circulation is unable to meet the high metabolic demand created by the photostress in a timely manner. Think of it as retinal claudication, with the prolonged visual recovery time being analogous to the calf pain after walking in PAD, or the jaw claudication induced by chewing in GCA.

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Can photostress recovery time be formally assessed in the clinic?

Yes, it can indeed, via the photostress recovery test. The test is performed unilaterally. The BCVA for the eye is determined (reliable results require that VA be 20/80 or better). An extremely bright light is shone directly into the eye from a distance of about 1 inch for 10 seconds. The pt is then asked to read a Snellen line one row worse than their BCVA, and the amount of time it takes for them to be able to do this is recorded. A normal photostress time would be 30-s or less; pts with OIS will take significantly longer, usually at least 90-s.

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Does it present unilaterally, or bilaterally?
Unilaterally (in about 80% of cases)

Is there a gender predilection?
Yes, men are twice as likely to have it

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Yes, OIS is a dz of older individuals—average age is about 65; and it’s rare before 55

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--Prolonged photostress recovery time

What is ‘photostress recovery time’?
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Two words

Photostress recovery test

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How would a pt with VA loss 2ndry to an optic neuropathy perform on the test?

Her result would be normal—which makes this test very useful in determining whether a pt with VA loss has macular/vascular dz vs an optic neuropathy.

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- [Kinda goes with cell/flare]
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- **ONH**
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What type of cataract is classically associated with OIS?

: Posterior subcapsular (PSC)

Are other ocular ischemic conditions associated with PSC?

I’m glad you asked…

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**Symptoms:**
- Decreased vision
- Pain
- Prolonged photostress recovery time

What type of cataract is classically associated with OIS?
: Posterior subcapsular (PSC)

Are other ocular ischemic conditions associated with PSC?
I'm glad you asked…

Does OIS carry implications for the general health of the afflicted individual?
Indeed it does—the 5-year mortality rate of OIS is 40%!
Regarding ischemic conditions that cause PSCs... The *Lens* book names two besides OIS.

- Ocular ischemic syndrome
Regarding ischemic conditions that cause PSCs…The *Lens* book names three besides OIS.

- **Ocular ischemic syndrome**
Regarding ischemic conditions that cause PSCs... The *Lens* book names three besides OIS. *What are they?*

- ?
- **Ocular ischemic syndrome**
- ?
- ?

*Mnemonic forthcoming*
Regarding ischemic conditions that cause PSCs... The *Lens* book names three besides OIS. *What are they?*

- B
- Ocular ischemic syndrome
- A
- T

*Mnemonic: BOAT*

*Hints forthcoming*
Regarding ischemic conditions that cause PSCs…The *Lens* book names three besides OIS. *What are they?*

**Systemic**
- B
  - **Ocular ischemic syndrome**

**Ocular**
- A

**Systemic**
- T

*Mnemonic: BOAT*

*Hints: One is ocular and…*
  *Two are systemic and…*
Regarding ischemic conditions that cause PSCs...The *Lens* book names three besides OIS. *What are they?*

**Systemic**
- **B**
- **Ocular ischemic syndrome**

**Ocular**
- **A**

**Systemic**
- **T**

*Mnemonic: BOAT*

*Hints: One is ocular and...iatrogenic*
  *Two are systemic and...eponymous, and rare (but you read about them in med school)*
Regarding ischemic conditions that cause PSCs…The *Lens* book names three besides OIS. *What are they?*

- **Buerger’s disease** (Thromboangiitis obliterans)
- **Ocular ischemic syndrome**
- **Anterior segment ischemia syndrome**
- **Takayasu’s arteritis** (Pulseless disease)

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**Mnemonic:** BOAT

**Hints:**
- One is ocular and... iatrogenic
- Two are systemic and... eponymous, and rare (but you read about them in med school)

*How bad can the cataract get in these conditions?*
- Total opacification is not uncommon
Regarding ischemic conditions that cause PSCs... The *Lens* book names three besides OIS. What are they?

