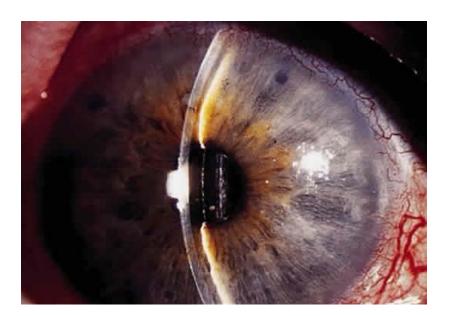


### Shallow/flat AC after CE (early post-op period)

Re shallow AC after CE: What is our chief concern, ie, what do we want to keep from occurring?

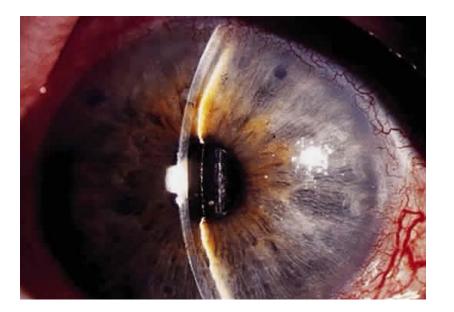




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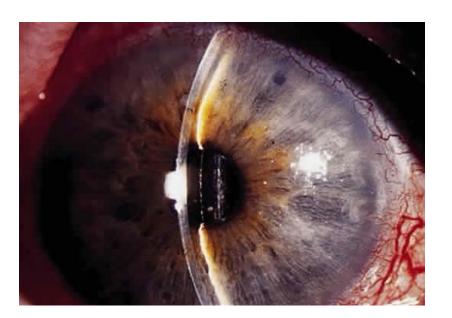
We want to avoid two words touch and word + abb. touch





### Shallow/flat AC after CE (early post-op period)

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What dreaded complication can result from prolonged cornea-iris touch?



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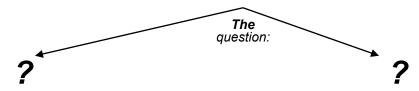
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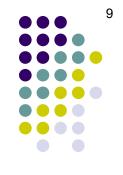
What dreaded complication can result from prolonged cornea-IOL touch?
K endothelium decompensation resulting in intractable corneal edema

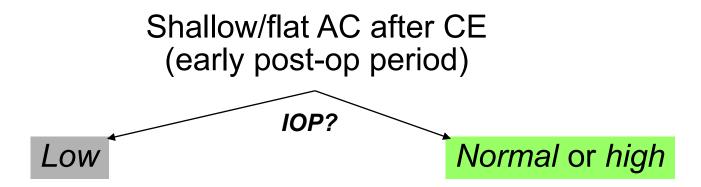


Shallow/flat AC after CE (early post-op period)



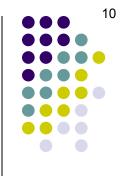
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Shallow/flat AC after CE (early post-op period)



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Shallow/flat AC after CE (early post-op period)



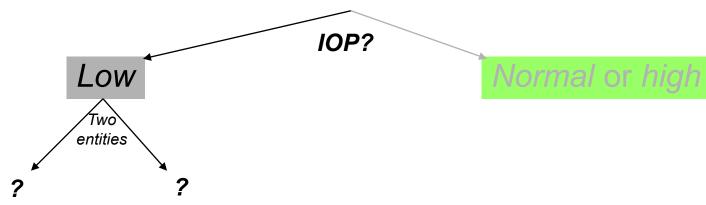
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How low is low, ie, at what IOP should push us to this side of the DDx?
Less than 10

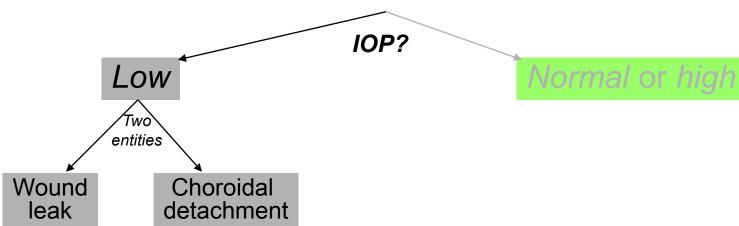


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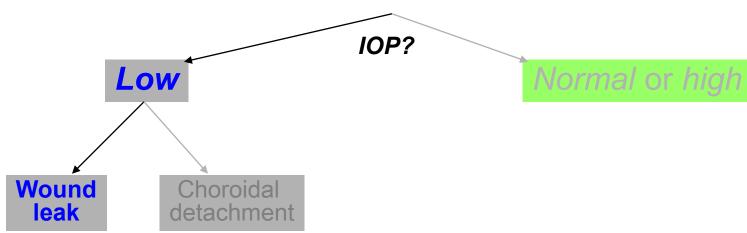


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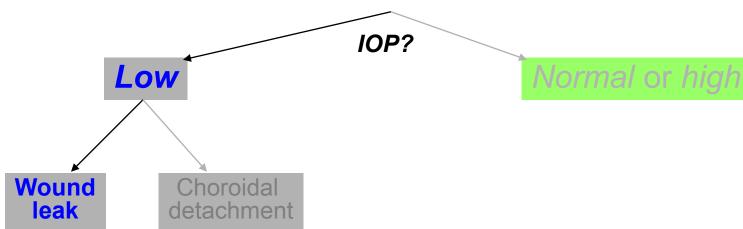
### Shallow/flat AC after CE (early post-op period)



How is a wound leak diagnosed?



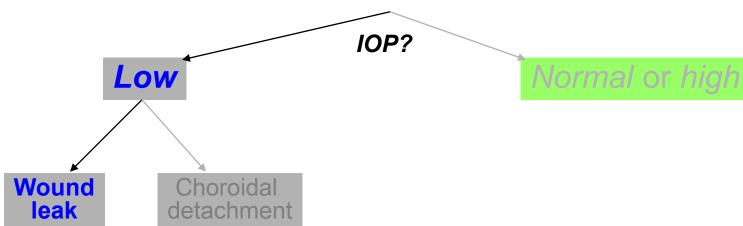
### Shallow/flat AC after CE (early post-op period)



How is a wound leak diagnosed? Via Seidel testing at the slit-lamp



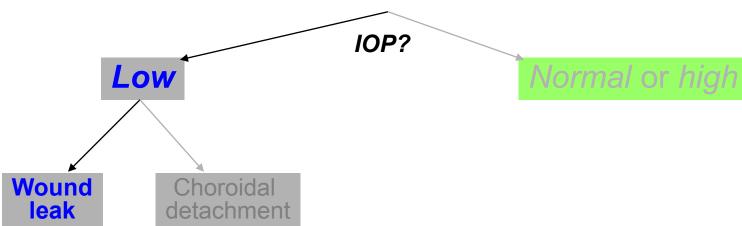
# Shallow/flat AC after CE (early post-op period)



How is a wound leak managed medically?



# Shallow/flat AC after CE (early post-op period)

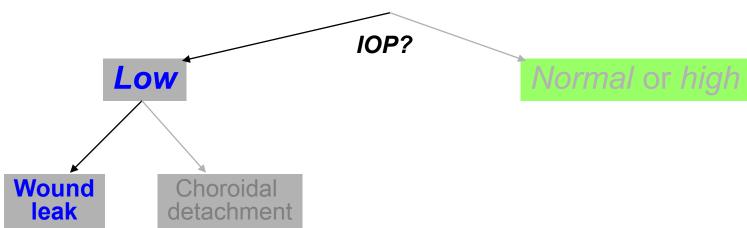


How is a wound leak managed medically? It's as simple as ABC(D):

- --A
- --B
- --C
- --D



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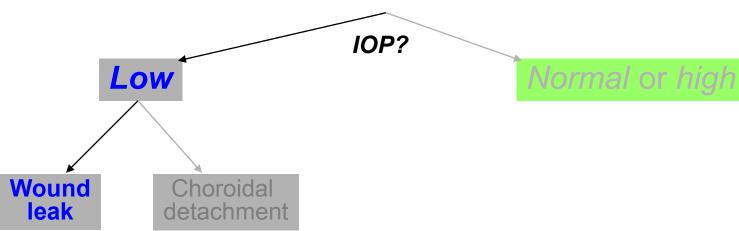


How is a wound leak managed medically? It's as simple as ABC(D):

- -- Aqueous suppressants
- --Bandage contact lens (BCL)
- -- Cycloplegia
- -- Discontinue (or at least Diminish) topical steroids



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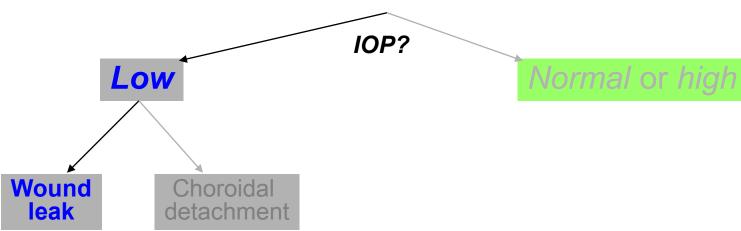
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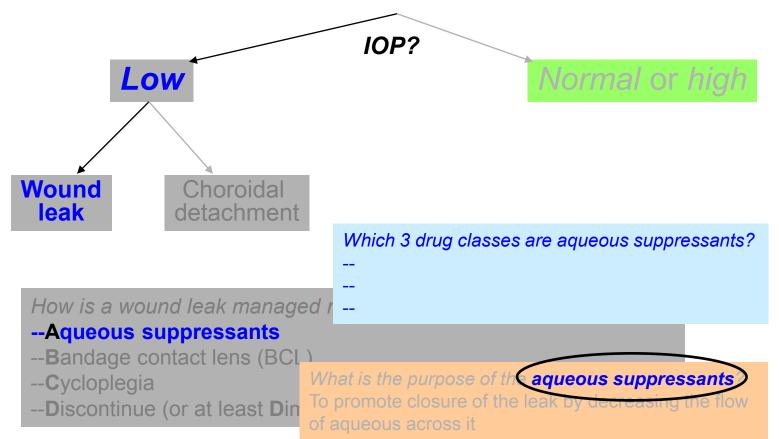
- --Aqueous suppressants
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- -- Cycloplegia
- -- Discontinue (or at least Din

What is the purpose of the aqueous suppressants?

