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

*What is the status of the angle?*
The first thought you should have when encountering a pt you suspect has glaucoma is…

**What is the status of the angle?**

**What does it mean to say the angle is closed?**

---

**Primary Angle Closure Glaucoma**

**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?

*What does it mean to say the angle is closed?*
It means the peripheral iris is in contact with the trabecular meshwork (TM)
The first thought you should have when encountering a pt you suspect has glaucoma is…

What is the status of the angle?

What does it mean to say the angle is closed?
It means the peripheral iris is in contact with the trabecular meshwork (TM)

This contact comes in two basic flavors—what are they?

--

--
What is the status of the angle?

What does it mean to say the angle is closed?
It means the peripheral iris is in contact with the trabecular meshwork (TM)

This contact comes in two basic flavors—what are they?
--The iris can appose the TM, ie, touch it without adhering to it
--The iris can be syneched to the TM, ie, adhered to it
The first thought you should have when encountering a pt you suspect has glaucoma is…

**What is the status of the angle?**

*What does it mean to say the angle is closed?*
It means the peripheral iris is in contact with the trabecular meshwork (TM)

*This contact comes in two basic flavors—what are they?*
--The iris can *appose* the TM, ie, touch it without adhering to it
--The iris can be *syneched* to the TM, ie, adhered to it

*I don’t know if *syneched* is actually a word, but you catch my drift*
Glaucoma

Primary Angle Closure Glaucoma

Open-angle

Closed- or narrow-angle

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

*is it primary or secondary?*
Glaucoma

Primary Angle Closure Glaucoma

Open-angle

Closed- or narrow-angle

Primary

Secondary

What differentiates primary from secondary angle-closure glaucoma?
What differentiates primary from secondary angle-closure glaucoma?
In secondary, a specific pathological cause of angle closure can be identified, whereas no such cause is present in primary dz.
Secondary angle-closure glaucoma is discussed in detail in its own slide-set; see the Table of Contents.
Glaucoma

Open-angle

Closed- or narrow-angle

Primary

Secondary

What are the four subtypes of PACG?
Glaucoma

Closed- or narrow-angle

Open-angle

Primary

Secondary

Primary Angle Closure Glaucoma

Acute
Subacute
Chronic
Plateau iris

What are the four subtypes of PACG?
Primary Angle Closure Glaucoma

Glaucoma

Open-angle

Closed- or narrow-angle

Primary

Secondary

Acute

Subacute

Chronic

Plateau iris

In what fundamental way do these three…
Glaucoma

Open-angle

Closed- or narrow-angle

Primary

Secondary

Primary Angle Closure Glaucoma

In what fundamental way do these three…

…differ from this one?

Acute

Subacute

Chronic

Plateau iris
In what fundamental way do these three…

They share a common mechanism:

two words
Glaucoma

Open-angle

Closed- or narrow-angle

Primary

Secondary

Primary Angle Closure Glaucoma

In what fundamental way do these three…

They share a common mechanism: Pupillary block
What does *pupillary block* refer to, exactly?

- They share a common mechanism: **Pupillary block**

*Primary Angle Closure Glaucoma*

- Glaucoma

*Glaucoma*

- What does *pupillary block* refer to, exactly?

  - Pupillary block refers to contact between the pupil margin and the lens that impedes the normal flow of aqueous from the posterior chamber (PC) to the anterior chamber (AC) through the pupillary aperture.

  - Pupillary block leads to the development of a pressure gradient across the iris, which causes the iris to bow forward.

  - If the iris bows far enough, the peripheral iris will come into apposition with and occlude the drainage angle, precipitating acute closure of the angle and a prodigious rise in IOP.

*Posterior Chamber? I didn't know the vitreous was involved.*

- It isn’t. The posterior chamber is the space immediately behind the iris and anterior to the lens/zonules. Vitreous resides in the vitreous cavity.
Glaucoma

Primary Angle Closure Glaucoma

What does **pupillary block** refer to, exactly?
It refers to contact between the pupil margin and the lens that impedes the normal flow of aqueous from the posterior chamber (PC) to the anterior chamber (AC) through the pupillary aperture.

- They share a common mechanism: **Pupillary block**
What does pupillary block refer to, exactly?
It refers to contact between the pupil margin and the lens that impedes the normal flow of aqueous from the posterior chamber (PC) to the anterior chamber (AC) through the pupillary aperture.
Primary Angle Closure Glaucoma

1. Resistance to aqueous flow from the PC to the AC

‘Pupillary block’
What does **pupillary block** refer to, exactly?
It refers to contact between the pupil margin and the lens that impedes the normal flow of aqueous from the posterior chamber (PC) to the anterior chamber (AC) through the pupillary aperture.