- **Buerger’s disease (Thromboangiitis obliterans)**

*In a nutshell, what is Buerger’s disease?*

- **Systemic**

Mnemonic: **BOAT**

Hints: One is ocular and... iatrogenic

Two are systemic and... eponymous, and rare (but you read about them in med school)
Regarding ischemic conditions that cause PSCs…The *Lens* book names three besides OIS. *What are they?*

- **Buerger’s disease (Thromboangiitis obliterans)**

**In a nutshell, what is Buerger’s disease?**

An inflammatory vaso-occlusive disease of small- to medium-sized vessels

**Mnemonic:** **BOAT**

**Hints:** One is ocular and…iatrogenic

Two are systemic and…eponymous, and rare (but you read about them in med school)
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- **Buerger’s disease** (Thromboangiitis obliterans)

*In a nutshell, what is Buerger’s disease?*
An inflammatory vaso-occlusive disease of small/medium-sized vessels. It has a propensity for affecting vessels of the one word

*Mnemonic: BOAT*

*Hints:* One is ocular and... iatrogenic
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  *In a nutshell, what is Buerger’s disease?*
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  *Mnemonic:* BOAT

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- **Buerger’s disease** (Thromboangiitis obliterans)

**In a nutshell, what is Buerger’s disease?**

An inflammatory vaso-occlusive disease of small/medium-sized vessels. It has a propensity for affecting vessels of the extremities, and because of this, it is not uncommon for Buerger’s pts to undergo multiple amputations.

**Mnemonic:** BOAT

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**Mnemonic:** BOAT

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  **Mnemonic: BOAT**

  **Hints:** One is ocular and...iatrogenic
  
  Two are systemic and...eponymous, and rare (but you read about them in med school)
Ocular Ischemic Syndrome

It was noted that anterior segment ischemia syndrome is iatrogenic. In very general terms, what physician-related activity is the cause?

**Anterior segment ischemia syndrome**

**Takayasu’s arteritis (Pulseless disease)**

Mnemonic: **BOAT**

Hints: One is ocular and **iatrogenic**

Two are systemic and…eponymous, and rare (but you read about them in med school)
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- Ocular ischemic syndrome
- Anterior segment ischemia syndrome
- Takayasu’s arteritis (Pulseless disease)

It was noted that anterior segment ischemia syndrome is iatrogenic. In very general terms, what physician-related activity is the cause? Eye surgery

Mnemonic: BOAT

Hints: One is ocular and iatrogenic
Two are systemic and eponymous, and rare (but you read about them in med school)
Regarding ischemic conditions that cause PSCs, the Lens book names three besides OIS:

- Buerger's disease (Thromboangiitis obliterans)
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**It was noted that anterior segment ischemia syndrome is iatrogenic. In very general terms, what physician-related activity is the cause?**

Eye surgery

**Again in general terms, how does eye surgery cause anterior segment ischemia?**

By impeding/disrupting blood flow to the anterior segment

**What two eye surgeries are the most common cause?**

- Scleral buckling surgery
- Strabismus surgery on more than two muscles simultaneously

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--Strabismus surgery

**Anterior segment ischemia syndrome**  
**Takayasu’s arteritis (Pulseless disease)**

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In a nutshell, what is Takayasu’s arteritis?

Takayasu’s arteritis (Pulseless disease)

Mnemonic: BOAT

Hints: One is ocular and...iatrogenic
Two are systemic and...eponymous, and rare (but you read about them in med school)
In a nutshell, what is Takayasu’s arteritis?
An inflammatory vasculitis that typically affects large vessels.

Takayasu’s arteritis (Pulseless disease)

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Systemic

Ocular

Systemic

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*How ‘large’ are we talking about here?*

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How ‘large’ are we talking about here?
‘The aorta and its major branches’ is the classic description of the affected vessels

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*Is it common, or rare?*

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Is there a gender predilection?
Yes, it is far more common in women

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Is there an age predilection?

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Yes, it is far more common in women

Is there an age predilection?
Yes, most cases present in early adulthood

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Is there an ethnicity predilection?

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*Is there a gender predilection?*
Yes, it is far more common in women

*Is there an age predilection?*
Yes, most cases present in early adulthood

*Is there an ethnicity predilection?*
Yes, it is reported at higher rates in Asian populations

**Takayasu’s arteritis (Pulseless disease)**

*Mnemonic: BOAT*

*Hints: One is ocular and...iatrogenic*
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Regarding ischemic conditions that cause PSCs...
The Lens book names three besides OIS. What are they?

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Yes, most cases present in early adulthood

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Takayasu’s arteritis (Pulseless disease) - Systemic

Mnemonic: BOAT

Hints: One is ocular and...iatrogenic
Two are systemic and...eponymous, and rare (but you read about them in med school)
(This is a good point in the set to take a break)
DDx for an OIS-like fundus

? OIS ?
DDx for an OIS-like fundus

- Hyperviscosity syndrome
- OIS
- CRVO
The Retina book mentions three causes of hyperviscosity syndrome—what are they?

Ocular Ischemic Syndrome

DDx for an OIS-like fundus

Hyperviscosity syndrome

? ? ? CRVO OIS
The Retina book mentions three causes of hyperviscosity syndrome—what are they?

