Define glaucoma.
Define glaucoma.

Glaucoma is a group of optic neuropathies that present with progressive ONH damage and characteristic VF loss.
Define glaucoma.
Glaucoma is a group of optic neuropathies that present with progressive ONH damage and characteristic VF loss

Why isn’t elevated IOP mentioned above?
Define glaucoma. Glaucoma is a group of optic neuropathies that present with progressive ONH damage and characteristic VF loss.

Why isn’t elevated IOP mentioned above? Elevated IOP is a strong risk factor for glaucoma, but it need not be present—IOP can be normal, or even low. (Hence this slide-set.)
Define glaucoma.
Glaucoma is a group of optic neuropathies that present with progressive ONH damage and characteristic VF loss

Why isn’t elevated IOP mentioned above?
Elevated IOP is a strong risk factor for glaucoma, but it need not be present—IOP can be normal, or even low. (Hence this slide-set.)

In addition to being the strongest risk factor for glaucoma, IOP has another quality that renders it unique—what is it?
Define glaucoma.
Glaucoma is a group of optic neuropathies that present with progressive ONH damage and characteristic VF loss.

Why isn’t elevated IOP mentioned above?
Elevated IOP is a strong risk factor for glaucoma, but it need not be present—IOP can be normal, or even low. (Hence this slide-set.)

In addition to being the strongest risk factor for glaucoma, IOP has another quality that renders it unique—what is it?
It is the only risk factor that is modifiable in a manner proven to influence the risk of glaucoma progression.
Define glaucoma.
Glaucoma is a group of optic neuropathies that present with progressive ONH damage and characteristic VF loss.

Why isn’t elevated IOP mentioned above?
Elevated IOP is a strong risk factor for glaucoma, but it need not be present—IOP can be normal, or even low. (Hence this slide-set.)

In addition to being the strongest risk factor for glaucoma, IOP has another quality that renders it unique—what is it?
It is the only risk factor that is modifiable in a manner proven to influence the risk of glaucoma progression.

That’s why glaucoma management consists of IOP-lowering maneuvers!
The first thought you should have when encountering a pt you suspect has glaucoma is…
Glaucoma

Open-angle  ?  Closed- or narrow-angle

The first thought you should have when encountering a pt you suspect has glaucoma is…

*What is the status of the angle?*

Normal-Tension Glaucoma (NTG)
The first thought you should have when encountering a pt you suspect has glaucoma is…

What is the status of the angle?

How does one determine the status of the angle?
Glaucoma

Open-angle

Closed- or narrow-angle

The first thought you should have when encountering a pt you suspect has glaucoma is…

*What is the status of the angle?*

*How does one determine the status of the angle?*

**Gonioscopy.** Don’t assume your glaucoma pt has open angles—**prove** it by gonioing them!
Normal-Tension Glaucoma (NTG)

Once you have determined your glaucoma pt has open angles, the next ‘first thought’ is to ask…
Once you have determined your glaucoma pt has open angles, the next ‘first thought’ is to ask…

*Is it high-tension OAG, or low (ie, ‘normal’) tension OAG?*
Untreated IOP measurement always above # mmHg

What IOP value is used to classify glaucoma pts as high- vs normal-tension?

Untreated IOP measurement always at or below # mmHg
Untreated IOP measurement always above 21 mmHg

Untreated IOP measurement always at or below 21 mmHg

What IOP value is used to classify glaucoma pts as high-vs normal-tension?

Normal-Tension Glaucoma (NTG)

Normal-tension glaucoma (NTG)

↑IOP

OAG

A
Normal-Tension Glaucoma (NTG)

OAG

↑IOP

Normal-tension glaucoma (NTG)

Untreated IOP measurement always above \(21\) mmHg

Untreated IOP measurement always at or below \(21\) mmHg

What IOP value is used to classify glaucoma pts as high- vs normal-tension?

Why ‘21’? What’s the justification for using this particular value as the cutoff?
Untreated IOP measurement always above 21 mmHg

What IOP value is used to classify glaucoma pts as high- vs normal-tension?

Why ‘21’? What’s the justification for using this particular value as the cutoff?

It’s a statistical, not clinical, extrapolation. Back in the day, population studies indicated that the mean IOP is [insert value], with a standard deviation (SD) of [insert value].
Untreated IOP measurement always above 21 mmHg.

Untreated IOP measurement always at or below 21 mmHg.

Normal-Tension Glaucoma (NTG)

OAG

↑IOP

What IOP value is used to classify glaucoma pts as high- vs normal-tension?

Why ‘21’? What’s the justification for using this particular value as the cutoff?

It’s a statistical, not clinical, extrapolation. Back in the day, population studies indicated that the mean IOP is 15.5, with a standard deviation (SD) of 2.6.
Untreated IOP measurement always above 21 mmHg

Untreated IOP measurement always at or below 21 mmHg

What IOP value is used to classify glaucoma pts as high- vs normal-tension?

Why ‘21’? What’s the justification for using this particular value as the cutoff?
It’s a statistical, not clinical, extrapolation. Back in the day, population studies indicated that the mean IOP is 15.5, with a standard deviation (SD) of 2.6. If one uses 2 SDs above the mean as the upper limit of normal (ie, non-pathologic) IOP, then the highest ‘normal’ IOP is 15.5 + (2×2.6) ≈ 21.
Why ‘21’? What’s the justification for using this particular value as the cutoff?

It’s a statistical, not clinical, extrapolation. Back in the day, population studies indicated that the mean IOP is 15.5, with a standard deviation (SD) of 2.6. If one uses 2 SDs above the mean as the upper limit of normal (i.e., non-pathologic) IOP, then the highest ‘normal’ IOP is 15.5 + (2×2.6) ≈ 21.

Note that, because this definition of normal vs abnormal IOP is purely statistical, some glaucomologists reject the notion that NTG is a distinct disease entity!
Why ‘21’? What’s the justification for using this particular value as the cutoff? It’s a statistical, not clinical, extrapolation. Back in the day, population studies indicated that the mean IOP is 15.5, with a standard deviation (SD) of 2.6. If one uses 2 SDs above the mean as the upper limit of normal (i.e., non-pathologic) IOP, then the highest normal IOP is 15.5 + (2×2.6) ≈ 21.

Untreated IOP measurement always above 21 mmHg

Untreated IOP measurement always at or below 21 mmHg

Normal-Tension Glaucoma (NTG)

Normal-tension glaucoma (NTG)

What IOP value is used to classify glaucoma pts as high- vs normal-tension?

But other glaucoma docs argue that the NTG haters need to slow their roll, because in fact there are clinical differences between high-tension OAG and NTG (as we shall soon see…)

Note that, because this definition of normal vs abnormal IOP is purely statistical, some glaucomologists reject the notion that NTG is a distinct disease entity!
Normal-Tension Glaucoma (NTG)

When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs
Normal-Tension Glaucoma (NTG)

When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs  T
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs  \textbf{T}
- NTG pts are less likely to have optic disc hemorrhages
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs  **T**
- NTG pts are less likely to have optic disc hemorrhages  **F**
**Normal-Tension Glaucoma (NTG)**

**vs High-Tension Glaucoma:**

- Some studies indicate NTG pts are more likely to be migraineurs ▶
- NTG pts are less likely to have optic disc hemorrhages ▼

*When compared to high-tension glaucoma pts:*

- Some studies indicate NTG pts are more likely to be migraineurs **T**
- NTG pts are less likely to have optic disc hemorrhages **F → T**
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs  \( \text{T} \)
- NTG pts are less likely to have optic disc hemorrhages  \( \text{T} \)