Pupillary block leads to the development of a pressure gradient across the iris, which causes the iris to **bow forward**. If the iris bows far enough, the peripheral iris will come into apposition with and occlude the drainage angle, precipitating acute closure of the angle and a prodigious rise in IOP.

They share a common mechanism: **Pupillary block**.
What does pupillary block refer to, exactly?
It refers to contact between the pupil margin and the lens that impedes the normal flow of aqueous from the posterior chamber (PC) to the anterior chamber (AC) through the pupillary aperture.

Pupillary block leads to the development of a pressure gradient across the iris, which causes the iris to bow forward.
Primary Angle Closure Glaucoma

2. The PC>AC pressure gradient causes the iris to bow forward, like a sail in the wind.

1. Resistance to aqueous flow from the PC to the AC

‘Pupillary block’
What does pupillary block refer to, exactly?
It refers to contact between the pupil margin and the lens that impedes the normal flow of aqueous from the posterior chamber (PC) to the anterior chamber (AC) through the pupillary aperture.

Pupillary block leads to the development of a pressure gradient across the iris, which causes the iris to bow forward. If the iris bows far enough, the peripheral iris will come into apposition with and occlude the drainage angle, precipitating acute closure of the angle and a prodigious rise in IOP.
3. Forward movement of the iris leads to apposition of the peripheral iris against the drainage angle, occluding it.

2. The PC>AC pressure gradient causes the iris to bow forward, like a sail in the wind.

1. Resistance to aqueous flow from the PC to the AC.

‘Pupillary block’
Primary Angle Closure Glaucoma
Primary Angle Closure Glaucoma

Normal angle

Trabecular meshwork

Angle closure

Iris

Blockage

Lens
Glaucoma

Primary Angle Closure Glaucoma

What does pupillary block refer to, exactly?
It refers to contact between the pupil margin and the lens that impedes the normal flow of aqueous from the posterior chamber (PC) to the anterior chamber (AC) through the pupillary aperture.

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It isn’t. The posterior chamber is the space immediately behind the iris and anterior to the lens/zonules. Vitreous resides in the vitreous cavity.
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Pupillary block leads to the development of a pressure gradient across the iris, which causes the iris to bow forward. If the iris bows far enough, the peripheral iris will come into apposition with and occlude the drainage angle, precipitating acute closure of the angle and a prodigious rise in IOP.

The posterior chamber? I didn’t know the vitreous was involved.
It isn’t. The posterior chamber is the space immediately behind the iris and anterior to the lens/zonules. Vitreous resides in the vitreous cavity.

They share a common mechanism:

Pupillary block
Primary Angle Closure Glaucoma
What's the dealio with plateau iris syndrome?
**Primary Angle Closure Glaucoma**

**Glaucoma**

- Closed- or narrow-angle
- Open-angle

**Primary**

- Acute
- Subacute
- Chronic

**Secondary**

**What's the dealio with plateau iris syndrome?**

In plateau iris, angle closure is due to ‘bad anatomy.’ Specifically, the ciliary processes are more anterior than normal, which in turn displace the peripheral iris perilously close to the drainage angle. (Some plateau-iris cases have a pupillary block component as well.)
Primary Angle Closure Glaucoma

Glaucoma

Open-angle

Closed- or narrow-angle

Primary

Secondary

In what fundamental way do these three... differ from this one?

Plateau iris

What’s the dealio with plateau iris syndrome?
In plateau iris, angle closure is due to ‘bad anatomy.’ Specifically, the ciliary processes are more anterior than normal, which in turn displace the peripheral iris perilously close to the drainage angle. (Some plateau-iris cases have a pupillary block component as well.)
Acute Primary Angle Closure Glaucoma

Note the too-anterior ciliary processes…

Plateau iris

(ignore this arrow)
Acute Primary Angle Closure Glaucoma

Plateau iris

...displacing the peripheral iris into the angle

Note the too-anterior ciliary processes…

(ignore this arrow)
Glaucoma

Open-angle

Closed- or narrow-angle

Primary

Secondary

Primary Angle Closure Glaucoma

Next let’s look at primary angle closure glaucoma in more detail
Is there a racial predilection regarding the risk of PACG?
Is there a racial predilection regarding the risk of PACG?
Yes, individuals of Inuit heritage have the highest known risk of PACG--their relative risk has been estimated to be as high as 40x that of whites.
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Is there a racial predilection regarding the risk of PACG?
Yes, individuals of Inuit heritage have the highest known risk of PACG—their relative risk has been estimated to be as high as 40x that of whites.