To promote closure of the leak by decreasing the flow of aqueous across it

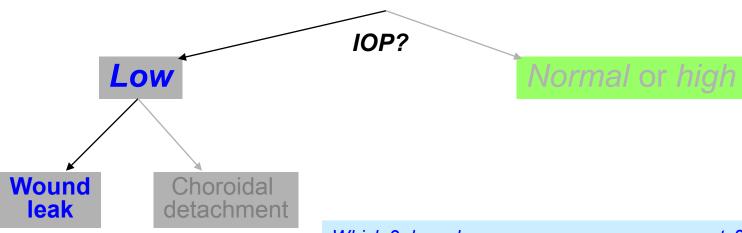


### Shallow/flat AC after CE (early post-op period)





### Shallow/flat AC after CE (early post-op period)



Which 3 drug classes are aqueous suppressants?

- --α agonists (brimonidine probably best)
- --β blockers

How is a wound leak managed -- Carbonic anhydrase inhibitors (CAIs)

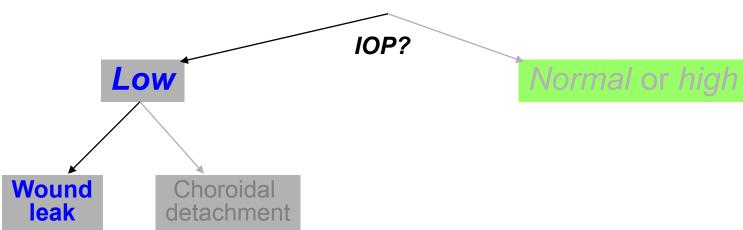
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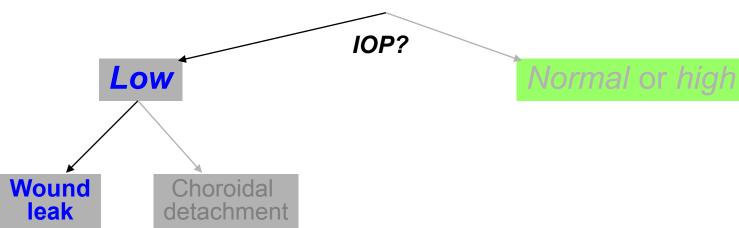
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What is the purpose of cycloplegia?

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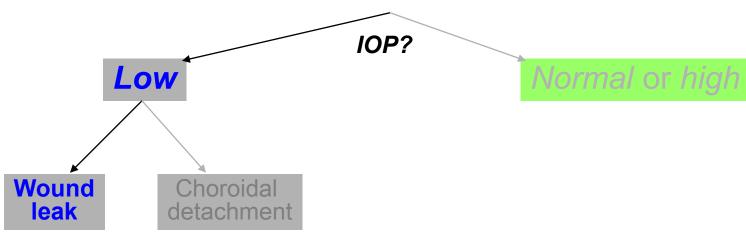
What is the purpose of cycloplegia?

To deepen the AC by rotating the ciliary body back

-- Discontinue (or at least Din 10 deepen the AC by 10



# Shallow/flat AC after CE (early post-op period)



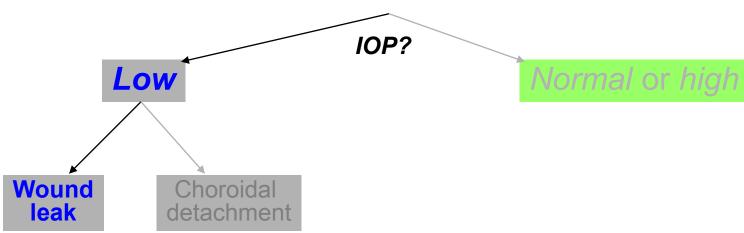
How is a wound leak manage

Why stop steroids? Won't that increase inflammation?

- -- Aqueous suppressants
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### Shallow/flat AC after CE (early post-op period)



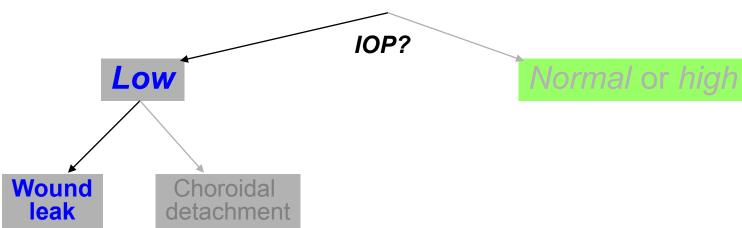
- -- Aqueous suppressants
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How is a wound leak manage

Why stop steroids? Won't that increase inflammation? Yes, but it will also promote leak closure by removing any steroid-induced inhibition of wound healing



# Shallow/flat AC after CE (early post-op period)

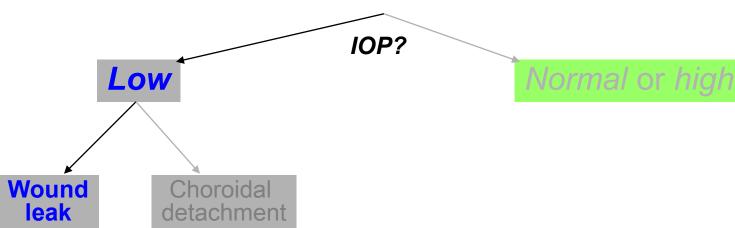


Under what circumstances should a wound leak be managed surgically?

- 1)
- 2)
- 3)
- 4)



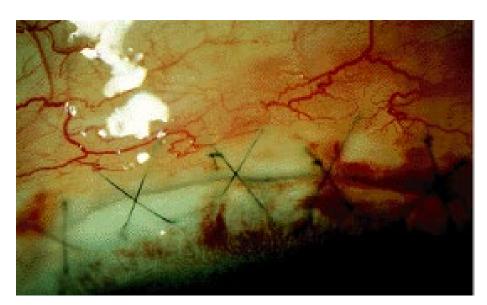
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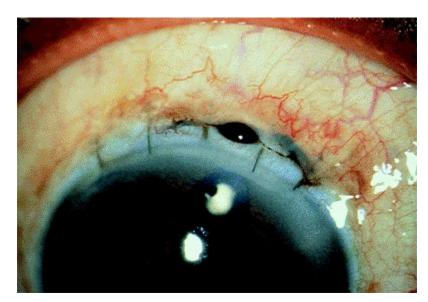
Under what circumstances should a wound leak be managed surgically?

- 1) No improvement for 48 hours
- 2) Obvious wound gape
- 3) IOL-cornea touch
- 4) Iris prolapse





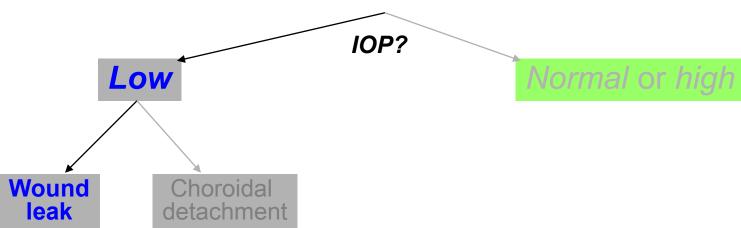




Iris prolapse



# Shallow/flat AC after CE (early post-op period)



Under what circumstances should a wound leak be managed surgically?

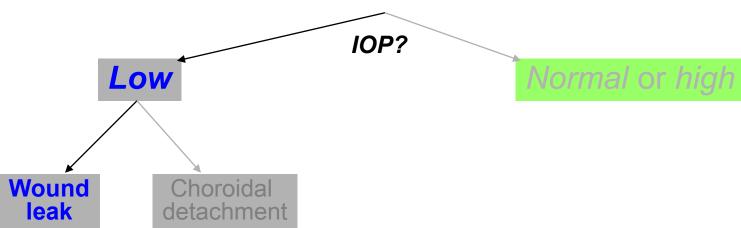
- --No improvement for 48 hours
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What stop-gap measure could you try for this?

-- Iris prolapse



# Shallow/flat AC after CE (early post-op period)



Under what circumstances should a wound leak be managed surgically?

- --No improvement for 48 hours
- --Obvious wound gape
- --IOL-cornea touch
- -- Iris prolapse

What stop-gap measure could you try for this?

Injection of viscoelastic to re-form the AC and push the IOL back



### Shallow/flat AC after CE (early post-op period)

**Choroidal** 

detachment

Wound

leak

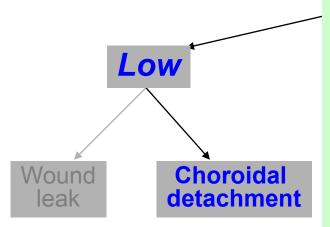
What does the term choroidal detachment mean? What is detached from what?



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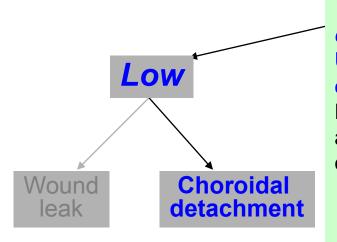
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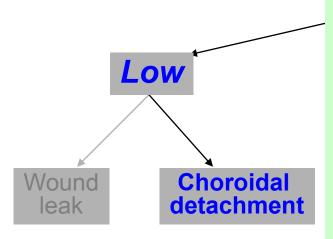


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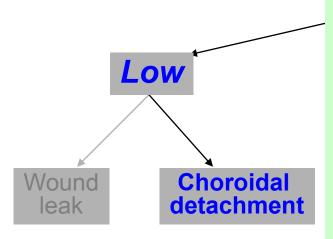
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What is the name of this potential space?



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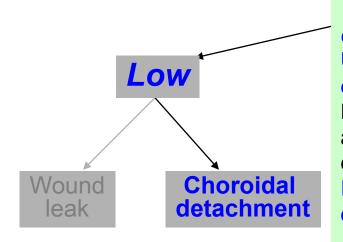
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What is the name of this potential space? The **suprachoroidal** space



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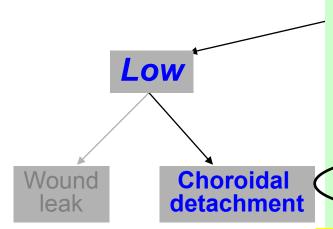


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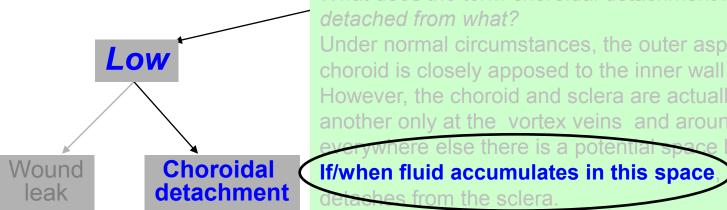
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There are two broad categories of fluid that are associated with choroidal detachment--what are they?