*In the context of NTG, are disc hemorrhages a finding of clinical significance (other than as evidence supporting the NTG diagnosis)*?
Normal-Tension Glaucoma (NTG) vs High-Tension Glaucoma: T/F

When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs T
- NTG pts are less likely to have optic disc hemorrhages T

In the context of NTG, are disc hemorrhages a finding of clinical significance (other than as evidence supporting the NTG diagnosis)? Yes. Disc hemorrhages are worrisome in that they indicate the glaucoma is progressing.
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs \( T \)
- NTG pts are less likely to have optic disc hemorrhages \( T \)
- NTG pts are more likely to test positive for syphilis
Normal-Tension Glaucoma (NTG) vs High-Tension Glaucoma: T/F

When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs **T**
- NTG pts are *less* likely to have optic disc hemorrhages **F**
- NTG pts are more likely to test positive for syphilis **F**
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs **T**
- NTG pts are less likely to have optic disc hemorrhages **F**
- NTG pts are more likely to test positive for syphilis **F**
Normal-Tension Glaucoma (NTG) vs High-Tension Glaucoma: T/F

When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs: **T**
- NTG pts are less likely to have optic disc hemorrhages: **F**
- NTG pts are more likely to test positive for syphilis: **T**

Does this mean syphilis testing plays no role in evaluating NTG?
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs: True
- NTG pts are less likely to have optic disc hemorrhages: False
- NTG pts are more likely to test positive for syphilis: False

Does this mean syphilis testing plays no role in evaluating NTG? To the contrary—some experts perform syphilis testing routinely during the initial evaluation of a possible NTG case.
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs \( \text{T} \)
- NTG pts are less likely to have optic disc hemorrhages \( \text{T} \)
- NTG pts are more likely to test positive for syphilis \( \text{T} \)
- Some studies indicate NTG pts have a higher rate of Raynaud’s
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs: T
- NTG pts are less likely to have optic disc hemorrhages: F → T
- NTG pts are more likely to test positive for syphilis: F → T
- Some studies indicate NTG pts have a higher rate of Raynaud’s: T
Normal-Tension Glaucoma (NTG)

vs High-Tension Glaucoma: T/F

When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs T
- NTG pts are less likely to have optic disc hemorrhages F
- NTG pts are more likely to test positive for syphilis F
- Some studies indicate NTG pts have a higher rate of Raynaud’s T

The increased prevalence of these conditions in the NTG population converges with the fact that vascular abnormalities may play a role in NTG
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs **T**
- NTG pts are **less** likely to have optic disc hemorrhages **F** **T**
- NTG pts are more likely to test positive for syphilis **F** **T**
- Some studies indicate NTG pts have a higher rate of Raynaud’s **T**
- VF defects in NTG tend to be more peripheral and diffuse
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs  **T**
- NTG pts are less likely to have optic disc hemorrhages  **F**  **T**
- NTG pts are more likely to test positive for syphilis  **F**  **T**
- Some studies indicate NTG pts have a higher rate of Raynaud’s  **T**
- VF defects in NTG tend to be more peripheral and diffuse  **F**
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs
- NTG pts are less likely to have optic disc hemorrhages
- NTG pts are more likely to test positive for syphilis
- Some studies indicate NTG pts have a higher rate of Raynaud’s
- VF defects in NTG tend to be more peripheral and diffuse
Normal-Tension Glaucoma (NTG) vs High-Tension Glaucoma:

When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs \(^{T}\)
- NTG pts are less likely to have optic disc hemorrhages \(^{F}\)
- NTG pts are more likely to test positive for syphilis \(^{T}\)
- Some studies indicate NTG pts have a higher rate of Raynaud’s \(^{T}\)
- VF defects in NTG tend to be more peripheral and diffuse \(^{F}\)
- NTG pts have a higher rate of congenital disc anomalies
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs: **T**
- NTG pts are less likely to have optic disc hemorrhages: **F**
- NTG pts are more likely to test positive for syphilis: **F**
- Some studies indicate NTG pts have a higher rate of Raynaud’s: **T**
- VF defects in NTG tend to be more peripheral and diffuse: **F**
- NTG pts have a higher rate of congenital disc anomalies: **F**
**Normal-Tension Glaucoma (NTG)**

vs High-Tension Glaucoma: T/F

*When compared to high-tension glaucoma pts:*

- Some studies indicate NTG pts are more likely to be migraineurs **T**
- NTG pts are less likely to have optic disc hemorrhages **F**
- NTG pts are more likely to test positive for syphilis **T**
- Some studies indicate NTG pts have a higher rate of Raynaud’s **T**
- VF defects in NTG tend to be more central and focal and peripheral and diffuse **F**
- NTG pts have a higher rate of congenital disc anomalies **F**
When compared to high-tension glaucoma pts:

- Some studies indicate NTG pts are more likely to be migraineurs: T ✓
- NTG pts are less likely to have optic disc hemorrhages: F ✓
- NTG pts are more likely to test positive for syphilis: T ✓
- Some studies indicate NTG pts have a higher rate of Raynaud’s: T ✓
- VF defects in NTG tend to be more peripheral and diffuse: F ✓
- NTG pts have a higher rate of congenital disc anomalies: F ✓
- Some studies indicate NTG pts are more likely to suffer with an autoimmune disease: T ✓
Normal-Tension Glaucoma (NTG) vs High-Tension Glaucoma: T/F

When compared to high-tension glaucoma pts:
- Some studies indicate NTG pts are more likely to be migraineurs $T$
- NTG pts are less likely to have optic disc hemorrhages $T$
- NTG pts are more likely to test positive for syphilis $F$
- Some studies indicate NTG pts have a higher rate of Raynaud’s $T$
- VF defects in NTG tend to be more central and focal $T$
- NTG pts have a higher rate of congenital disc anomalies $F$
- Some studies indicate NTG pts are more likely to suffer with an autoimmune disease $T$
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

-- Duh, it’s NTG

-- ?

-- ?

-- ?

-- ?

(Not specific diseases—broad categories of causes)
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

(not specific diseases—broad categories of causes)
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

Other than instrumentation error, what factor is most likely to account for an artifically low applanation IOP measurement?

A thinner-than-normal central corneal thickness

We know a 'naturally' thin CCT will produce an artifically-low applanation IOP. Is the same true for an iatrogenically thin cornea, ie, one that is s/p laser keratorefractive surgery for myopia?

Yes
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

Other than instrumentation error, what factor is most likely to account for an artifactually low applanation IOP measurement?

A thinner-than-normal central corneal thickness
Q

Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

Other than instrumentation error, what factor is most likely to account for an artifactually low applanation IOP measurement?

A thinner-than-normal central corneal thickness

We know a ‘naturally’ thin CCT will produce an artifactually-low applanation IOP. Is the same true for an iatrogenically thin cornea, ie, one that is s/p laser keratorefractive surgery for myopia?
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

Other than instrumentation error, what factor is most likely to account for an artifactually low applanation IOP measurement?

A thinner-than-normal central corneal thickness

We know a ‘naturally’ thin CCT will produce an artifactually-low applanation IOP. Is the same true for an iatrogenically thin cornea, ie, one that is s/p laser keratorefractive surgery for myopia?

Yes
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What is the most likely cause of IOP suppression in an ‘untreated’ (note the quotes) pt?**
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. *Other than NTG, what is in the DDx?*

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is *high*, but it’s being suppressed

--The IOP is *intermittently* high, and you keep missing it

--The IOP *used to be* high, but it’s not anymore

--It ain’t GON

What is the most likely cause of IOP suppression in an ‘untreated’ (note the quotes) pt?