What about people of Asian descent?
Is there a racial predilection regarding the risk of PACG?
Yes, individuals of Inuit heritage have the highest known risk of PACG--their relative risk has been estimated to be as high as 40x that of whites.

What about people of Asian descent?
Their relative risk is somewhere between that of the Inuit and whites
Is there a racial predilection regarding the risk of PACG?
Yes, individuals of Inuit heritage have the highest known risk of PACG--their relative risk has been estimated to be as high as 40x that of whites.

What about people of Asian descent?
Their relative risk is somewhere between that of the Inuit and whites

Is age a risk factor?
Is there a racial predilection regarding the risk of PACG?
Yes, individuals of Inuit heritage have the highest known risk of PACG—their relative risk has been estimated to be as high as 40x that of whites.

What about people of Asian descent?
Their relative risk is somewhere between that of the Inuit and whites

Is age a risk factor?
Yes, the incidence ↑ vs ↓ with age
Is there a racial predilection regarding the risk of PACG?
Yes, individuals of Inuit heritage have the highest known risk of PACG—their relative risk has been estimated to be as high as 40x that of whites.

What about people of Asian descent?
Their relative risk is somewhere between that of the Inuit and whites

Is age a risk factor?
Yes, the incidence increases with age
Is there a racial predilection regarding the risk of PACG?
Yes, individuals of **Inuit** heritage have the highest known risk of PACG--their relative risk has been estimated to be as high as **40x** that of whites.

What about people of Asian descent?
Their relative risk is somewhere between that of the Inuit and whites

Is age a risk factor?
Yes, the incidence **increases** with age

Is gender a risk factor?
Is there a racial predilection regarding the risk of PACG?
Yes, individuals of Inuit heritage have the highest known risk of PACG—their relative risk has been estimated to be as high as 40x that of whites.

What about people of Asian descent?
Their relative risk is somewhere between that of the Inuit and whites

Is age a risk factor?
Yes, the incidence increases with age

Is gender a risk factor?
Yes, women are at higher risk
Is there a racial predilection regarding the risk of PACG?
Yes, individuals of Inuit heritage have the highest known risk of PACG—their relative risk has been estimated to be as high as 40x that of whites.

What about people of Asian descent?
Their relative risk is somewhere between that of the Inuit and whites.

Is age a risk factor?
Yes, the incidence increases with age.

Is gender a risk factor?
Yes, women are at higher risk.
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Yes, individuals of Inuit heritage have the highest known risk of PACG--their relative risk has been estimated to be as high as 40x that of whites.

What about people of Asian descent?  
Their relative risk is somewhere between that of the Inuit and whites

Is age a risk factor?  
Yes, the incidence increases with age

Is gender a risk factor?  
Yes, women are at higher risk

Is refraction a risk factor?
Is there a racial predilection regarding the risk of PACG?
Yes, individuals of Inuit heritage have the highest known risk of PACG—their relative risk has been estimated to be as high as 40x that of whites.

What about people of Asian descent?
Their relative risk is somewhere between that of the Inuit and whites.

Is age a risk factor?
Yes, the incidence increases with age.

Is gender a risk factor?
Yes, women are at higher risk.

Is refraction a risk factor?
Yes; PACG is more likely to occur in hyperopes.
Is there a racial predilection regarding the risk of PACG? Yes, individuals of Inuit heritage have the highest known risk of PACG—their relative risk has been estimated to be as high as 40x that of whites.

What about people of Asian descent? Their relative risk is somewhere between that of the Inuit and whites.

Is age a risk factor? Yes, the incidence increases with age.

Is gender a risk factor? Yes, women are at higher risk.

Is refraction a risk factor? Yes; PACG is more likely to occur in hyperopes.
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe:
Pain is severe: **Acute**
Pain is severe: **Acute**

Laser iridoplasty may be beneficial:
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic

Q: By what other name is iridoplasty called?
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser therapy may be beneficial: Plateau iris; chronic

By what other name is iridoplasty called?
Gonioplasty
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated:

- Pain is severe: Acute
- Laser treatment may be beneficial: Plateau iris; chronic

By what other name is iridoplasty called?
Gonioplasty

What is its purpose, ie, its therapeutic goal?
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated:

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic

By what other name is iridoplasty called?
Gonioplasty

What is its purpose, ie, its therapeutic goal?
To deepen the angle
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated.