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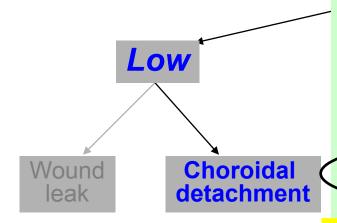
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--Serum (via transudation)

--Blood (via hemorrhage)





## Shallow/flat AC after CE (early post-op period)

Low

Wound

leak

Choroidal

detachment

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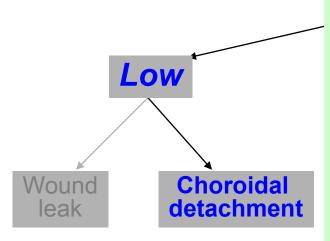
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When a choroidal detachment is present in association with a shallow chamber and low IOP, is it typically serous, or hemorrhagic? In this scenario, the detachment is virtually always serous



## Shallow/flat AC after CE (early post-op period)



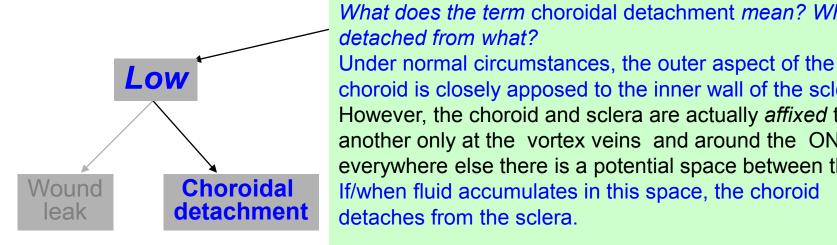
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Is choroidal detachment a common cause of low IOP + shallow/flat AC after CE?



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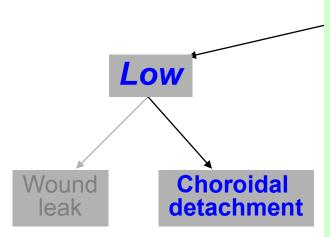
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This is a tricky question. Certainly, choroidal detachments are not an uncommon finding when a post-CE pt presents with a shallow AC and low IOP.



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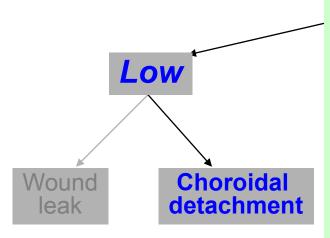
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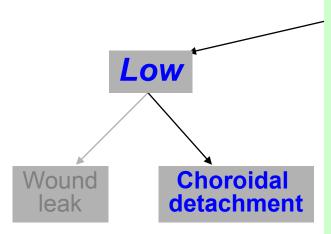
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So if a pt with a flat AC is found to have a choroidal detachment, don't assume the detachment is the cause. Be sure to check carefully for a wound leak!



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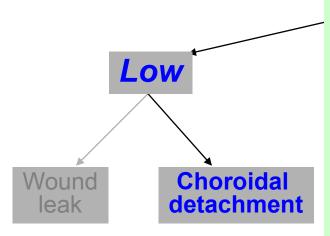
How is choroidal detachment diagnosed?

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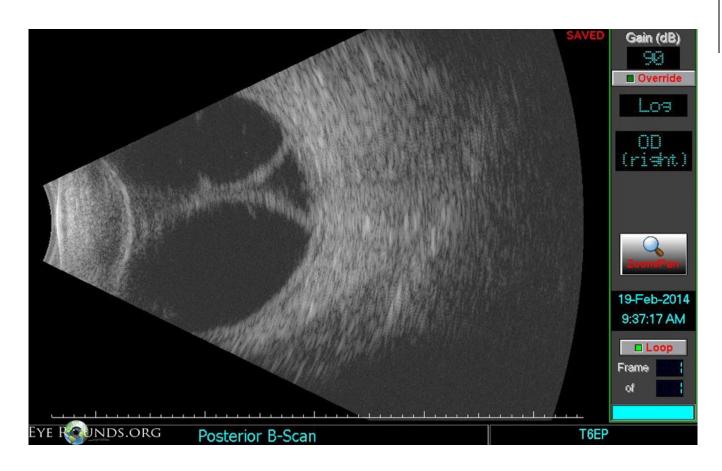
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- How is choroidal detachment diagnosed?
- **b**-scan

Is choroidal detachment a common cause of low IOP + shallow/flat AC after CE?

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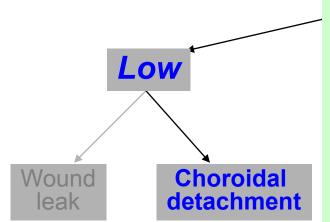




Choroidal detachment (Confession: I don't think this was post-CE)



## Shallow/flat AC after CE (early post-op period)



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or owing to a phoroidal datachment he managed?

How should a flat chamber owing to a choroidal detachment be managed?

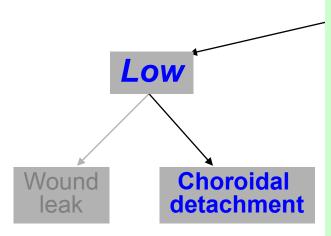
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the majority of such cases, the choroidal detachment is a **result** of the low IOP, not a **cause** of it.



### Shallow/flat AC after CE (early post-op period)



What does the term choroidal detachment mean? What is detached from what?

Under normal circumstances, the outer aspect of the choroid is closely apposed to the inner wall of the sclera. However, the choroid and sclera are actually *affixed* to one another only at the vortex veins and around the ONH; everywhere else there is a potential space between them. If/when fluid accumulates in this space, the choroid detaches from the sclera.

La charaidal datachment a common course of law OP

How should a flat chamber owing to a choroidal detachment be managed?

- --Topical (+/- systemic) corticosteroids should be started (or increased)
- --Mydriatics and cycloplegics should be employed in an attempt to rotate the lens-iris diaphragm posteriorly

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Wound leak Choroidal detachment

Low

whould a flat chamber owing to a choroidal detachment be managed?

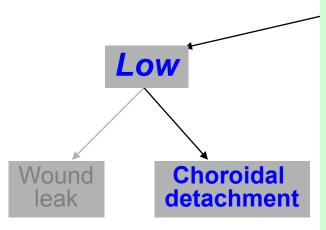
--Topl (+/- system(c) corticosteroids should be started (or increased)

-- Mydrid ics and cycloplegics should be employed in an attempt to rotate

Recall that managing the other diagnosis of flat AC+low IOP (wound leak) included taking the **opposite** step, ie, *stopping* or *decreasing* steroids. So, it's vitally important that you differentiate accurately between these two conditions!



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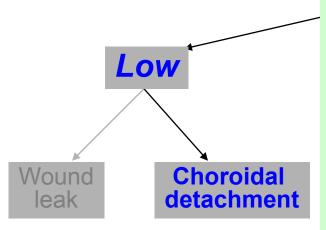
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Under what circumstances should the detachment be addressed surgically? There are no hard-and-fast rules in this regard, but indications include detachments refractory to medical management for a week or so.

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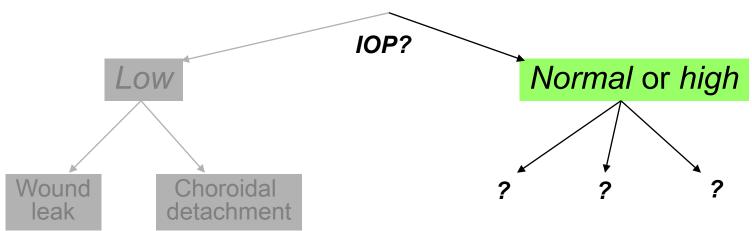
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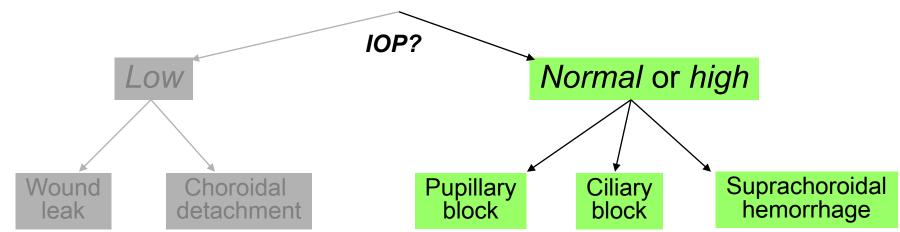


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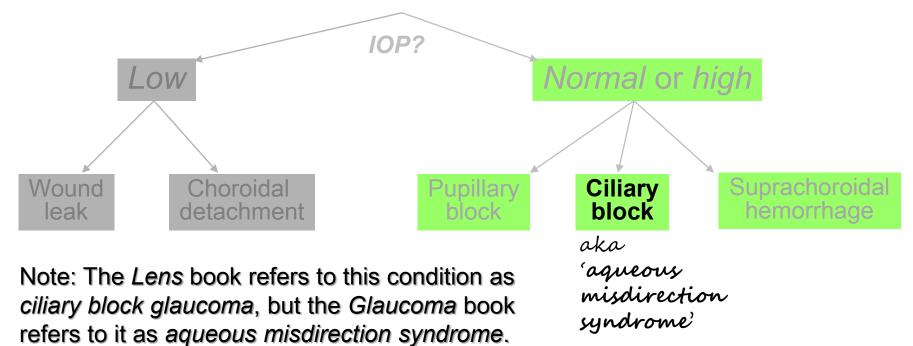


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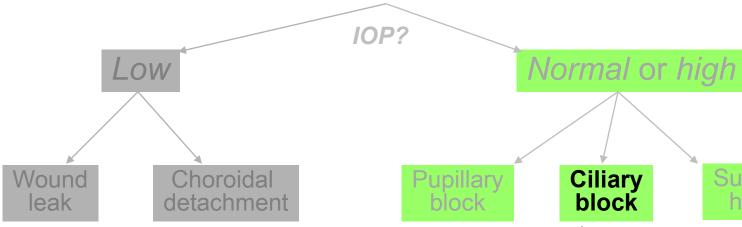


# Shallow/flat AC after CE (early post-op period)





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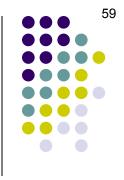


Note: The *Lens* book refers to this condition as *ciliary block glaucoma*, but the *Glaucoma* book refers to it as *aqueous misdirection syndrome*. Both books also *aka* it as *malignant glaucoma*.