Systemic treatment of HTN with a β blocker
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is **intermittently** high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What are some of the causes of intermittent IOP elevation in a pt with open angles?**

--

--
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

What are some of the causes of intermittent IOP elevation in a pt with open angles?

--Diurnal IOP variation in high-tension OAG
--Posner-Schlossman syndrome

--The IOP used to be high, but it’s not anymore

--It ain’t GON
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is the range of diurnal variation typical of nonglaucomatous eyes?

Diurnal IOP variation in high-tension OAG

--Posner-Schlossman syndrome
A

Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is the range of diurnal variation typical of nonglaucomatous eyes?

2 to 6 mmHg

What is the range of diurnal variation in high-tension OAG?

Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is the range of diurnal variation typical of nonglaucomatous eyes?
2 to 6 mmHg

Is there a relationship between IOP and the degree of fluctuation?

In a pt with open angles?

--Diurnal IOP variation in high-tension OAG

--Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is the range of diurnal variation typical of nonglaucomatous eyes?
2 to 6 mmHg

Is there a relationship between IOP and the degree of fluctuation?
Yes—the higher the IOP, the greater the amount of variation

In a pt with open angles?
--Diurnal IOP variation in high-tension OAG
--Posner-Schlossman syndrome
Q

Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is the range of diurnal variation typical of nonglaucomatous eyes?
2 to 6 mmHg

Is there a relationship between IOP and the degree of fluctuation?
Yes—the higher the IOP, the greater the amount of variation

Do glaucomatous eyes tend to have more, or less variation?

In pt with open angles?
--Diurnal IOP variation in high-tension OAG
--Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, and it’s being suppressed

--The IOP is **intermittently** high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

---

**What is the range of diurnal variation typical of nonglaucomatous eyes?**

2 to 6 mmHg

---

**Is there a relationship between IOP and the degree of fluctuation?**

Yes—the higher the IOP, the greater the amount of variation

---

**Do glaucomatous eyes tend to have more, or less variation?**

More

---

**In a pt with open angles?**

--Diurnal IOP variation in high-tension OAG

--Posner-Schlossman syndrome
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--- Duh, it’s NTG

--- The IOP is high, but you missed it

--- The IOP is high, but it’s being suppressed

--- The IOP is intermittently high, and you keep missing it

--- The IOP used to be high, but it’s not anymore

--- It ain’t GON

--- What is the range of diurnal variation typical of nonglaucomatous eyes?

  2 to 6 mmHg

--- Is there a relationship between IOP and the degree of fluctuation?

  Yes—the higher the IOP, the greater the amount of variation

--- Do glaucomatous eyes tend to have more, or less variation?

  More

--- At what amount of diurnal variation can one be fairly confident the pt has glaucoma?

  **Diurnal IOP variation in high-tension OAG**

  -- Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG  

--The IOP is high, but you missed it  

--The IOP is high, but it’s being suppressed  

--The IOP is intermittently high, and you keep missing it  

--The IOP used to be high, but it’s not anymore  

--It ain’t GON

---

**What is the range of diurnal variation typical of nonglaucomatous eyes?**  
2 to 6 mmHg

**Is there a relationship between IOP and the degree of fluctuation?**  
Yes—the higher the IOP, the greater the amount of variation

**Do glaucomatous eyes tend to have more, or less variation?**  
More

**At what amount of diurnal variation can one be fairly confident the pt has glaucoma?**  
The BCSC Glaucoma book mentions 10 mmHg in this regard

---

--Diurnal IOP variation in high-tension OAG

--Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What are some of the causes of intermittent IOP elevation in a pt with open angles?

--Diurnal IOP variation in high-tension OAG

As a clinician, what can one do to minimize the chance of missing the high readings in a pt with wide diurnal variation?
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What are some of the causes of intermittent IOP elevation in a pt with open angles?**

--Diurnal IOP variation in high-tension OAG

As a clinician, what can one do to minimize the chance of missing the high readings in a pt with wide diurnal variation?

Determine a pressure curve for all ‘NTG’ pts, ie, check their IOP at multiple time points throughout the day
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high.

**DDx**

- Duh, it’s NTG
- The IOP is high, but you missed it
- The IOP is high, but it’s being suppressed
- The IOP is **intermittently** high, and you keep missing it
- The IOP used to be high, but it’s not anymore
- It ain’t GON

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

- Posner-Schlossman syndrome

-- Diurnal IOP variation in high-tension OAG
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is normal.

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What is the nonpneonymous name for Posner-Schlossman?**

Glaucomatocyclitic crisis

--Diurnal IOP variation in high-tension OAG

--Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high.

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

Who is the typical pt?

- An adult age 20-50
- Diurnal IOP variation in high-tension OAG
- Posner-Schlossman syndrome

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is **intermittently** high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**Diurnal IOP variation in high-tension OAG**

--Posner-Schlossman syndrome

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

Glaucomatocyclitic crisis

**Who is the typical pt?**

An adult age 20-50
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG
--The IOP is high, but you missed it
--The IOP is high, but it’s being suppressed
--The IOP is intermittently high, and you keep missing it
--The IOP used to be high, but it’s not anymore
--It ain’t GON

What are some of the causes of intermittent IOP elevation in a pt with open angles?

--Diurnal IOP variation in high-tension OAG
--Posner-Schlossman syndrome

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

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

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

How long do the crises last?
Hours to days

Do they recur?
Yes
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high.

--- Duh, it’s NTG

--- The IOP is high, but you missed it

--- The IOP is high, but it’s being suppressed

--- The IOP is intermittently high, and you keep missing it

--- The IOP used to be high, but it’s not anymore

--- It ain’t GON

DDx

--- Diurnal IOP variation in high-tension OAG

--- Posner-Schlossman syndrome

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

--- Glaucomatocyclitic crisis

--- Who is the typical pt?

--- An adult age 20-50

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

--- Mild
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is
never high.

- What is the non-eponymous name for Posner-Schlossman?
  - 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 eye tend to be red and angry?

- No, it is usually white and quiet

-- Duh, it’s NTG

Dx
-- The IOP is high, but you missed it

-- The IOP is intermittently high, and you keep missing it

-- The IOP used to be high, but it’s not anymore

-- It ain’t GON
Normal-Tension Glaucoma (NTG)
You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is normal.

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is intermittently high, and you keep missing it

--The IOP is **intermittently** high, but it’s not anymore

--It ain’t GON

**What is the nonpneonymous name for Posner-Schlossman?**
Glaucmatocyclitic crisis

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

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

Does the eye tend to be **red and angry**?
No, it is usually **white and quiet**

--Diurnal IOP variation in high-tension OAG
--Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high.

- What is the non-eponymous name for Posner-Schlossman?
  - 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?

-- Duh, it’s NTG

-- The IOP is intermittently high, and you keep missing it

-- The IOP used to be high, but it’s not anymore

-- It ain’t GON

DDx

-- The IOP is high, but you missed it

-- The IOP is high, but it’s being suppressed

-- Diurnal IOP variation in high-tension OAG

-- Posner-Schlossman syndrome

What are some of the causes of intermittent IOP elevation in a pt with open angles?

-- Diurnal IOP variation in high-tension OAG

-- Posner-Schlossman syndrome

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?
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is **intermittently** high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

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

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?*

Severe

--Diurnal IOP variation in high-tension OAG

--Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is normal.

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

How severe?
- IOP in the 40-60 range is typical

- Diurnal IOP variation in high-tension OAG
- Posner-Schlossman syndrome

DDx

- Duh, it’s NTG
- The IOP is high, but you missed it
- The IOP is high, but it’s being suppressed
- The IOP is intermittently high, and you keep missing it
- The IOP used to be high, but it’s not anymore
- It ain’t GON
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is normal.