What key finding strongly suggests an OIS-like presentation is in fact a manifestation of a hyperviscosity syndrome?

If hyperviscosity syndrome is suspected, what tests should be ordered?

A DDx for an OIS-like fundus

Hyperviscosity syndrome
- Waldenström macroglobulinemia
- Multiple myeloma
- Polycythemia vera

OIS

CRVO
The Retina book mentions three causes of hyperviscosity syndrome—what are they?

What key finding strongly suggests an OIS-like presentation is in fact a manifestation of a hyperviscosity syndrome?
The Retina book mentions three causes of hyperviscosity syndrome—what are they?

What key finding strongly suggests an OIS-like presentation is in fact a manifestation of a hyperviscosity syndrome?

If the findings are bilateral...
The Retina book mentions three causes of hyperviscosity syndrome—what are they?

What key finding strongly suggests an OIS-like presentation is in fact a manifestation of a hyperviscosity syndrome?
If the findings are bilateral

If hyperviscosity syndrome is suspected, what tests should be ordered?
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--?
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The Retina book mentions three causes of hyperviscosity syndrome—what are they?

What key finding strongly suggests an OIS-like presentation is in fact a manifestation of a hyperviscosity syndrome?

If the findings are bilateral

If hyperviscosity syndrome is suspected, what tests should be ordered?

--CBC
--Serum electrophoresis
--Measurement of whole-blood viscosity
What is the mechanism underlying CRVO?

DDx for an OIS-like fundus

CRVO

Ocular Ischemic Syndrome
Ocular Ischemic Syndrome

DDx for an OIS-like fundus

What is the mechanism underlying CRVO?
Thrombosis of the central retinal vein

CRVO
What is the mechanism underlying CRVO?
Thrombosis of the central retinal vein

Where does thrombosis typically occur?
What is the mechanism underlying CRVO?
Thrombosis of the central retinal vein

Where does thrombosis typically occur?
At the lamina cribrosa, or just posterior to it
DDx for an OIS-like fundus

What is the mechanism underlying CRVO?
Thrombosis of the central retinal vein

Where does thrombosis typically occur?
At the lamina cribrosa, or just posterior to it

Do CRVO pts tend to be vasculopaths?
What is the mechanism underlying CRVO?
Thrombosis of the central retinal vein

Where does thrombosis typically occur?
At the lamina cribrosa, or just posterior to it

Do CRVO pts tend to be vasculopaths?
Yes—HTN is second only to age as a risk factor for CRVO
What is the mechanism underlying CRVO?
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Do CRVO pts tend to be vasculopathies?
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What role does vasculopathy play in the genesis of a CRVO?
What is the mechanism underlying CRVO? Thrombosis of the central retinal vein

Where does thrombosis typically occur? At the lamina cribrosa, or just posterior to it

Do CRVO pts tend to be vasculopathies? Yes—HTN is second only to age as a risk factor for CRVO

What role does vasculopathy play in the genesis of a CRVO? Vasculopathy contributes to the development of atherosclerotic dz, and it’s atherosclerotic changes to retinal arterial vessels that cause them to impinge upon and compress adjacent venous vessels.
What is the mechanism underlying CRVO?
Thrombosis of the central retinal vein

Where does thrombosis typically occur?
At the lamina cribrosa, or just posterior to it

Do CRVO pts tend to be vasculopaths?
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What role does vasculopathy play in the genesis of a CRVO?
Vasculopathy contributes to the development of atherosclerotic dz, and it’s atherosclerotic changes to retinal arterial vessels that cause them to impinge upon and compress adjacent venous vessels. Impingement impedes blood flow through the venous vessel, as well as damages its endothelial cells. The combination of endothelial damage and impeded blood flow initiates the clotting cascade, with the result being formation of a thrombus.
What is the mechanism underlying CRVO?
Thrombosis of the central retinal vein

Where does thrombosis typically occur?
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What two DFE findings are the hallmark of an CRVO event?
--?
--?
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What two DFE findings are the hallmark of an CRVO event?
--Hemorrhages mainly in the
--?
What is the mechanism underlying CRVO?
Thrombosis of the central retinal vein

Where does thrombosis typically occur?
At the lamina cribrosa, or just posterior to it

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What role does vasculopathy play in the genesis of a CRVO?
Vasculopathy contributes to the development of atherosclerotic dz, and it’s atherosclerotic changes to retinal arterial vessels that cause them to impinge upon and compress adjacent venous vessels. Impingement impedes blood flow through the venous vessel, as well as damages its endothelial cells. The combination of endothelial damage and impeded blood flow initiates the clotting cascade, with the result being formation of a thrombus.