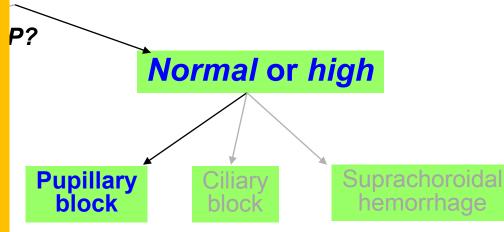
Suprachoroidal hemorrhage

aka
'aqueous
misdirection
syndrome',
aka
'malignant
glaucoma'

What is the mechanism underlying pupillary block?

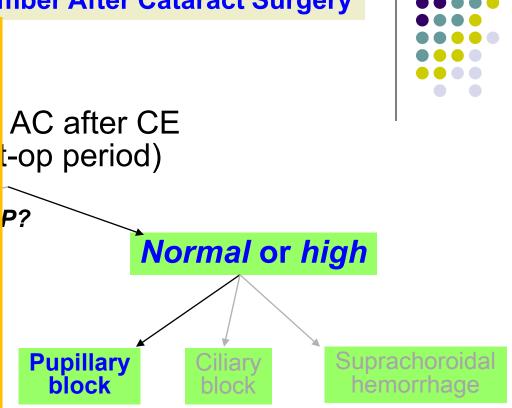


AC after CE t-op period)



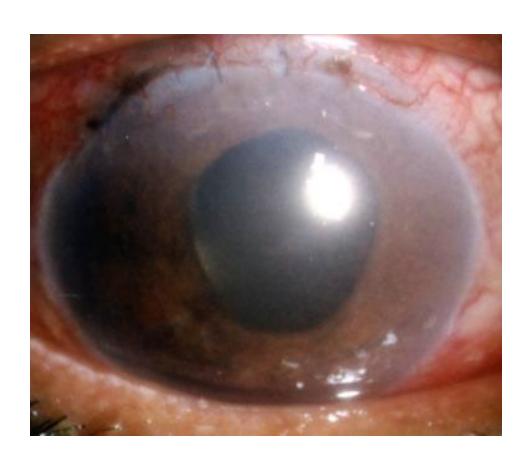
What is the mechanism underlying pupillary block?

Apposition between the pupil margin and the IOL prevents the normal flow of aqueous from the posterior chamber to the AC. This results in a pressure gradient across the iris, causing it to bow forward. In doing so, the peripheral iris interferes with the egress of aqueous through the TM. The net result is a normal-to-high IOP and shallowed AC.



60





PC IOL pupillary block after wound leak

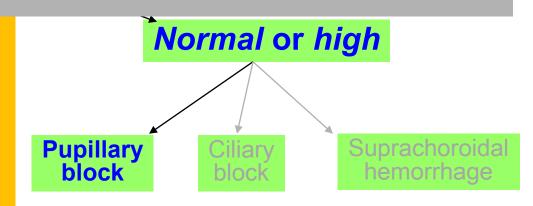
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AC after CF

In the acute post-op period, what process commonly leads to the IOL being apposed to the pupillary margin?

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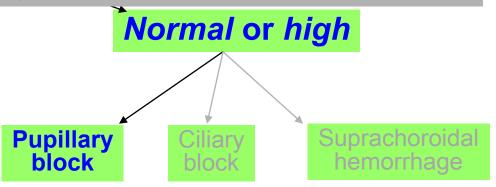


#### AC after CF

In the acute post-op period, what process commonly leads to the IOL being apposed to the pupillary margin? One common cause is a wound leak, which can allow the vitreous body to push the IOL up against the pupil, resulting in pseudophakic pupillary block. So, a post-op eye that initially has a shallow chamber + low IOP ends up having a shallow chamber + a normal/high IOP.

interferes with the egress of aqueous through the TM. The net result is a normal-to-high IOP and shallowed AC.

Wound leak



What is the mechanism underlying pupillary block?

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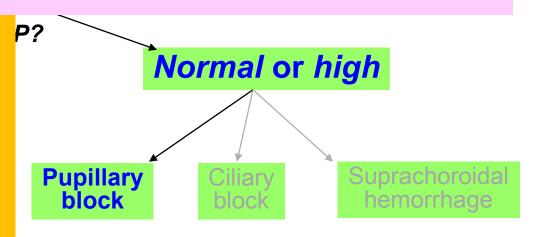
fter Cataract Surgery

64

AC after CE

In the late post-op period, what process commonly leads to the IOL being apposed to the pupillary margin?

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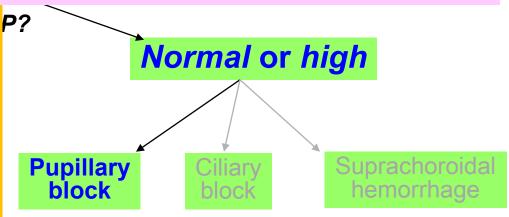
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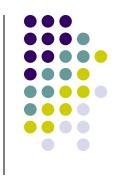


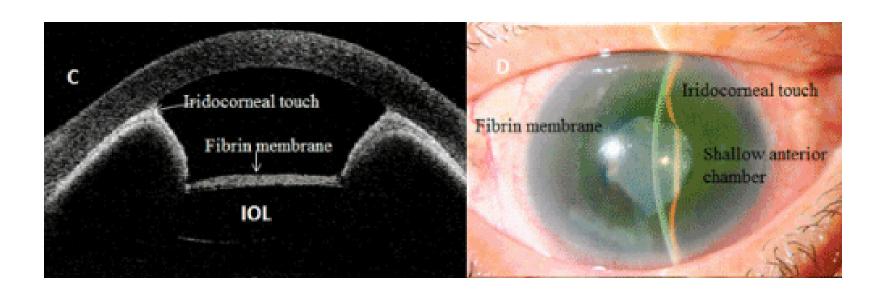
#### AC after CE

In the late post-op period, what process commonly leads to the IOL being apposed to the pupillary margin? Severe/long-lasting post-op inflammation can result in posterior synechiae formation

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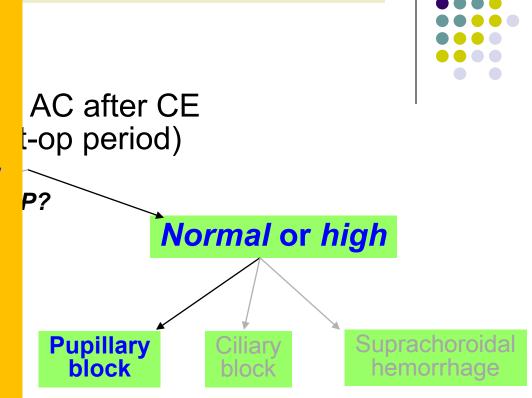


Late-onset PSK pupillary-block shallow AC 2ndry to posterior synechiae

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Which pt population is particularly prone to pseudophakic pupillary block?

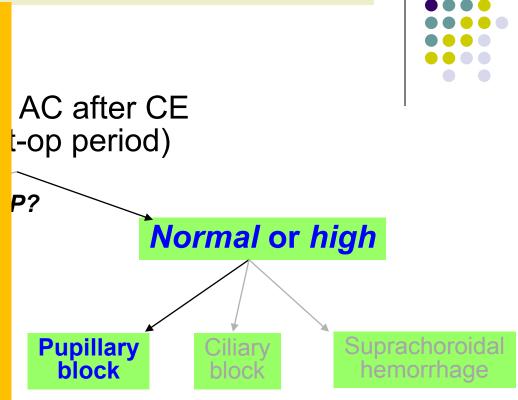


67

What is the mechanism underlying pupillary block?

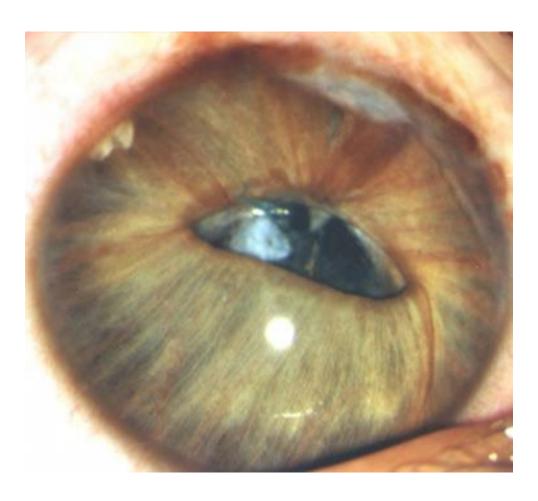
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Which pt population is particularly prone to pseudophakic pupillary block? The pediatric population. As a general rule, the younger the pt, the more likely they are to develop pseudophakic pupillary block.



68





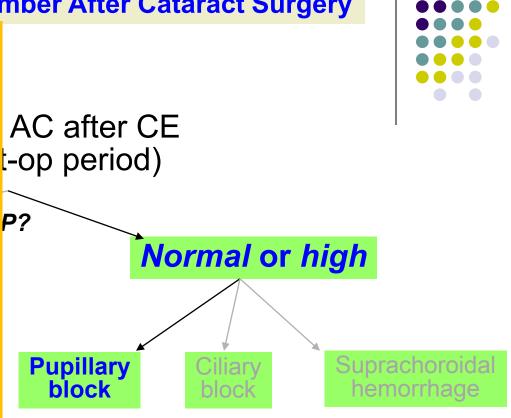
The patient is 6 years old. Closure of peripheral iridectomy, lens decentration, partial pupil capture, and adhesions between the optic and the iris have produced pupillary block. One of the loops has started cheese-wiring the iris. Iris bombé is all around. Iris incision line adhesions are visible.