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

How severe?
- IOP in the 40-60 range is typical

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

--Diurnal IOP variation in high-tension OAG
--Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high.

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

How long do the crises last?
Hours to days

Do they recur?
Yes

--Duh, it’s NTG
--The IOP is high, but you missed it
--The IOP is high, but it’s being suppressed
--The IOP is intermittently high, and you keep missing it
--The IOP used to be high, but it’s not anymore
--It ain’t GON

DDx

--Diurnal IOP variation in high-tension OAG
--Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is not high.

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What is the nonpejorative name for Posner-Schlossman?**

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?**

Severe

**How long do the crises last?**

Hours to days

--Diurnal IOP variation in high-tension OAG

--Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high.

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

How long do the crises last?
- Hours to days

Do they recur?
- Yes

- Diurnal IOP variation in high-tension OAG
- Posner-Schlossman syndrome

DDx

-- Duh, it’s NTG

-- The IOP is high, but you missed it

-- The IOP is high, but it’s being suppressed

-- The IOP is intermittently high, and you keep missing it

-- The IOP used to be high, but it’s not anymore

-- It ain’t GON
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high.

---Duh, it’s NTG

---The IOP is high, but you missed it

---The IOP is high, but it’s being suppressed

---The IOP is intermittently high, and you keep missing it

---The IOP used to be high, but it’s not anymore

---It ain’t GON

DDx

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

How long do the crises last?
Hours to days

Do they recur?
Yes

--Diurnal IOP variation in high-tension OAG
--Posner-Schlossman syndrome
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high.

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

**DDx**

- Duh, it’s NTG
- The IOP is high, but you missed it
- The IOP is high, but it’s being suppressed
- The IOP is **intermittently** high, and you keep missing it
- The IOP used to be high, but it’s not anymore
- It ain’t GON

**What are the presenting complaints in Posner-Schlossman?**

- Unilateral discomfort
- Blurred vision
- Haloes around lights

**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 long do the crises last?**

- Hours to days

**Do they recur?**

- Yes

**Diurnal IOP variation in high-tension OAG**

**Posner-Schlossman syndrome**
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high.

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

How long do the crises last?
Hours to days

Do they recur?
Yes

What are the presenting complaints in Posner-Schlossman?
- Unilateral discomfort
- Blurred vision
- Haloes around lights

--Diurnal IOP variation in high-tension OAG
--Posner-Schlossman syndrome

---Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is normal.

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

How long do the crises last?
Hours to days

What is the cause of the blurred vision/haloes?
--Corneal edema secondary to the high IOP

Do they recur?
Yes

What are the presenting complaints?
--Unilateral discomfort
--Blurred vision
--Haloes around lights

- Posner-Schlossman syndrome
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is not high.

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

How long do the crises last?
- Hours to days

What is the cause of the blurred vision/haloes?
- Corneal edema secondary to the high IOP

Do they recur?
- Yes

What are the presenting complaints?
- Unilateral discomfort
  - Blurred vision
  - Haloes around lights

- Posner-Schlossman syndrome

DDx

-- Duh, it’s NTG

-- The IOP is high, but you missed it

-- The IOP is intermittently high, and you keep missing it

-- The IOP used to be high, but it’s not anymore

-- It ain’t GON
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?

Histories of the following:

--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?

Histories of the following:

--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis

Also, so-called ‘burned out’ pigment-dispersion glaucoma'
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP.
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What is pigment-dispersion glaucoma (PDG)?**
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

**What is the mechanism by which pigment is liberated from the posterior iris?**

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?

Histories of the following:
--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out’ pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, and it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What is the mechanism by which pigment is liberated from the posterior iris?
Rubbing of the lens zonules against the iris

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?
Histories of the following:
--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out’ pigment-dispersion glaucoma
**Q**

**Normal-Tension Glaucoma (NTG)**

*You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?*

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, and it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

---

What is pigment-dispersion glaucoma (PDG)?

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

---

What are the classic clinical signs of PDG located on…

…the iris?

---

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?

Histories of the following:

---Systemic steroid use with steroid-response glaucoma

---Trauma with angle damage and/or severe inflammation

---Uveitis

Also, so-called ‘burned out’ pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, and you keep missing it

--The IOP is intermittently high, but it’s being suppressed

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What are the classic clinical signs of PDG located on…
…the iris? Transillumination defects

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?
Histories of the following:
--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out’ pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**How are the TIDs typically oriented?**

...the iris? Transillumination defects

**What clinical scenarios might explain why an eye once had elevated IOP but no longer does?**

Histories of the following:

--Systemic steroid use with steroid-response glaucoma

--Trauma with angle damage and/or severe inflammation

--Uveitis

Also, so-called ‘burned out’ pigment-dispersion glaucoma.**
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

How are the TIDs typically oriented?

Radially

...the iris? Transillumination defects

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?

Histories of the following:

--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis

Also, so-called ‘burned out’ pigment-dispersion glaucoma.
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

How are the TIDs typically oriented?
Radially

If they were limited to the pupillary margin, what dz process would be suggested?

...the iris? Transillumination defects

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?

Histories of the following:
--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis

Also, so-called 'burned out' pigment-dispersion glaucoma.
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

How are the TIDs typically oriented?
Radially

If they were limited to the pupillary margin, what dz process would be suggested?
Pseudoexfoliation syndrome (PXS)

…the iris? Transillumination defects

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?
Histories of the following:
--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out’ pigment-dispersion glaucoma
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, and it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What are the classic clinical signs of PDG located on…
...the iris? Transillumination defects
...the cornea?

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?
Histories of the following:
--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out’ pigment-dispersion glaucoma

Q
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What are the classic clinical signs of PDG located on…

…the iris? Transillumination defects

…the cornea? Krukenberg spindle

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?

Histories of the following:

--Systemic steroid use with steroid-response glaucoma

--Trauma with angle damage and/or severe inflammation

--Uveitis

Also, so-called ‘burned out’ pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?

What is a Krukenberg spindle?

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?

Histories of the following:

--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis

Also, so-called ‘burned out pigment-dispersion glaucoma’
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

---

**What is pigment-dispersion glaucoma (PDG)?**

**What is a Krukenberg spindle?**

A vertical distribution of pigment on the endothelial surface of the cornea

---

**What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?**

Histories of the following:

--Systemic steroid use with steroid-response glaucoma

--Trauma with angle damage and/or severe inflammation

--Uveitis

Also, so-called ‘burned out pigment-dispersion glaucoma’
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, and it’s being suppressed

--The IOP is **intermittently** high, and you keep missing it

--The IOP **used to be** high, but it’s not anymore

--It ain’t GON

---

**What is pigment-dispersion glaucoma (PDG)?**

**What is a Krukenberg spindle?**
A vertical distribution of pigment on the endothelial surface of the cornea

**What factors account for the location and shape of the spindle?**

...the cornea? **Krukenberg spindle**

---

**What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?**

Histories of the following:

--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis

Also, so-called ‘burned out' **pigment-dispersion glaucoma.’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, and it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What is pigment-dispersion glaucoma (PDG)?**

**What is a Krukenberg spindle?**
A vertical distribution of pigment on the endothelial surface of the cornea

**What factors account for the location and shape of the spindle?**
Convection currents within the anterior chamber funnel pigment into this area

...the cornea? **Krukenberg spindle**

**What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?**

Histories of the following:

--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis

Also, so-called ‘burned out’ **pigment-dispersion glaucoma’**
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is *intermittently* high, and you keep missing it

--The IOP **used to be** high, but it’s not anymore

--It ain’t GON

**What is pigment-dispersion glaucoma (PDG)?**

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

**What are the classic clinical signs of PDG located on…**

…the iris? Transillumination defects

…the cornea? Krukenberg spindle

…the angle?