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic

---

**Q**

By what other name is iridoplasty called?
Gonioplasty

**What is its purpose, ie, its therapeutic goal?**
To deepen the angle

**In a nutshell, how is it performed, and how does it deepen the angle?**
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated:

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic

**Acute angle closure**
**Sub-acute angle closure**
**Chronic angle closure**
**Plateau iris**

# of answers: (>1)

*By what other name is iridoplasty called?*
Gonioplasty

*What is its purpose, ie, its therapeutic goal?*
To deepen the angle

*In a nutshell, how is it performed, and how does it deepen the angle?*
Laser burns are placed in the peripheral iris stroma, and the resulting contraction causes the iris to flatten and pull away from the angle.
Primary Angle Closure Glaucoma

Left: A flat iris plane but shallow angle recess (arrow). Note that the midperipheral angle appears deeper (double arrow) than the narrow angles associated with pupillary block. Right: A much deeper angle recess (arrow) following laser peripheral iridoplasty.

Plateau iris pre- and post-iridoplasty
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: **Acute**
- Laser iridoplasty may be beneficial: **Plateau iris; chronic**
- IOP *low* after events:
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: **Acute**
- Laser iridoplasty may be beneficial: **Plateau iris; chronic**
- IOP *low* after events: **Acute**
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: **Acute**

Why is IOP low after an acute angle-closure event?
Q/ For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute

Why is IOP low after an acute angle-closure event?
Very high IOP \(\rightarrow\) CB ischemia \(\rightarrow\) ↓ aqueous production \(\rightarrow\) low IOP
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated:

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute

Why is IOP low after an acute angle-closure event?
Very high IOP → CB ischemia → ↓ aqueous production → low IOP
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: **Acute**

**Why is IOP low after an acute angle-closure event?**

Very high IOP $\rightarrow$ CB ischemia $\rightarrow$ ↓ aqueous production $\rightarrow$ low IOP

**What is the implication for management?**

Low IOP post-event should not be interpreted as evidence of an adequately functioning angle. Follow-up with serial gonio must be performed.
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
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Why is IOP low after an acute angle-closure event?
Very high IOP → CB ischemia → ↓ aqueous production → low IOP

What is the implication for management?
Low IOP post-event should not be interpreted as evidence of an adequately functioning angle—follow-up with serial gonio must be performed!
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: **Acute**
- Laser iridoplasty may be beneficial: **Plateau iris; chronic**
- IOP *low* after events: **Acute**
- LPI does not help:
Pain is severe: Acute

Laser iridoplasty may be beneficial: Plateau iris; chronic

IOP low after events: Acute

LPI does not help: Plateau iris
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
- [LPI] does not help: Plateau iris

What does LPI stand for?
A

For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
- LPI does not help: Plateau iris

What does LPI stand for?
Laser peripheral iridotomy
Pain is severe: Acute
Laser iridoplasty may be beneficial: Plateau iris; chronic
IOP low after events: Acute
LPI does not help: Plateau iris

What does LPI stand for?
Laser peripheral iridotomy

What is the rationale for performing LPI in PACG?
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated:

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
- LPI does not help: Plateau iris

What does LPI stand for?
Laser peripheral iridotomy

What is the rationale for performing LPI in PACG?
Recall the pathophysiology of pupillary block—it produces a pressure gradient across the iris, which causes it to bow forward and possibly obstruct the angle.
Primary Angle Closure Glaucoma

Angle Closure due to Relative Pupillary Block

- Iris against TM
- Sclera
- Convex iris
- Lens capsule
- Ciliary body
- Before laser iridectomy

NYEEI, Ocular Imaging Center
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
- LPI does not help: Plateau iris

What does LPI stand for?
Laser peripheral iridotomy

What is the rationale for performing LPI in PACG?
Recall the pathophysiology of pupillary block—it produces a pressure gradient across the iris, which causes it to bow forward and possibly obstruct the angle. The LPI provides an alternative route for aqueous to get from the PC to the AC. Re-establishment of aqueous flow dissipates the pressure gradient, causing the iris to fall back and away from the angle.
Primary Angle Closure Glaucoma

Angle Closure due to Relative Pupillary Block

- Iris against TM
- Sclera
- Convex iris
- Lens capsule
- Flat iris
- Ciliary body

Before laser iridectomy

After laser iridectomy

NYEEI, Ocular Imaging Center
What does LPI stand for?
Laser peripheral iridotomy

What is the rationale for performing LPI in PACG?
Recall the pathophysiology of pupillary block—it produces a pressure gradient across the iris, which causes it to bow forward and possibly obstruct the angle. The LPI provides an alternative route for aqueous to get from the PC to the AC. Re-establishment of aqueous flow dissipates the pressure gradient, causing the iris to fall back and away from the angle.