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In adults, what class of IOL is most likely to produce pseudophakic pupillary block?



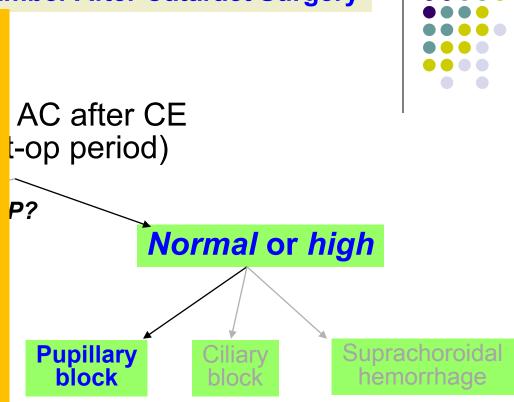
70

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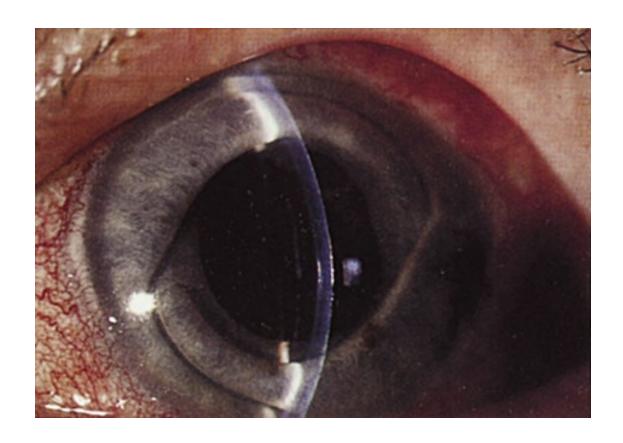
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In adults, what class of IOL is most likely to produce pseudophakic pupillary block? AC IOLs, especially if the surgeon fails to perform an iridectomy at the time of IOL implantation



71





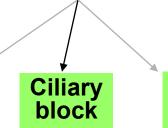
That feeling when an AC IOL is implanted, but the surgeon forgets to create a PI



What is ciliary block glaucoma?

Ε



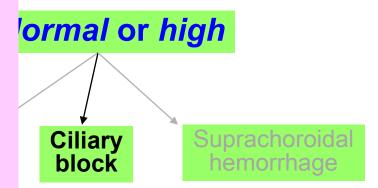


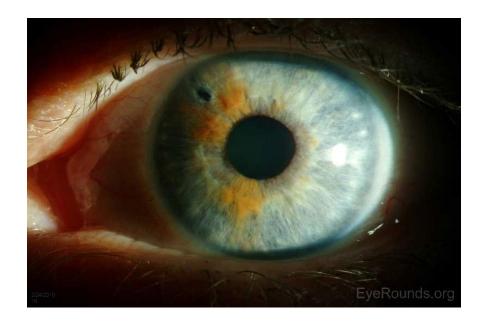
Suprachoroidal hemorrhage

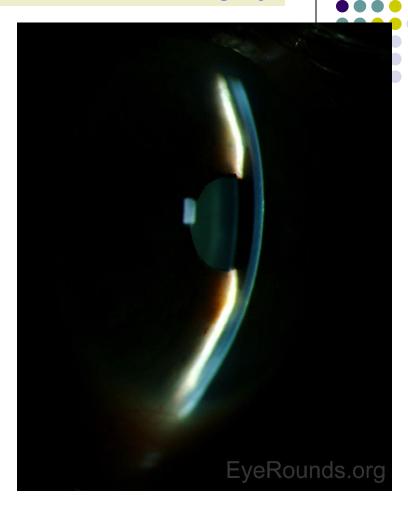


What is ciliary block glaucoma?

A rare condition in which anterior rotation of the ciliary body causes newly-produced aqueous to be directed posteriorly, toward and perhaps into or behind the vitreous body

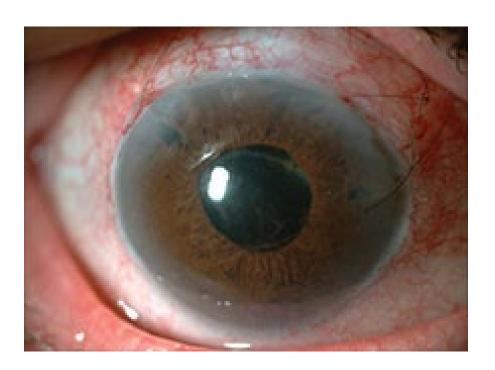






Ciliary block glaucoma. Lateral illumination produces shadowing nasally, revealing the extent of AC shallowing. Note the presence of an LPI, ineffective because pupillary block is not present.







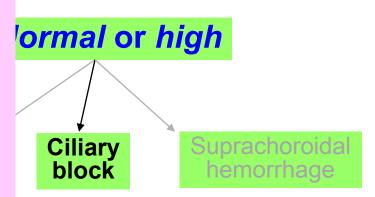
Ciliary block glaucoma. AS-OCT reveals the extent of AC shallowing. Note again the presence of an ineffective LPI.



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*Is it common, or rare?* 

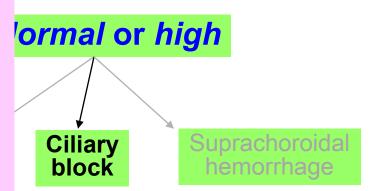




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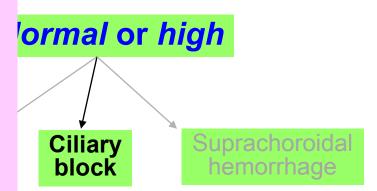


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What is the chief risk factor?



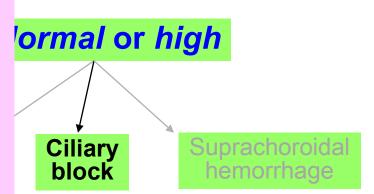


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Intraocular surgery in an eye with tight angles





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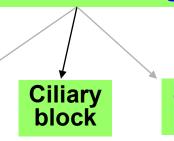
How is ciliary block glaucoma managed medically?

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ormal or high



Suprachoroidal hemorrhage



What is ciliary block glaucoma?

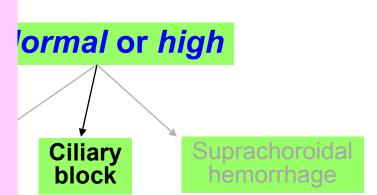
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How is ciliary block glaucoma managed medically?

- --Aqueous suppressants
- --Aggressive cycloplegia (atropine 1% and phenylephrine 10% qid)
- --Dehydration of the vitreous with hyperosmotic agents





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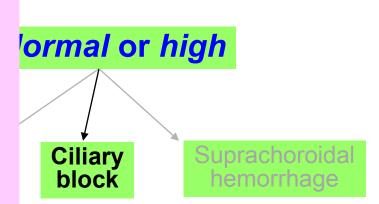
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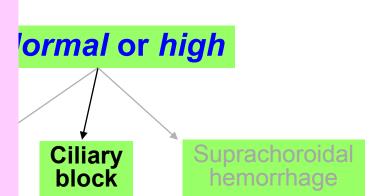
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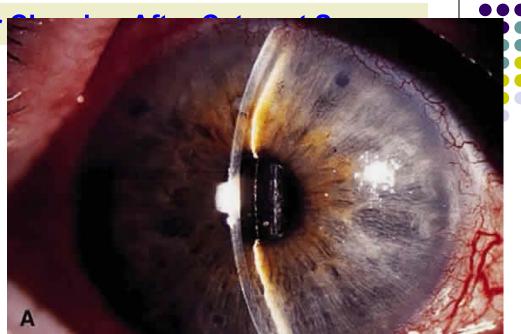
- --Aqueous suppressants
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What about surgical management--is it usually necessary? Yes; surgical or laser disruption of the vitreous face is often required for resolution



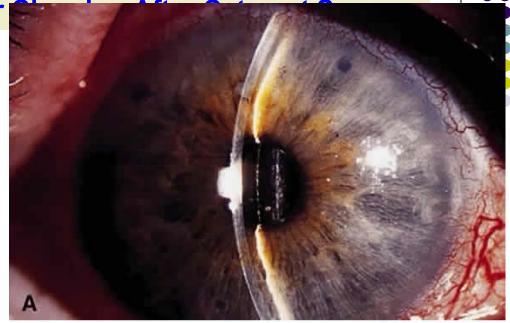
## **Shallow Anterior**

Aqueous misdirection. The anterior chamber is shallow. Two patent peripheral iridotomies are barely seen at the 10- and 1-o'clock positions. Intraocular pressure was 42 mmHg.

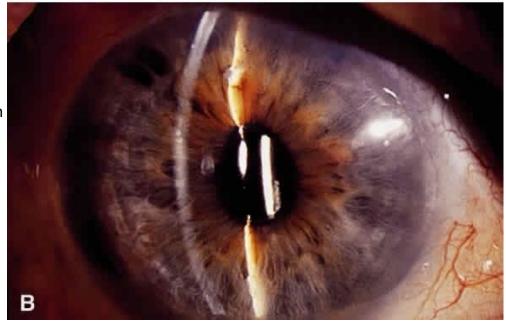


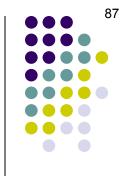
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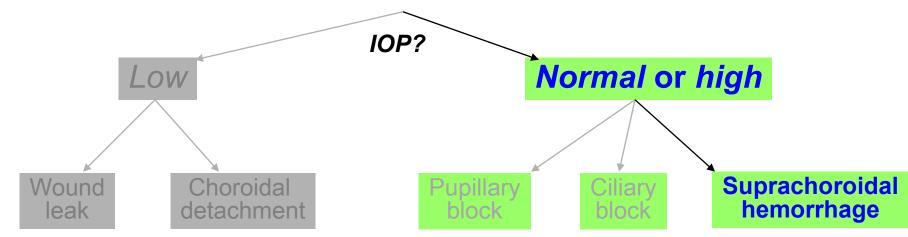


Same eye 4 weeks after pars plana tube insertion of aqueous shunt with vitrectomy. The anterior chamber is deep. The temporal iridectomy is enlarged. Intraocular pressure was 12 mmHg.