**What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?**

Histories of the following:

--Systemic steroid use with steroid-response glaucoma

--Trauma with angle damage and/or severe inflammation

--Uveitis

Also, so-called ‘burned out’ pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What are the classic clinical signs of PDG located on...

...the iris? Transillumination defects
...the cornea? Krukenberg spindle
...the angle? Sampaolesi line

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?
Histories of the following:
--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out’ pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What is pigment-dispersion glaucoma (PDG)?**
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

**What are the classic clinical signs of PDG located on…**
…the iris? Transillumination defects
…the cornea? Krukenberg spindle
…the angle? **Sampaolesi line**

**What is a Sampaolesi line?**
A scalloped line of pigment located anterior (ie, ‘above’ on gonioscopy) to Schwalbe’s line in the angle.

Histories of the following:
--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out’ pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG
--The IOP is high, but you missed it
--The IOP is high, but it’s being suppressed
--The IOP is intermittently high, and you keep missing it
--The IOP used to be high, but it’s not anymore
--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What are the classic clinical signs of PDG located on...
...the iris? Transillumination defects
...the cornea? Krukenberg spindle
...the angle? Sampaolesi line

What is a Sampaolesi line?
A scalloped line of pigment located anterior (ie, ‘above’ on gonioscopy) to Schwalbe’s line in the angle

Histories of the following:
--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

-- Duh, it’s NTG

-- The IOP is high, but you missed it

-- The IOP is high, but it’s being suppressed

-- The IOP is intermittently high, and you keep missing it

-- The IOP used to be high, but it’s not anymore

-- It ain’t GON

*What is pigment-dispersion glaucoma (PDG)?*

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

*What are the classic clinical signs of PDG located on…*

… the iris? Transillumination defects

… the cornea? Krukenberg spindle

… the angle? Sampaolesi line

… the lens?

*What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?*

Histories of the following:

-- Systemic steroid use with steroid-response glaucoma

-- Trauma with angle damage and/or severe inflammation

-- Uveitis

Also, so-called ‘burned out’ pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, and it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP **used to be** high, but it’s not anymore

--It ain’t GON

---

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What are the classic clinical signs of PDG located on…
…the iris? Transillumination defects
…the cornea? Krukenberg spindle
…the angle? Sampaolesi line
…the lens? Scheie stripe

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?
Histories of the following:
--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What is pigment-dispersion glaucoma (PDG)?

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What is a Scheie stripe?

A ribbon-shaped deposition of pigment on the posterior capsule, where the zonules insert

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?

Histories of the following:

--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out’ pigment-dispersion glaucoma.
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

---Duh, it’s NTG

---The IOP is high, but you missed it

---The IOP is high, and you keep missing it

---The IOP is intermittently high, but it’s being suppressed

---The IOP used to be high, but it’s not anymore

---It ain’t GON

**DDx**

---What is pigment-dispersion glaucoma (PDG)?

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

---What is a Scheie stripe?

A ribbon-shaped deposition of pigment on the posterior capsule, where the zonules insert

---What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?

Histories of the following:

---Systemic steroid use with steroid-response glaucoma

---Trauma with angle damage and/or severe inflammation

---Uveitis

Also, so-called ‘burned out’ pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What is a Scheie stripe?
A ribbon-shaped deposition of pigment on the posterior capsule, where the zonules insert

By what other eponymous name is this sign known?

...the lens? **Scheie stripe**

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?
Histories of the following:
--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis
Also, so-called ‘burned out’ pigment-dispersion glaucoma.
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, and you keep missing it

--The IOP is intermittently high, but it’s being suppressed

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What is pigment-dispersion glaucoma (PDG)?

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What is pigment-dispersion glaucoma (PDG)?

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What is a Scheie stripe?

A ribbon-shaped deposition of pigment on the posterior capsule, where the zonules insert

By what other eponymous name is this sign known?

Zentmayer line (the Glaucoma book prefers this term)

Scheie stripe

What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?

Histories of the following:

--Systemic steroid use with steroid-response glaucoma
--Trauma with angle damage and/or severe inflammation
--Uveitis

Also, so-called 'burned out' pigment-dispersion glaucoma'
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, and it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What is pigment-dispersion glaucoma (PDG)?**
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

**What are the classic clinical signs of PDG located on…**

…the iris? Transillumination defects?

…the cornea? Krukenberg spindle?

…the angle? Sampaolesi line?

…the lens? Scheie stripe?

**Which (if any) of these is/are pathognomonic for PDG?**

**What clinical scenarios might explain why an eye once had elevated IOP, but no longer does?**
Histories of the following:

--Systemic steroid use with steroid-response glaucoma

--Trauma with angle damage and/or severe inflammation

--Uveitis

Also, so-called ‘burned out’ pigment-dispersion glaucoma'
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

--The IOP is high, but it’s being suppressed

What are the classic clinical signs of PDG located on…

…the iris? Transillumination defects
…the cornea? Krukenberg spindle
…the angle? Sampaolesi line
…the lens? **Scheie stripe**

Which (if any) of these is/are pathognomonic for PDG?
Only the **Scheie stripe**

--The IOP intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

Also, so-called ‘burned out’ pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

What is pigment-dispersion glaucoma (PDG)?

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What are the classic clinical signs of PDG located on...

...the iris? Transillumination defects
...the cornea? Krukenberg spindle
...the angle? Sampaolesi line
...the lens? Scheie stripe

What does it mean to say PDG ‘burns out’?

Also, so-called ‘burned out pigment-dispersion glaucoma’

--It ain’t GON
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is **intermittently** high, and you keep missing it

---

**What is pigment-dispersion glaucoma (PDG)?**

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP.

---

**What are the classic clinical signs of PDG located on…**

…the iris? Transillumination defects

…the cornea? Krukenberg spindle

…the angle? Sampaolesi line

…the lens? Scheie stripe

---

**What does it mean to say PDG ‘burns out’?**

Age-related changes in the architecture of the anterior segment, coupled with decreased accommodation-related movement of the lens, result in less and less contact between the posterior iris and the zonules, and therefore smaller and smaller amounts of liberated pigment. By middle age, the signs of PDG often fade, and the IOP normalizes.

---

--It ain’t GON

---

Also, so-called ‘**burned out** pigment-dispersion glaucoma’
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

**What is pigment-dispersion glaucoma (PDG)?**

A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

**What are the classic clinical signs of PDG located on…**

…the iris? **Transillumination defects?**

…the cornea? **Krukenberg spindle?**

…the angle? **Sampaolesi line?**

…the lens? **Scheie stripe?**

One sign doesn’t fade with time—which one?

**What does it mean to say PDG ‘burns out’?**

Age-related changes in the architecture of the anterior segment, coupled with decreased accommodation-related movement of the lens, result in less and less contact between the posterior iris and the zonules, and therefore smaller and smaller amounts of liberated pigment. By middle age, the signs of PDG often **fade**, and the IOP normalizes.

--It ain’t GON

*Also, so-called ‘burned out pigment-dispersion glaucoma’*
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

What is pigment-dispersion glaucoma (PDG)?
A form of secondary OAG in which pigment liberated from the posterior aspect of the iris leads to elevated IOP

What are the classic clinical signs of PDG located on...
...the iris? Transillumination defects
...the cornea? Krukenberg spindle
...the angle? Sampaolesi line
...the lens? **Scheie stripe**

One sign doesn’t fade with time— which one?
Scheie’s stripe (a fact that increases its value as an exam finding)

What does it mean to say PDG ‘burns out’?
Age-related changes in the architecture of the anterior segment, coupled with decreased accommodation-related movement of the lens, result in less and less contact between the posterior iris and the zonules, and therefore smaller and smaller amounts of liberated pigment. By middle age, the signs of PDG often fade, and the IOP normalizes.