Why doesn't LPI help plateau iris?
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
- LPI does not help: Plateau iris

What does LPI stand for?
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What is the rationale for performing LPI in PACG?
Recall the pathophysiology of pupillary block—it produces a pressure gradient across the iris, which causes it to bow forward and possibly obstruct the angle. The LPI provides an alternative route for aqueous to get from the PC to the AC. Re-establishment of aqueous flow dissipates the pressure gradient, causing the iris to fall back and away from the angle.

Why doesn't LPI help plateau iris?
We'll get to that shortly
### Q

**For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated**

<table>
<thead>
<tr>
<th>Acute angle closure</th>
<th>Sub-acute angle closure</th>
<th>Chronic angle closure</th>
<th>Plateau iris</th>
</tr>
</thead>
</table>

- Pain is severe: **Acute**
- Laser iridoplasty may be beneficial: **Plateau iris; chronic**
- IOP *low* after events: **Acute**
- LPI does not help: **Plateau iris**
- LPI important:
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated:

- Pain is severe: **Acute**
- Laser iridoplasty may be beneficial: **Plateau iris; chronic**
- IOP low after events: **Acute**
- LPI does not help: **Plateau iris**
- LPI important: **All (including plateau iris)**

Acute angle closure
Sub-acute angle closure
Chronic angle closure
Plateau iris
<table>
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- Pain is severe: Acute
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- IOP *low* after events: Acute
- LPI does not help: **Plateau iris**
- LPI important: *All (including plateau iris)*

**If LPI doesn’t help in plateau iris syndrome, why is it still important to do one?**
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
- LPI does not help: Plateau iris
- LPI important: All (including plateau iris)

PC = Posterior chamber; AC = Anterior chamber

If LPI doesn't help in plateau iris syndrome, why is it still important to do one?

The fundamental problem in plateau iris is not pupillary block, with its resulting PC>AC pressure gradient. Rather, the problem is with the native configuration of the angle—the ciliary processes and peripheral iris are too anterior, resulting in an angle that is narrowed and prone to occlusion.
Primary Angle Closure Glaucoma

Note the too-anterior ciliary processes resulting in displacement of the peripheral iris.

Plateau iris
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
- LPI does not help: Plateau iris
- LPI important: All (including plateau iris)

PC = Posterior chamber; AC = Anterior chamber

If LPI doesn't help in plateau iris syndrome, why is it still important to do one? The fundamental problem in plateau iris is not pupillary block, with its resulting PC>AC pressure gradient. Rather, the problem is with the native configuration of the angle—the ciliary processes and peripheral iris are too anterior, resulting in an angle that is narrowed and prone to occlusion. However, this is often a difficult call to make at the slit lamp—is it plateau iris or pupillary block? An LPI is very helpful in making this distinction. In a pupillary block situation, LPI will dissipate the PC>AC pressure gradient, thereby allowing the iris to fall back into a normal anatomic position.
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
- LPI does not help: Plateau iris
- LPI important: All (including plateau iris)

If LPI doesn’t help in plateau iris syndrome, why is it still important to do one?

The fundamental problem in plateau iris is not pupillary block, with its resulting PC>AC pressure gradient. Rather, the problem is with the native configuration of the angle—the ciliary processes and peripheral iris are too anterior, resulting in an angle that is narrowed and prone to occlusion. However, this is often a difficult call to make at the slit lamp—is it plateau iris or pupillary block? An LPI is very helpful in making this distinction. In a pupillary block situation, LPI will dissipate the PC>AC pressure gradient, thereby allowing the iris to fall back into a normal anatomic position. But an LPI will have no effect on the fundamentally abnormal configuration of the angle in plateau iris. Some authorities maintain that a diagnosis of plateau iris should not be rendered unless a patent PI has been placed and proven ineffective.
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
- LPI does not help: Plateau iris
- LPI important: All (including plateau iris)