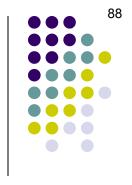




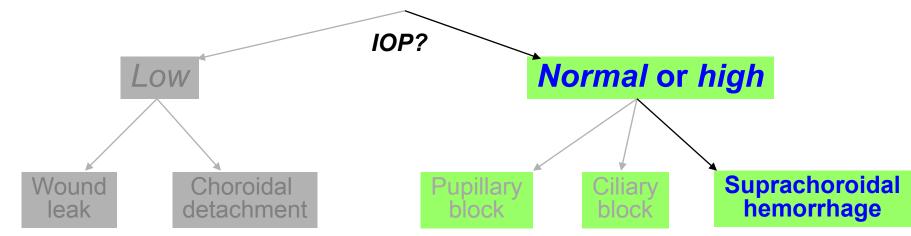
# Shallow/flat AC after CE (early post-op period)



What is the classic presentation of a post-op suprachoroidal hemorrhage, ie, what will the pt complain of?



# Shallow/flat AC after CE (early post-op period)



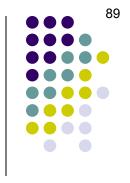
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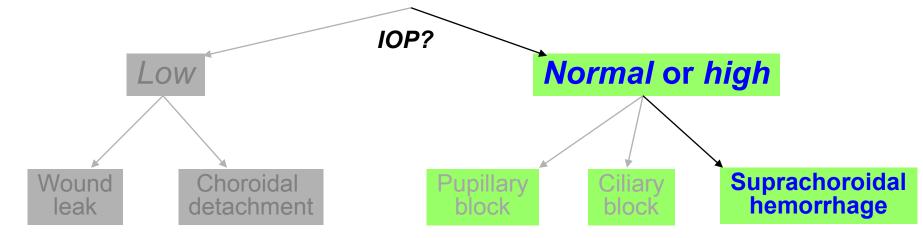
two words

and

two diff words



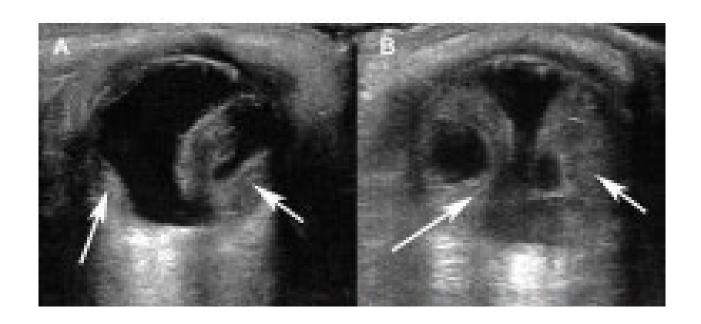
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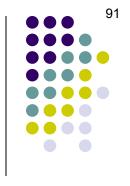
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The pt will complain of the sudden onset of vision loss and excruciating pain

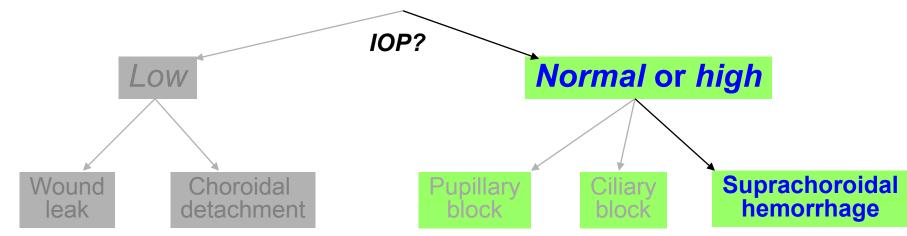




Suprachoroidal hemorrhage



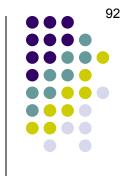
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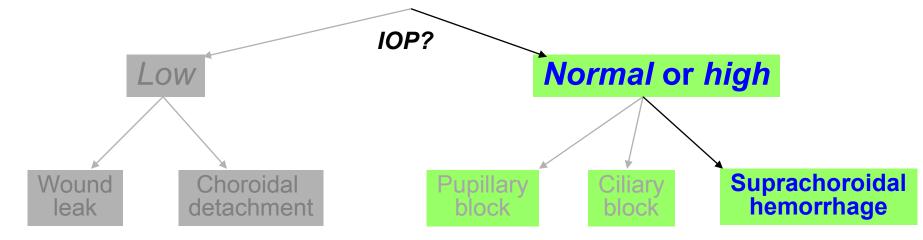
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Is the vision loss usually mild, or severe?



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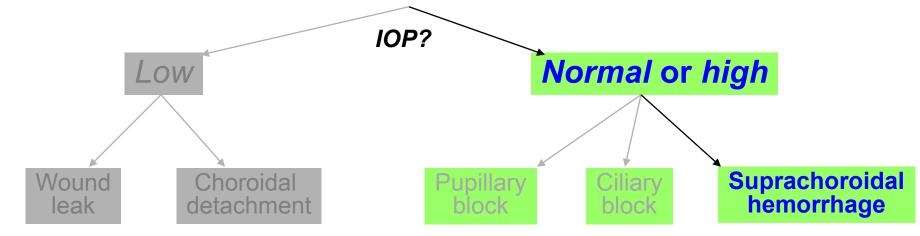
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Is the vision loss usually mild, or severe?

Severe



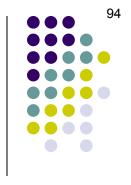
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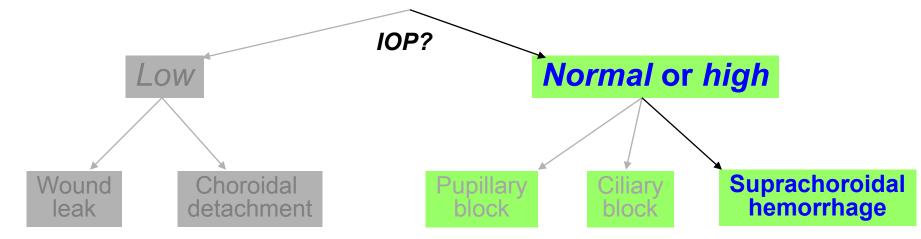
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What word classically characterizes the nature of the pain?



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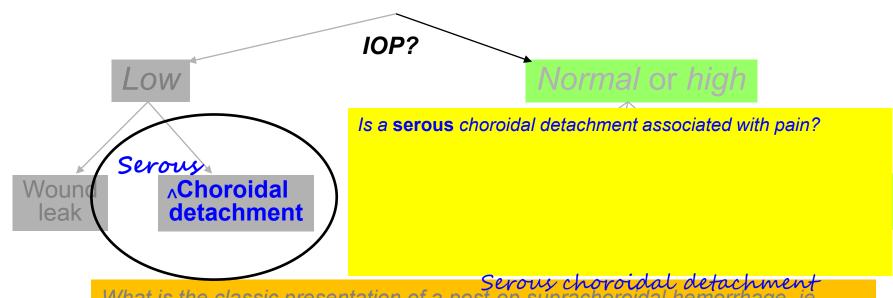
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What word classically characterizes the nature of the pain? 'Throbbing'



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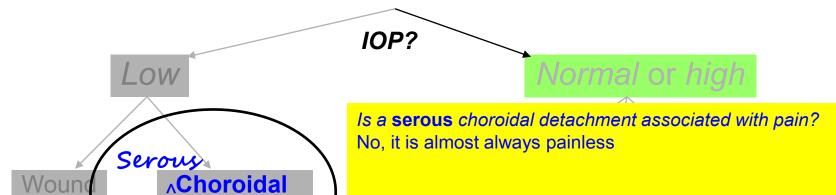


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## Shallow/flat AC after CE (early post-op period)



detachment

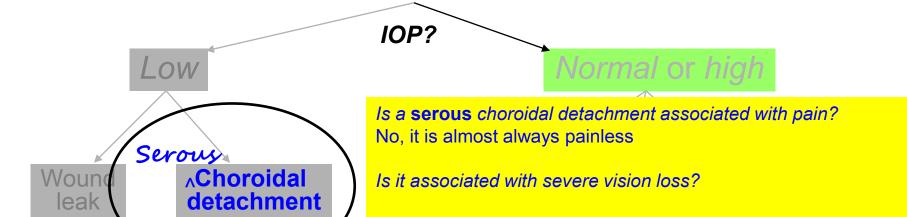
leak

What is the classic presentation of a post-op suprachoroidal hemorrhage, ie, what will the pt complain of?

The pt will complain of the sudden onset of vision loss and excruciating pain? No



## Shallow/flat AC after CE (early post-op period)



What is the classic presentation of a post-op suprachoroidal hemorrhage, ie, what will the pt complain of?

The pt will complain of the sudden onset of vision loss? and excruciating pain



## Shallow/flat AC after CE (early post-op period)



Wound leak Serous Choroidal detachment

Is a **serous** choroidal detachment associated with pain? No, it is almost always painless

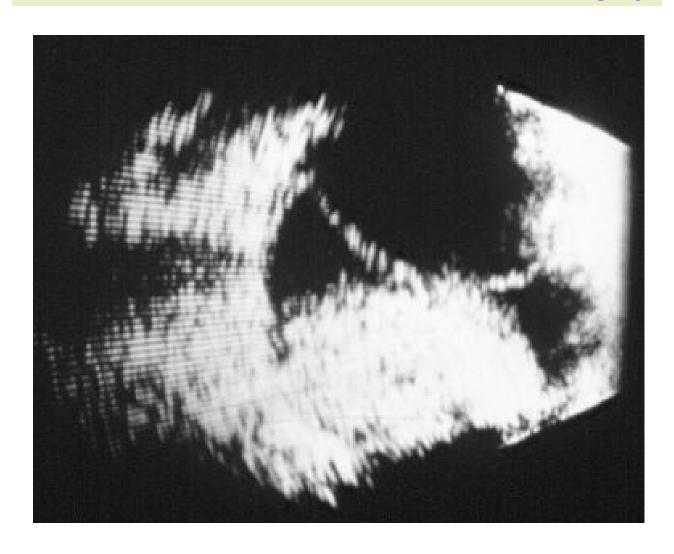
Is it associated with severe vision loss?