--It ain’t GON

Also, so-called ‘burned out pigment-dispersion glaucoma’
**Normal-Tension Glaucoma (NTG)**

*You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?*

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?

--

--

--
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?

--Certain congenital disc anomalies
--Hx of AION
--Hx of PION
--Toxic/nutritional optic neuropathy

--It ain’t GON
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

---

*What ‘ain’t GON’ conditions might preser Mimic NTG? What are they?*

--Certain congenital disc anomalies

--Hx of AION

--Hx of PION

--Toxic/nutritional optic neuropathy

---

Four congenital disc anomalies can mimic NTG. What are they?
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP *is* high, but you missed it

--The IOP *is* high, but it’s being suppressed

--The IOP is *intermittently* high, and you keep missing it

--The IOP *used to be* high, but it’s not anymore

--It ain’t GON

Four congenital disc anomalies can mimic NTG. What are they?

--Optic nerve pits
--Optic nerve colobomas
--Optic nerve hypoplasia
--Superior segmental hypoplasia

What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?

--Certain congenital disc anomalies
--Hx of AION
--Hx of PION
--Toxic/nutritional optic neuropathy
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

---

**What are the 4 D’s of optic nerve hypoplasia?**

--D

--D

--D

--D

*Hints forthcoming…*

---

**Four congenital disc anomalies can mimic NTG. What are they?**

--Optic nerve pits

--Optic nerve colobomas

--Optic nerve hypoplasia

--Superior segmental hypoplasia

---

**What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?**

--Certain congenital disc anomalies

--Hx of AION

--Hx of PION

--Toxic/nutritional optic neuropathy
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?

--Certain congenital disc anomalies
--Hx of AION
--Hx of PION
--Toxic/nutritional optic neuropathy

What are the 4 D’s of optic nerve hypoplasia?

These three concern mom’s life while she was pregnant with the child who will have ON hypoplasia

A rare congenital condition

Four congenital disc anomalies can mimic NTG. What are they?

--Optic nerve pits
--Optic nerve colobomas
--Optic nerve hypoplasia
--Superior segmental hypoplasia
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?

--Certain congenital disc anomalies
--Hx of AION
--Hx of PION
--Toxic/nutritional optic neuropathy

What are the 4 D’s of optic nerve hypoplasia?

--Drink (ie, heavy EtOH consumption)
--Diabetes
--Drugs (especially anti-sz meds, esp. Dilantin)
--De Morsier syndrome

These three concern mom’s life while she was pregnant with the child who will have ON hypoplasia

A rare congenital condition

Four congenital disc anomalies can mimic NTG. What are they?

--Optic nerve pits
--Optic nerve colobomas
--Optic nerve hypoplasia
--Superior segmental hypoplasia
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

Four congenital disc anomalies can mimic NTG. What are they?

--Optic nerve pits
--Optic nerve colobomas
--Optic nerve hypoplasia
--Superior segmental hypoplasia

What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?

--Certain congenital disc anomalies
--Hx of AION
--Hx of PION
--Toxic/nutritional optic neuropathy

What are the 4 D’s of optic nerve hypoplasia?

--Drink (ie, heavy EtOH consumption)
--Diabetes
--Drugs (especially anti-sz meds, esp. Dilantin)
--De Morsier syndrome

These three concern mom’s life while she was pregnant with the child who will have ON hypoplasia

A rare congenital condition
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What specific pattern of ON hypoplasia is associated with maternal DM?**

--Drink (ie, heavy EtOH consumption)

--Diabetes

--Drugs (especially anti-sz meds, esp. Dilantin)

--De Morsier syndrome

**Four congenital disc anomalies can mimic NTG. What are they?**

--Optic nerve pits

--Optic nerve colobomas

--Optic nerve hypoplasia

--Superior segmental hypoplasia

**What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?**

--Certain congenital disc anomalies

--Hx of AION

--Hx of PION

--Toxic/nutritional optic neuropathy

These three concern mom’s life while she was pregnant with the child who will have ON hypoplasia

A rare congenital condition
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

DDx

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?

--Certain congenital disc anomalies
--Optic nerve hypoplasia
--Optic nerve colobomas

What specific pattern of ON hypoplasia is associated with maternal DM?

Superior segmental hypoplasia

These three concern mom’s life while she was pregnant with the child who will have ON hypoplasia

A rare congenital condition

What are the 4 D’s of optic nerve hypoplasia?

--Drink (ie, heavy EtOH consumption)
--Diabetes
--Drugs (especially anti-sz meds, esp. Dilantin )
--De Morsier syndrome

Four congenital disc anomalies can mimic NTG. What are they?

--Optic nerve pits
--Optic nerve colobomas
--Superior segmental hypoplasia

These three concern mom’s life while she was pregnant with the child who will have ON hypoplasia

A rare congenital condition
**Q**

**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?**

--Certain congenital disc anomalies
--Hx of AION
--Hx of PION
--Toxic/nutritional

What does AION stand for in this context?

Anterior ischemic optic neuropathy

What are the two types of AION?

Arteritic (AAION) and nonarteritic (NAION)
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. *Other than NTG, what is in the DDx?*

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?**

--Certain congenital disc anomalies
--Hx of AION
--Hx of PION
--Toxic/nutritional vis a vis GON?

**What does AION stand for in this context?**

Anterior ischemic optic neuropathy
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

---What ‘ain’t GON

---Certain congenital

---Hx of AION

---Hx of PION

---Toxic/nutritional

**What does AION stand for in this context?**

Anterior ischemic optic neuropathy

**What are the two types of AION?**

Arteritic (AAION) and nonarteritic (NAION)
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What ‘ain’t GON

--Certain congen

--Hx of AION

--Hx of PION

--Toxic/nutritional

What does AION stand for in this context?

Anterior ischemic optic neuropathy

What are the two types of AION?

Arteritic (AAION) and nonarteritic (NAION)
**Q**

**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

- What ‘ain’t GON
  - Certain congenital disc anomalies
  - Hx of AION
  - Hx of PION
  - Toxic/nutritional

- What does AION stand for in this context?
  - Anterior ischemic optic neuropathy

- What disease is being referred to by the modifier ‘arteritic’?
  - Arteritic (AAION) and nonarteritic (NAION)

- What is suggestive of GON?
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What ‘ain’t GON**

--Certain congen

--Hx of AION

--Hx of PION

--Toxic/nutritional

**What does AION stand for in this context?**

Anterior ischemic optic neuropathy

**What disease is being referred to by the modifier ‘arteritic’?**

Temporal arteritis (aka giant cell arteritis)

**Arteritic (AAION) and nonarteritic (NAION)**
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is **intermittently** high, and you keep missing it

--The IOP **used to be** high, but it’s not anymore

--It ain’t GON

What ‘ain’t GON

--Certain congen

--Hx of AION

--Hx of PION

--Toxic/nutritional

*What does PION stand for in this context? Is suggestive of GON?*
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What ‘ain’t GON**

--Certain congen.
--Hx of AION
--Hx of PION
--Toxic/nutritional

**What does PION stand for in this context?**

*Posterior* ischemic optic neuropathy

Is suggestive of GON?
**Normal-Tension Glaucoma (NTG)**

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What ‘ain’t GON**

--Certain congen

--Hx of AION

--Hx of PION

--Toxic/nutritional

**What does PION stand for in this context?**

**Posterior** ischemic optic neuropathy

**What is the classic backstory for PION?**

A history of a prolonged hypotensive event
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

What ‘ain’t GON
--Certain congen
--Hx of AION
--Hx of PION
--Toxic/nutritional

What does PION stand for in this context?
**Posterior** ischemic optic neuropathy

What is the classic backstory for PION?
A history of a prolonged hypotensive event
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

The fact that you’re looking for a ‘history’ of something suggests what?