What two DFE findings are the hallmark of an CRVO event?
--Hemorrhages mainly in the nerve fiber layer (FH)
--?
What is the mechanism underlying CRVO?
Thrombosis of the central retinal vein

Where does thrombosis typically occur?
At the lamina cribrosa, or just posterior to it

Do CRVO pts tend to be vasculopathes?
Yes—HTN is second only to age as a risk factor for CRVO

What role does vasculopathy play in the genesis of a CRVO?
Vasculopathy contributes to the development of atherosclerotic dz, and it’s atherosclerotic changes to retinal arterial vessels that cause them to impinge upon and compress adjacent venous vessels. Impingement impedes blood flow through the venous vessel, as well as damages its endothelial cells. The combination of endothelial damage and impeded blood flow initiates the clotting cascade, with the result being formation of a thrombus.

What two DFE findings are the hallmark of an CRVO event?
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DDx for an OIS-like fundus

Ocular Ischemic Syndrome

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**DDx for an OIS-like fundus**

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- Hyperviscosity syndrome

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OIS and a mild CRVO can be difficult to differentiate from one another.
Ocular Ischemic Syndrome

OIS and a mild CRVO can be difficult to differentiate from one another. For each statement, indicate whether it best applies to OIS, CRVO, or Both.

No question yet--proceed
For each statement, indicate whether it best applies to OIS, CRVO, or Both.

- Retinal hemorrhages present:
For each statement, indicate whether it best applies to OIS, CRVO, or Both.

- Retinal hemorrhages present: Both
Ocular Ischemic Syndrome

For each statement, indicate whether it best applies to **OIS, CRVO, or Both**.

- Retinal hemorrhages present: **Both**
- c/o periorbital ache:
For each statement, indicate whether it best applies to **OIS**, **CRVO**, or **Both**.

- Retinal hemorrhages present: **Both**
- c/o periorbital ache: **OIS**
For each statement, indicate whether it best applies to OIS, CRVO, or Both.

- Retinal hemorrhages present: Both
- c/o periorbital ache: OIS
- Retinal veins dilated: 

Ocular Ischemic Syndrome
Retinal hemorrhages present: Both

c/o periorbital ache: OIS

Retinal veins dilated: Both
For each statement, indicate whether it best applies to \textit{OIS}, \textit{CRVO}, or \textit{Both}.

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- Hemorrhages confined to mid-periphery:
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For each statement, indicate whether it best applies to **OIS**, **CRVO**, or **Both**.

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- Cell and flare present:
Ocular Ischemic Syndrome

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- At risk for rubeosis iridis:
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What is the landmark clinical trial dictating management of carotid occlusive disease as is so often associated with OIS?

The Carotid Endarterectomy (CEA) Study

What forms of management were compared in the CEA Study?

It looked at CEA vs antiplatelet therapy for carotid occlusive disease in symptomatic patients.

How was symptomatic defined?

Patients had a history of TIA, amaurosis fugax, or nondisabling CVA.

What was the major finding of the CEA Study?

The major finding was that treatment risk/benefit ratio was a function of the extent of carotid blockage. Specific recommendations were as follows:

- If blockage was 70-99%: risk of CVA 9% in CEA group, 26% in antiplatelet group; the benefit outweighed the risk, and these patients should be offered CEA.
- If blockage was 50-69%: risk of CVA is 16% in CEA, 22% in antiplatelet group; the risk outweighed the benefit, and these patients should not be offered CEA.

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Only if you want to do well on the OKAPs and Boards...
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It is not uncommon for pts with OIS to have 100% blockage of their ipsilateral carotid artery. Note that 100% blockage of the carotids is a contraindication to CEA, as it is ineffective in these cases.
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What is the landmark clinical trial dictating management of carotid occlusive disease as is so often associated with OIS? The Carotid Endarterectomy Study

What forms of management were compared in the CEA Study? It looked at CEA vs antiplatelet therapy for carotid occlusive disease in symptomatic patients

How was symptomatic defined? Patients had a history of TIA, amaurosis fugax, or nondisabling CVA

What was the major finding of the CEA Study? The major finding was that treatment risk/benefit ratio was a function of the extent of carotid blockage. Specific recommendations were as follows:
If blockage was...

...70-99%: risk of CVA 9% in CEA group, 26% in antiplatelet group; the benefit outweighed the risk, and these patients should be offered CEA

...50-69%: risk of CVA is 16% in CEA, 22% in antiplatelet group; the risk outweighed the benefit, and these patients should not be offered CEA

As an ophthalmology resident, I don’t really need to know this in detail, do I? Only if you want to do well on the OKAPs and Boards...