It depends. If a serous choroidal detachment is very extensive, it can block light from reaching the fovea, in which case SVL would result

What is the classic presentation of a post-op suprachoroidal hemorrhage, ie, what will the pt complain of?

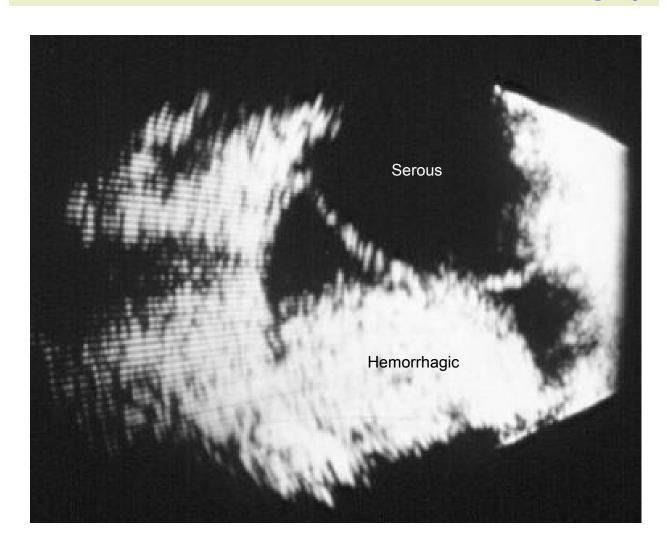
The pt will complain of the sudden onset of vision loss? Maybe iciating pain





Is this suprachoroidal effusion serous, or hemorrhagic?

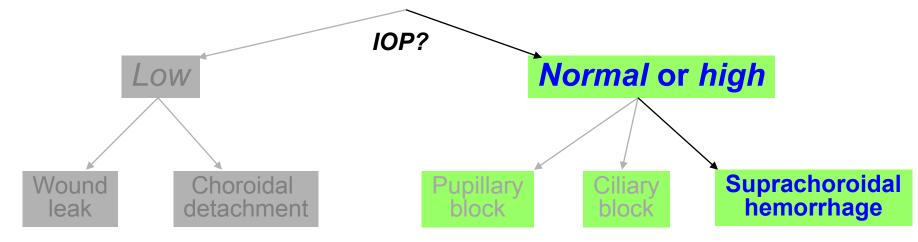




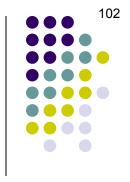
Is this suprachoroidal effusion serous, or hemorrhagic? It's both



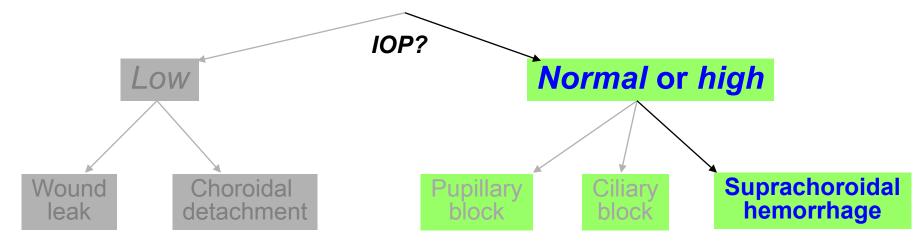
# Shallow/flat AC after CE (early post-op period)



What factors put an eye at risk for post-op suprachoroidal hemorrhage?
--------(there are a number of others)



# Shallow/flat AC after CE (early post-op period)

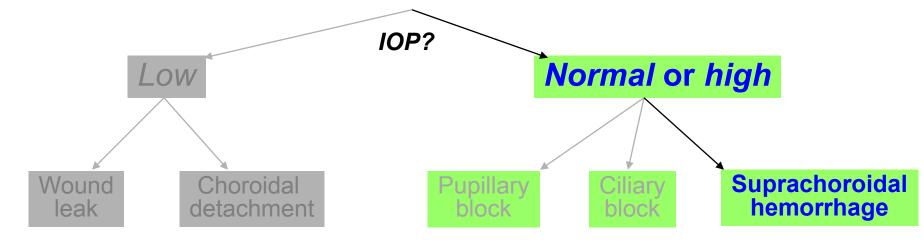


What factors put an eye at risk for post-op suprachoroidal hemorrhage?

- --High myopia
- --Nanophthalmia
- --Sturge-Weber syndrome
- --Hypertension
- --Glaucoma
- --(there are a number of others)



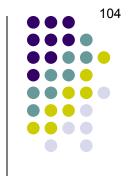
# Shallow/flat AC after CE (early post-op period)



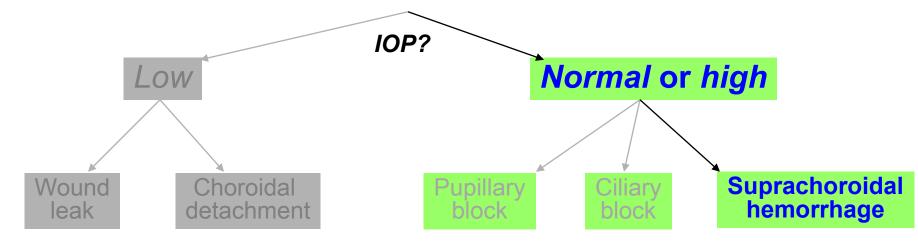
What factors put an eye at risk for post-op suprachoroidal hemorrhage?
--High myopia

Do the others include being in anticoagulated state?

--(there are a number of others)



# Shallow/flat AC after CE (early post-op period)



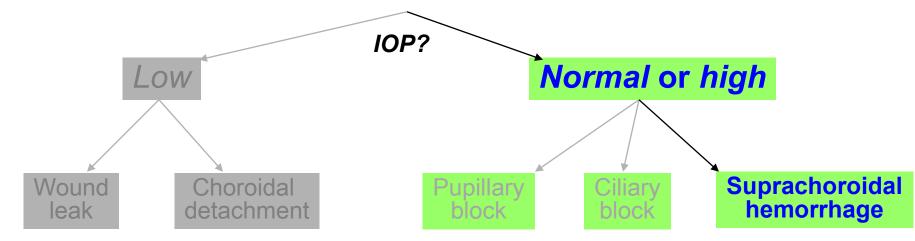
What factors put an eye at risk for post-op suprachoroidal hemorrhage? --High myopia

Do the others include being in anticoagulated state? Surprisingly, no. Long thought to be a risk factor for intra- and post-op hemorrhage, a large clinical trial found no evidence for this.

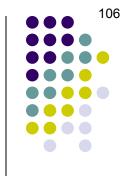
--(there are a number of others)



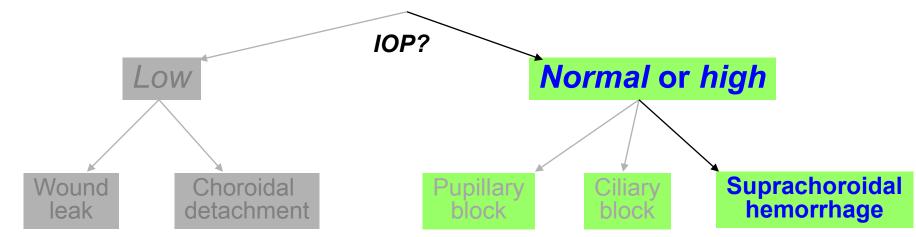
# Shallow/flat AC after CE (early post-op period)



What is the classic precipitating event for a post-op suprachoroidal hemorrhage?



Shallow/flat AC after CE (early post-op period)

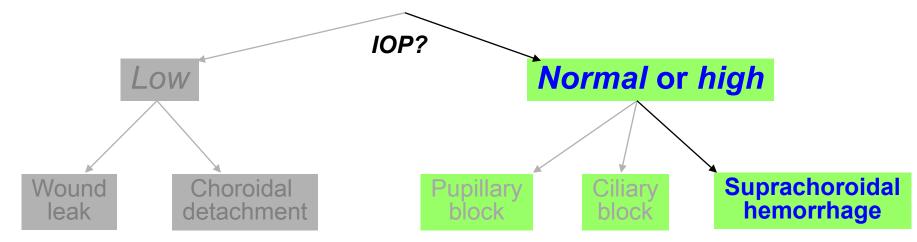


What is the classic precipitating event for a post-op suprachoroidal hemorrhage?

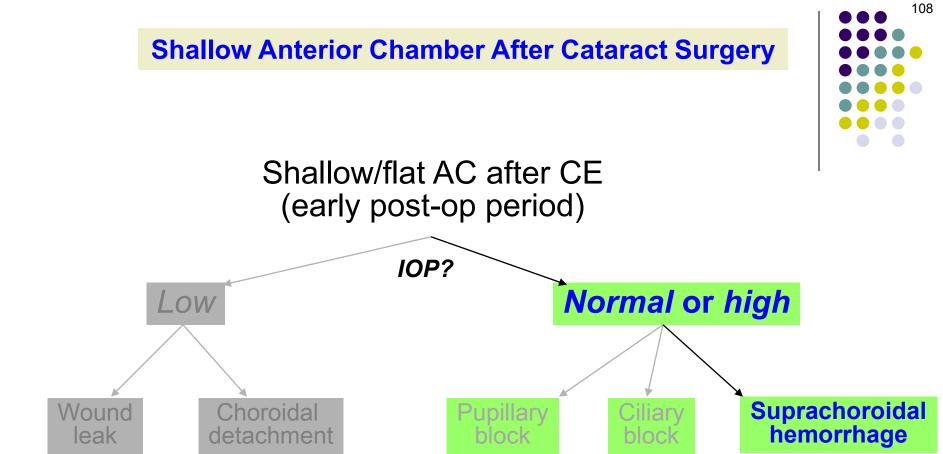
A Valsalva maneuver on the part of the pt (eg, sneezing; coughing; straining at stool)



## Shallow/flat AC after CE (early post-op period)



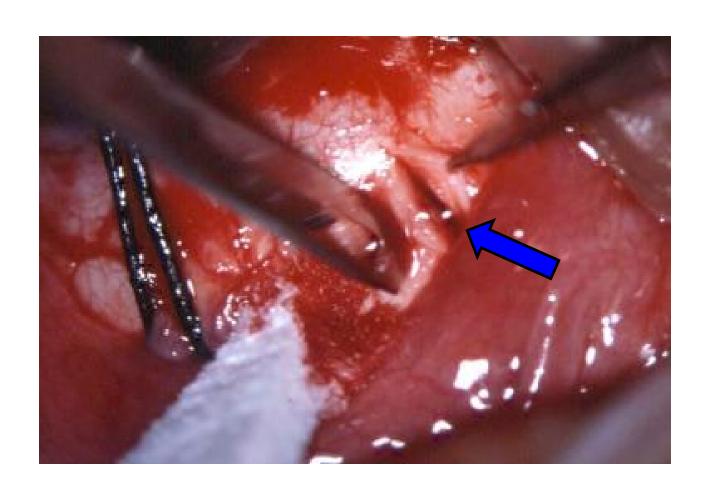
How is a suprachoroidal hemorrhage managed?