What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?

--Certain congenital disc anomalies
--Hx of AION
--Hx of PION
--Toxic/nutritional

A history of a prolonged hypotensive event

Posterior ischemic optic neuropathy (PION)

What is the classic backstory for PION?

A history of a prolonged hypotensive event

The fact that you’re looking for a ‘history’ of something suggests what?
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

The fact that you’re looking for a ‘history’ of something suggests what? That you have to inquire directly about this during the H&P (Remember: When all else fails, talk to the pt)

What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?

--Certain congenital disc anomalies
--Hx of AION
--Hx of PION
--Toxic/nutritional

A history of a prolonged hypotensive event
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is **intermittently** high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

---

The fact that you’re looking for a ‘history’ of something suggests what? That you have to inquire directly about this during the H&P (Remember: When all else fails, talk to the pt)

**What sorts of events should one ask about?**

---

What ‘ain’t GON

--Certain congen

--Hx of AION

--Hx of PION

--Toxic/nutritional

---

A history of a prolonged hypotensive event
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

---Certain congen
---Hx of AION
---Hx of PION
---Toxic/nutritional
---Some other

*The fact that you’re looking for a ‘history’ of something suggests what?*
That you have to inquire directly about this during the H&P
(Remember: When all else fails, talk to the pt)

*What sorts of events should one ask about?*
---Cardiac arrest
---Cardiac surgery involving a bypass machine
---Significant blood loss during surgery or after trauma
---A history of shock with profound hypotension
---A history of severe anemia

*A history of a prolonged hypotensive event*
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

*What specific portion of the optic nerve is affected in toxic/nutritional optic neuropathy?*

*What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?*

--Certain congenital disc anomalies

--Hx of AION

--Hx of PION

--Toxic/nutritional optic neuropathy
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

**What specific portion of the optic nerve is affected in toxic/nutritional optic neuropathy?**
The papillomacular bundle (PMB)

**What 'ain't GON' conditions might present with ONH/VF findings suggestive of GON?**
--Certain congenital disc anomalies
--Hx of AION
--Hx of PION
--Toxic/nutritional optic neuropathy
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. **Other than NTG, what is in the DDx?**

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

---What specific portion of the optic nerve is affected in toxic/nutritional optic neuropathy?

The **papillomacular bundle** (PMB)

---Why are fibers of the PMB affected preferentially?

---Toxic/nutritional optic neuropathy

---Certain congenital disc anomalies

---Hx of AION

---Hx of PION

---Toxic/nutritional optic neuropathy
Normal-Tension Glaucoma (NTG)

You have a pt with ONH and VF changes c/w glaucomatous optic neuropathy (GON), but at every exam, her IOP is never high. Other than NTG, what is in the DDx?

**DDx**

--Duh, it’s NTG

--The IOP is high, but you missed it

--The IOP is high, but it’s being suppressed

--The IOP is intermittently high, and you keep missing it

--The IOP used to be high, but it’s not anymore

--It ain’t GON

---

**What ‘ain’t GON’ conditions might present with ONH/VF findings suggestive of GON?**

--Certain congenital disc anomalies
--Hx of AION
--Hx of PION--Toxic/nutritional optic neuropathy

---

**What specific portion of the optic nerve is affected in toxic/nutritional optic neuropathy?**

The papillomacular bundle (PMB)

---

**Why are fibers of the PMB affected preferentially?**

Think of the PMB fibers as the canary in the coal mine. These fibers are small, have high metabolic activity rates, and are unmyelinated. Taken together, these characteristics make them highly vulnerable to toxins and/or nutritional deficiencies.
Objective: Determine whether IOP is involved in the pathogenesis of NTG

What was the name of the clinical trial that had this as its objective?
Normal-Tension Glaucoma (NTG)

Collaborative Normal-Tension Glaucoma Study

Objective: Determine whether IOP is involved in the pathogenesis of NTG

*What was the name of the clinical trial that had this as its objective?* Depending on who you ask, there are 6-8 glaucoma clinical trials a resident might be expected to know by name, and the CNTGS is one of them. (As for the others, we'll meet one shortly, and the rest of mine can be found in the *Glaucoma Clinical Trials* slide-set.)
Objective: Determine whether IOP is involved in the pathogenesis of NTG

Subjects: 70 patients (140 eyes) with normal IOP and VF loss
Collaborative Normal-Tension Glaucoma Study

Objective: Determine whether IOP is involved in the pathogenesis of NTG

Subjects: 70 patients (140 eyes) with normal IOP and VF loss

Protocol: 1 eye assigned to tx, the other to no tx

Tx: 3 modalities as needed to lower IOP
Collaborative Normal-Tension Glaucoma Study

Objective: Determine whether IOP is involved in the pathogenesis of NTG

Subjects: 70 patients (140 eyes) with normal IOP and VF loss

Protocol: 1 eye assigned to tx, the other to no tx

Tx: Meds/ALT/surgery as needed to lower IOP 30%
Collaborative Normal-Tension Glaucoma Study

- Objective: Determine whether IOP is involved in the pathogenesis of NTG
- Subjects: 70 patients (140 eyes) with normal IOP and VF loss
- Protocol: 1 eye assigned to tx, the other to no tx
  - Tx: Meds/ALT/surgery as needed to lower IOP 30%

What one topical hypotensive was used?
Collaborative Normal-Tension Glaucoma Study

Objective: Determine whether IOP is involved in the pathogenesis of NTG

Subjects: 70 patients (140 eyes) with normal IOP and VF loss

Protocol: 1 eye assigned to tx, the other to no tx

Tx: **Meds/ALT/surgery** as needed to lower IOP by 30%

What one topical hypotensive was used? Pilo
Collaborative Normal-Tension Glaucoma Study

- Objective: Determine whether IOP is involved in the pathogenesis of NTG
- Subjects: 70 patients (140 eyes) with normal IOP and VF loss
- Protocol: 1 eye assigned to tx, the other to no tx
  - Tx: Meds/ALT/surgery as needed to lower IOP 30%
- Findings:
  - Lowering IOP 30% → reduced rate of ONH/VF loss, but…
Collaborative Normal-Tension Glaucoma Study

Objective: Determine whether IOP is involved in the pathogenesis of NTG

Subjects: 70 patients (140 eyes) with normal IOP and VF loss

Protocol: 1 eye assigned to tx, the other to no tx
- Tx: Meds/ALT/surgery as needed to lower IOP 30%

Findings:
- Lowering IOP 30% \(\rightarrow\) reduced rate of ONH/VF loss, *but*...
  - 65% of untreated eyes had...
Collaborative Normal-Tension Glaucoma Study

Objective: Determine whether IOP is involved in the pathogenesis of NTG

Subjects: 70 patients (140 eyes) with normal IOP and VF loss

Protocol: 1 eye assigned to tx, the other to no tx
- Tx: Meds/ALT/surgery as needed to lower IOP 30%

Findings:
- Lowering IOP 30% → reduced rate of ONH/VF loss, but…
  - 65% of untreated eyes had no progression
**Collaborative Normal-Tension Glaucoma Study**