**Acute angle closure**
**Sub-acute angle closure**
**Chronic angle closure**
**Plateau iris**

If LPI doesn't help in plateau iris syndrome, why is it still important to do one? The fundamental problem in plateau iris is not pupillary block, with its resulting PC>AC pressure gradient. Rather, the problem is with the native configuration of the angle—the ciliary processes and peripheral iris are too anterior, resulting in an angle that is narrowed and prone to occlusion. However, this is often a difficult call to make at the slit lamp—is it plateau iris or pupillary block? An LPI is very helpful in making this distinction. In a pupillary block situation, LPI will dissipate the PC>AC pressure gradient. In plateau iris, LPI will have no effect on the fundamentally abnormal configuration of the angle.

Some authorities maintain that a diagnosis of plateau iris should not be rendered unless a patent PI has been placed and proven ineffective.

What is the classic gonioscopic description of the angle in plateau iris?

- Without indentation/compression:
- With indentation/compression:
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated:

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
- LPI does not help: Plateau iris
- LPI important: All (including plateau iris)

If LPI doesn’t help in plateau iris syndrome, why is it still important to do one? The fundamental problem in plateau iris is not pupillary block, with its resulting PC>AC pressure gradient. Rather, the problem is with the native configuration of the angle—the ciliary processes and peripheral iris are too anterior, resulting in an angle that is narrowed and prone to occlusion. However, this is often a difficult call to make at the slit lamp—is it plateau iris or pupillary block? An LPI is very helpful in making this distinction. In a pupillary block situation, LPI will dissipate the PC>AC pressure.

What is the classic gonioscopic description of the angle in plateau iris?

--Without indentation/compression: A flat iris approach that plunges steeply at the angle
--With indentation/compression: A sine-wave-like appearance, AKA the double-hump sign
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
- LPI does not help: Plateau iris
- LPI important: All (including plateau iris)

If LPI doesn't help in plateau iris syndrome, why is it still important to do one? The fundamental problem in plateau iris is not pupillary block, with its resulting PC>AC pressure gradient. Rather, the problem is with the native configuration of the angle—the **ciliary processes and peripheral iris are too anterior, resulting in an angle that is narrowed and prone to occlusion**. However, this is often a difficult call to make at the slit lamp—is it plateau iris or pupillary block? An LPI is very helpful in making this distinction. In a pupillary block situation, LPI will dissipate the PC>AC pressure gradient. However, an LPI will have no effect on the fundamentally abnormal configuration of the angle in plateau iris. Some authorities maintain that each angle should be considered to be **plateau iris**. This diagnosis should not be rendered unless a patent PI has been placed and proven ineffective.

What is the classic gonioscopic description of the angle in plateau iris?
--Without indentation/compression: **A flat iris approach that plunges steeply at the angle**
--With indentation/compression: (In other words, it looks like a plateau)
Primary Angle Closure Glaucoma

Plateau iris looking all plateau-like
Q

For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
- IOP low after events: Acute
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What is the classic gonioscopic description of the angle in plateau iris?
--Without indentation/compression: A flat iris approach that plunges steeply at the angle
--With indentation/compression: A sine-wave-like appearance, AKA the double-hump sign
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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What is the classic gonioscopic description of the angle in plateau iris?
--Without indentation/compression: A flat iris approach that plunges steeply at the angle
--With indentation/compression: A sine-wave-like appearance, AKA the double-hump sign
Primary Angle Closure Glaucoma

Plateau iris: ‘Sine wave/double-hump sign’
Primary Angle Closure Glaucoma

Peripheral “roll” of the iris, seen on indentation gonioscopy. Some consider this pathognomonic.

Plateau iris: ‘Sine wave/double-hump sign’
If LPI doesn't help in plateau iris syndrome, why is it still important to do one? The fundamental problem in plateau iris is not pupillary block, with its resulting PC>AC pressure gradient. Rather, the problem is with the native configuration of the angle—the ciliary processes and peripheral iris are too anterior, resulting in an angle that is narrowed and prone to occlusion. However, this is often a difficult call to make at the slit lamp—an investigation with the disc placed 90 degrees below the angle is helpful in making this distinction. In a pupillary block situation, LPI will dissipate the PC>AC pressure gradient, thereby allowing the iris to fall back into a normal anatomic position. However, an LPI will have no effect on the fundamentally abnormal configuration of the angle in plateau iris. Some authorities maintain that a diagnosis of plateau iris should not be rendered unless a patent PI has been placed and proven ineffective.