#### How is a suprachoroidal hemorrhage managed?

If not too severe (ie, the AC is not flat; the IOP not too high; the pt not in too much pain; no kissing choroidal present), medical management with aggressive cycloplegia and aqueous suppressants can be attempted. Otherwise, sclerotomy surgery is indicated.

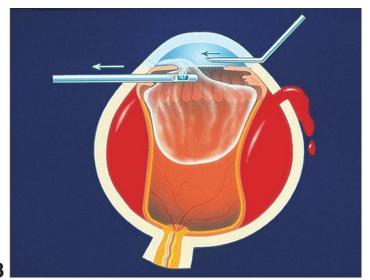




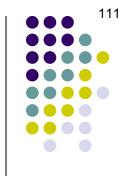
Suprachoroidal hemorrhage: Drainage via sclerotomy







Suprachoroidal hemorrhage. A, Schematic shows anterior infusion and simultaneous drainage of suprachoroidal hemorrhage through pars plana sclerotomy. B, Schematic shows pars plana vitrectomy to remove vitreous prolapse as drainage of suprachoroidal hemorrhage continues



## during Shallow/flat AC, after CE

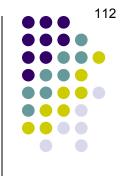
With regard to an **intraoperative** shallowing of the AC, one of these entities is closely related to the most dreaded intraoperative complication of all. What is that most dreaded of complications?

Wound leak

Choroidal detachment

Pupillary block

Ciliary block Suprachoroidal hemorrhage



during
Shallow/flat AC, after CE

With regard to an **intraoperative** shallowing of the AC, one of these entities is closely related to the most dreaded intraoperative complication of all. What is that most dreaded of complications? The **expulsive choroidal hemorrhage** 

Wound leak

Choroidal detachment

Pupillary block Ciliary block Expulsive

Suprachoroidal hemorrhage



 Expulsive choroidal hemorrhage is the most feared intraoperative complication of CE surgery. What is the classic first sign?



 Expulsive choroidal hemorrhage is the most feared intraoperative complication of CE surgery. What is the classic first sign?
 Darkening of the red reflex





Still from a video depicting an expulsive choroidal hemorrhage

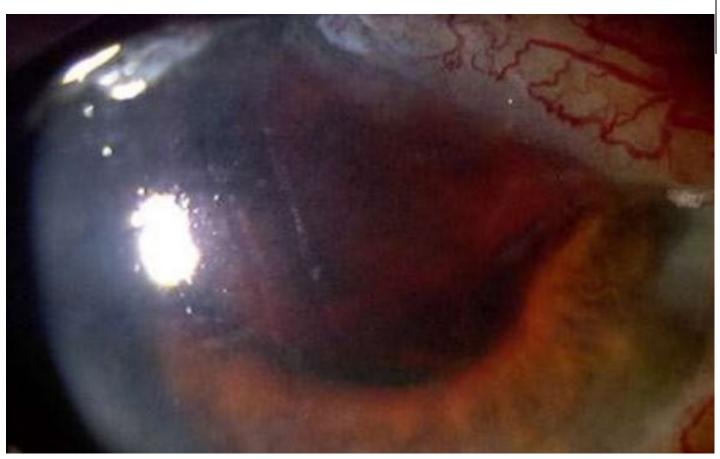


- Expulsive choroidal hemorrhage is the most feared intraoperative complication of CE surgery. What is the classic first sign?
   Darkening of the red reflex
- What is the classic 'late' sign?



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   Darkening of the red reflex
- What is the classic 'late' sign? Expulsion of the intraocular contents through the wound





Expulsive suprachoroidal hemorrhage



- Expulsive choroidal hemorrhage is the most feared intraoperative complication of CE surgery. What is the classic first sign?
   Darkening of the red reflex
- What is the classic 'late' sign? Expulsion of the intraocular contents through the wound
- How should it be managed intraoperatively?
  - 1)
  - 2)
  - 3)



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   Darkening of the red reflex
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  - 1) Put your finger on the wound to seal it
  - 2) Suture the wound closed
  - 3) Consider posterior sclerotomies to drain blood



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- Post-op, how should IOP be managed?



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- How should it be managed intraoperatively?
  - 1) Put your finger on the wound to seal it
  - 2) Suture the wound closed
  - 3) Consider posterior sclerotomies to drain blood
- Post-op, how should IOP be managed?
   Leave it elevated (will tamponade the bleed)



# Shallow/flat AC after CE Late (early post-op period)

What is the differential for a shallow AC in the late post-op period?	
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# Shallow/flat AC after CE Late (carly post-op period)

What is the differential for a shallow AC in the late post-op period?

- --RD
- --Bleb formation
- -- Chronic uveitis
- -- Cyclodialysis
- -- Delayed choroidal hemorrhage





## Shallow/flat AC after CE Late (carly post-op period)

What is the differential for a shallow AC in the late post-op period?

- --RD
- --Bleb formation

What sort of incision makes inadvertent bleb formation more likely?

- --Chronic uveitis
- --Cyclodialysis
- -- Delayed choroidal hemorrhage





# Shallow/flat AC after CE Late (carly post-op period)

What is the differential for a shallow AC in the late post-op period?

- --RD
- --Bleb formation

What sort of incision makes inadvertent bleb formation more likely?
A limbal incision

- -- Chronic uveitis
- --Cyclodialysis
- -- Delayed choroidal hemorrhage





# Shallow/flat AC after CE Late (carly post-op period)

What is the differential for a shallow AC in the late post-op period?

- --RD
- --Bleb formation
- -- Chronic uveitis
- --Cyclodialysis

What sort of incision makes cyclodialysis more likely?

--Delayed choroidan nemormage





# Shallow/flat AC after CE Late (carly post-op period)

What is the differential for a shallow AC in the late post-op period?

- --RD
- --Bleb formation
- --Chronic uveitis
- -- Cyclodialysis

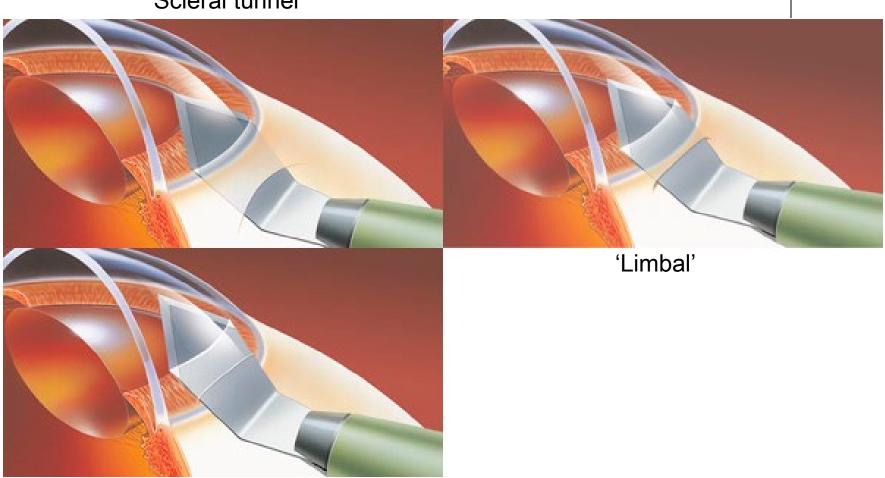
What sort of incision makes cyclodialysis more likely?
A scleral-tunnel incision

-- Delayed choroidar nemormage





'Scleral tunnel'



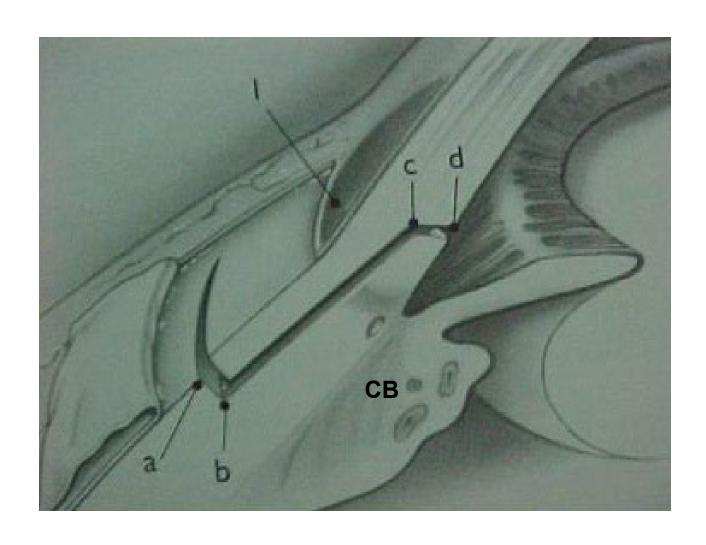
'Clear cornea'





Bleb formation after limbal-incision CE





Scleral-tunnel CE incision. Note the proximity to the ciliary body (CB)



## Shallow/flat AC after CE Late (carly post-op period)

What is the differential for a shallow AC in the late post-op period?

- --RD
- --Bleb formation
- --Chronic uveitis
- -- Cyclodialysis

What exam maneuver should be performed to check for cyclodialysis?

--Delayed choroidan nemormage

dal



# Shallow/flat AC after CE Late (carly post-op period)

What is the differential for a shallow AC in the late post-op period?

- --RD
- --Bleb formation
- --Chronic uveitis
- -- Cyclodialysis

What exam maneuver should be performed to check for cyclodialysis? Gonioscopy

-- Delayed choroidar nemormage

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