- Objective: Determine whether IOP is involved in the pathogenesis of NTG
- Subjects: 70 patients (140 eyes) with normal IOP and VF loss
- Protocol: 1 eye assigned to tx, the other to no tx
  - Tx: Meds/ALT/surgery as needed to lower IOP 30%
- Findings:
  - Lowering IOP 30% → reduced rate of ONH/VF loss, *but*...
    - 65% of untreated eyes had *no progression*
    - 12% of treated eyes...
**Collaborative Normal-Tension Glaucoma Study**

- **Objective:** Determine whether IOP is involved in the pathogenesis of NTG
- **Subjects:** 70 patients (140 eyes) with normal IOP and VF loss
- **Protocol:** 1 eye assigned to tx, the other to no tx
  - Tx: Meds/ALT/surgery as needed to lower IOP 30%
- **Findings:**
  - Lowering IOP 30% → reduced rate of ONH/VF loss, *but*…
    - 65% of untreated eyes had *no progression*
    - 12% of treated eyes *progressed anyway*
Collaborative Normal-Tension Glaucoma Study

Objective: Determine whether IOP is involved in the pathogenesis of NTG

Subjects: 70 patients (140 eyes) with normal IOP and VF loss

Protocol: 1 eye assigned to tx, the other to no tx

Tx: Meds/ALT/surgery as needed to lower IOP 30%

Findings:

- Lowering IOP 30% → reduced rate of ONH/VF loss, but...
- 65% of untreated eyes had no progression
- 12% of treated eyes progressed anyway

If you remember nothing else about the CNTGS, remember this!
If asked (on the OKAP, the WQE, the Boards, or in clinic) what your initial treatment goal is for a NTG pt, the answer is a 30% reduction in IOP from baseline.
Collaborative Normal-Tension Glaucoma Study

Objective: Determine whether IOP is involved in the pathogenesis of NTG

Subjects: 70 patients (140 eyes) with normal IOP and VF loss

Protocol: 1 eye assigned to tx, the other to no tx

Tx: Meds/ALT/surgery as needed to lower IOP 30%

Findings:

- Lowering IOP 30% → reduced rate of ONH/VF loss, but…
  - 65% of untreated eyes had no progression
  - 12% of treated eyes progressed anyway

The CNTGS employed pilo—très passé. Regarding other meds, is there a reason to use a particular med (or to avoid one)?

As for preferred meds, the book mentions that there is some evidence of a 'neuroprotective effect' imparted by the highly selective α agonists, in particular brimonidine. So you might give that a shot.
Collaborative Normal-Tension Glaucoma Study

Objective: Determine whether IOP is involved in the pathogenesis of NTG

Subjects: 70 patients (140 eyes) with normal IOP and VF loss

Protocol: 1 eye assigned to tx, the other to no tx

Tx:
- Meds/ALT/surgery as needed to lower IOP 30%

Findings:
- Lowering IOP 30% → reduced rate of ONH/VF loss
- 65% of untreated eyes had no progression
- 12% of treated eyes progressed anyway

The CNTGS employed pilo—très passé. Regarding other meds, is there a reason to use a particular med (or to avoid one)?

Yes and yes. The Glaucoma book is at pains to point out that the Early Manifest Glaucoma Trial (EMGT—another know-by-name glaucoma clinical trial) found that in NTG pts, tx with a β blocker + ALT combo failed to produce a significant reduction in IOP. So, maybe avoid β blockers. As for preferred meds, the book mentions that there is some evidence of a ‘neuroprotective effect’ imparted by the highly selective α agonists, in particular brimonidine. So you might give that a shot.
Collaborative Normal-Tension Glaucoma Study

Objective: Determine whether IOP is involved in the pathogenesis of NTG

Subjects: 70 patients (140 eyes) with normal IOP and VF loss

Protocol: 1 eye assigned to tx, the other to no tx

Tx: Meds/ALT/surgery as needed to lower IOP 30%

Findings:

- Lowering IOP
  - 65% of untreated eyes had no progression
  - 12% of treated eyes progressed anyway

The CNTGS employed pilo—très passé. Regarding other meds, is there a reason to use a particular med (or to avoid one)? Yes and yes. The Glaucoma book is at pains to point out that the Early Manifest Glaucoma Trial (EMGT—another know-by-name glaucoma clinical trial) found that in NTG pts, tx with a β blocker + ALT combo failed to produce a significant reduction in IOP. So, maybe avoid β blockers. As for preferred meds, the book mentions that there is some evidence of a ‘neuroprotective effect’ imparted by the highly selective α agonists, in particular brimonidine. So you might give that a shot.
Normal-Tension Glaucoma (NTG)

Speaking of the

Early Manifest Glaucoma Trial...
Normal-Tension Glaucoma (NTG)

- Early Manifest Glaucoma Trial
  - Objective:
Early Manifest Glaucoma Trial

Objective: Compare immediate treatment vs observation in newly-diagnosed POAG/NTG
Early Manifest Glaucoma Trial

- Objective: Compare immediate treatment vs observation in newly-diagnosed POAG/NTG
- Protocol: 1 eye assigned to ALT + betaxolol, the other to no treatment
Early Manifest Glaucoma Trial

- Objective: Compare immediate treatment vs observation in newly-diagnosed POAG/NTG
- Protocol: 1 eye assigned to ALT + betaxolol, the other to no treatment
Normal-Tension Glaucoma (NTG)

Early Manifest Glaucoma Trial

- Objective: Compare immediate treatment vs observation in newly-diagnosed POAG/NTG
- Protocol: 1 eye assigned to ALT + betaxolol, the other to no treatment
- Findings:
  - Significantly more progression in untreated eyes than in treated eyes
Early Manifest Glaucoma Trial

- **Objective:** Compare immediate treatment vs observation in newly-diagnosed POAG/NTG
- **Protocol:** 1 eye assigned to ALT + betaxolol, the other to no treatment
- **Findings:**
  - Significantly more progression in untreated eyes (62%) than in treated eyes (45%)
Early Manifest Glaucoma Trial

Objective: Compare immediate treatment vs observation in newly-diagnosed POAG/NTG

Protocol: 1 eye assigned to ALT + betaxolol, the other to no treatment

Findings:
- Significantly more progression in untreated eyes (62%) than in treated eyes (45%)
  - Every 1 mmHg decrease in IOP translated into a roughly 10% risk reduction regarding progression
Early Manifest Glaucoma Trial

Objective: Compare immediate treatment vs observation in newly-diagnosed POAG/NTG

Protocol: 1 eye assigned to ALT + betaxolol, the other to no treatment

Findings:
- Significantly more progression in untreated eyes (62%) than in treated eyes (45%)
  - Every 1 mmHg decrease in IOP translated into a roughly 10% risk reduction regarding progression
Early Manifest Glaucoma Trial

Objective: Compare immediate treatment vs observation in newly-diagnosed POAG/NTG

Protocol: 1 eye assigned to ALT + betaxolol, the other to no treatment

Findings:

- Significantly more progression in untreated eyes (62%) than in treated eyes (45%)
  - Every 1 mmHg decrease in IOP translated into a roughly 10% risk reduction regarding progression
- Progression occurred later in treated eyes
- ALT + betaxolol had little IOP-lowering effect on eyes for which the baseline IOP was # or less
Early Manifest Glaucoma Trial

Objective: Compare immediate treatment vs observation in newly-diagnosed POAG/NTG

Protocol: 1 eye assigned to **ALT + betaxolol**, the other to no treatment

Findings:

- Significantly more progression in untreated eyes (62%) than in treated eyes (45%)
  - Every 1 mmHg decrease in IOP translated into a roughly 10% risk reduction regarding progression
- Progression occurred later in treated eyes
- **ALT + betaxolol** had little IOP-lowering effect on eyes for which the baseline IOP was 15 or less

Normal-Tension Glaucoma (NTG)