What accounts for the humps in the double-hump sign?

--Without indentation/compression: A sine-wave-like appearance, AKA the double-hump sign.

--With indentation/compression: A sine-wave-like appearance, AKA the double-hump sign.
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A

For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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- The peripheral hump: The iris draped over the...anteriorly-located ciliary processes
- The central hump:
- With indentation/compression: A sine-wave-like appearance, AKA the double-hump sign
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For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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--The peripheral hump: The iris draped over the...anteriorly-located ciliary processes
--The central hump: The iris draped over the...anterior lens surface

What is the classic gonioscopic description of the angle in plateau iris?
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For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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- Often improves with sleep: **Sub-acute**

**Acute angle closure**
**Sub-acute angle closure**
**Chronic angle closure**
**Plateau iris**
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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What happens during sleep that leads to improvement?
Pain is severe: Acute
Laser iridoplasty may be beneficial: Plateau iris; chronic
IOP low after events: Acute
LPI does not help: Plateau iris
LPI important: All (including plateau iris)
Often improves with sleep: Sub-acute

What happens during sleep that leads to improvement?
Sleep-induced miosis breaks the pupillary block
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**What happens during sleep that leads to improvement?**
Sleep-induced miosis breaks the pupillary block

**When you hear that periocular pain ‘improves with sleep,’ three conditions should come to mind. What are the other two?**
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-- ?
-- ?
Pain is severe: Acute

Laser iridoplasty may be beneficial: Plateau iris; chronic

IOP low after events: Acute

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When you hear that periocular pain ‘improves with sleep,’ three conditions should come to mind. What are the other two?
--Sub-acute angle-closure glaucoma
--Migraine
--OIS
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
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What does OIS stand for in this context?
Ocular ischemic syndrome

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

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

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

Is there a relationship with age?
Yes, OIS is a disease of older individuals
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated.

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OIS

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Sub-acute angle-closure glaucoma
Migraine

What does OIS stand for in this context?
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Occlusion of what vessel is most commonly implicated in OIS?
Ipsilateral internal carotid artery (ICA)

Atherosclerosis

CAD
CVA
PAD

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

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OIS

hypoperfusion
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**Acute angle closure**
**Sub-acute angle closure**
**Chronic angle closure**
**Plateau iris**

---

**What happens during sleep that leads to improvement?**
Sleep-induced miosis breaks the pupillary block

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Yes, OIS is a disease of older individuals

**Occlusion of what vessel is most commonly implicated in OIS?**
The ipsilateral internal carotid artery (ICA)

**What is the term for the process that leads to ICA occlusion?**
Atherosclerosis

**With what nonocular atherosclerotic conditions is OIS commonly associated?**
- CAD
- CVA
- PAD
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

- Pain is severe: Acute
- Laser iridoplasty may be beneficial: Plateau iris; chronic
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When you hear that periocular pain ‘improves with sleep,’ three conditions should come to mind. What are the other two?
--Sub-acute angle-closure glaucoma--Migraine--

OIS

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With what nonocular atherosclerotic conditions is OIS commonly associated?
- ?
- ?
- ?
Acute angle closure
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What are the signs/symptoms of OIS?

**Signs:**
-- ?
-- ?
-- ?
-- ?

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

For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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Ocular ischemic syndrome

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What are the signs/symptoms of OIS?

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

**Symptoms:**
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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- OIS stands for Ocular ischemic syndrome

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

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

Is there a relationship with age?
Yes, OIS is a dz of older individuals
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What happens during sleep that leads to improvement?
Sleep-induced miosis breaks the pupillary block

When you hear that periocular pain 'improves with sleep,' three conditions should come to mind. What are the other two?
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What does OIS stand for in this context?
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Circling back to the original point: By what mechanism does sleep improve the periocular pain associated with OIS?
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated:

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Circling back to the original point: By what mechanism does sleep improve the periocular pain associated with OIS?
It’s not actually sleeping per se that does it, rather, a classic feature of OIS is that the pain improves when the pt lies down (lying down increases perfusion pressure of the eye)
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated:

- Pain is severe: **Acute**
- Laser iridoplasty may be beneficial: **Plateau iris; chronic**
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- Pain usually absent: **Chronic**
- Cornea cloudy during event: **Acute angle closure**
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Why is the cornea cloudy?
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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*Why is the cornea cloudy?*
*It is edematous*
Primary Angle Closure Glaucoma

Cloudy cornea in acute ACG
<table>
<thead>
<tr>
<th>Question</th>
<th>Form(s) of primary angle-closure glaucoma associated</th>
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<tbody>
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Why is the cornea cloudy?
It is edematous

What causes the edema?
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated:

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**Why is the cornea cloudy?**
It is edematous

**What causes the edema?**
Elevated IOP→endothelial-cell dysfunction
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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**Why is the cornea cloudy?**
It is edematous

**What causes the edema?**
Elevated IOP → endothelial-cell dysfunction

**What is the classic one-word descriptor for the appearance of the cornea in ACG?**
Pain is severe: Acute

Laser iridoplasty may be beneficial: Plateau iris; chronic

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Why is the cornea cloudy?
It is edematous

What causes the edema?
Elevated IOP → endothelial-cell dysfunction

What is the classic one-word descriptor for the appearance of the cornea in ACG?
‘Steamy’
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated.

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Why don’t CACG pts get corneal edema?
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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Why don’t CACG pts get corneal edema?
Because their IOP doesn’t get high enough
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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- Often misdiagnosed as migraines:
Pain is severe: **Acute**

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Why would sub-acute ACG be confused with migraines?
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

Acute angle closure
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Why would sub-acute ACG be confused with migraines?
Think about it—these pts c/o intermittent terrible headaches that improve with sleep. Sounds like migraines to me…
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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- Presents like POAG:
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*In what sense(s) does CACG present like POAG?*
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**Presents like POAG:** **Chronic**

*In what sense(s) does CACG present like POAG?*

In that, like POAG, CNAG:

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In what sense(s) does CACG present like POAG?
In that, like POAG, CNAG:
--is painless
--is associated with modestly elevated IOP (at least initially)
--results in typical-for-glaucoma progressive VF loss and ONH changes
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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What does this mean, ‘at least initially’?

If unchecked, CACG can progress, and IOP can climb very high.
For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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**Q**

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What does this mean, "at least initially"?
If unchecked, CACG can progress, and IOP can climb very high

How (ie, by what mechanism) does CACG progress?
PAS are present in CACG. Early in the dz process, enough of the angle is open to keep the IOP from getting too high. However, PAS progression is a common occurrence, and if the angle zips up sufficiently the IOP can rise precipitously.
A

For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated

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How (ie, by what mechanism) does CACG progress?
PAS are present in CACG. Early in the dz process, enough of the angle is open to keep the IOP from getting too high. However, PAS progression is a common occurrence, and if the angle zips up sufficiently the IOP can rise precipitously.

What does this mean, “at least initially”?
If unchecked, CACG can progress and IOP can climb very high

modestly elevated IOP (at least initially)
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The haloes are said to have a particular appearance—what is it?
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_The haloes are said to have a particular appearance—what is it?_

They are ‘rainbow-colored’
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- What causes the haloes and blurry vision?
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What causes the haloes and blurry vision? The corneal edema associated with these conditions

Presents like POAG: Chronic

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For each statement, identify which form(s) of primary angle-closure glaucoma is/are associated with these conditions:

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What causes the haloes and blurry vision?

Edema of which layer of the cornea is responsible for the visual symptoms?

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- What causes the haloes and blurry vision? corneal edema
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Edema of which layer of the cornea is responsible for the visual symptoms? The corneal epithelium
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Acute angle closure
Sub-acute angle closure
Chronic angle closure
Plateau iris
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Glaucoma

Closed- or narrow-angle

Open-angle

Primary Angle Closure Glaucoma

Primary

Secondary

Acute
Subacute
Chronic
Plateau iris

Let’s summarize what we know about PACG:
In **acute** ACG, the entire angle becomes occluded over a short period of time, producing a precipitous rise in IOP. The extremely high IOP causes severe eye pain and HA, N/V, and blurry vision. The event will not resolve without intervention.

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In **chronic** ACG, some portion of the angle is *always* occluded via PAS, resulting in consistently modest IOP elevation. This IOP is not high enough to cause eye pain, HA or blurry vision. The consistently elevated IOP produces typical glaucomatous VF loss and ONH changes.

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In **plateau iris syndrome**, anteriorly-positioned ciliary processes displace the peripheral iris into the angle, predisposing the eye to either chronic or acute ACG without the need for pupillary block (although it is often present). The diagnosis can only be made via gonio (or imaging).

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*Let’s summarize what we know about PACG:*