



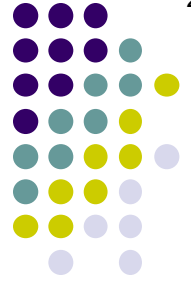
Q

- **Post-op Endophthalmitis after CE**

(Cataract extraction)

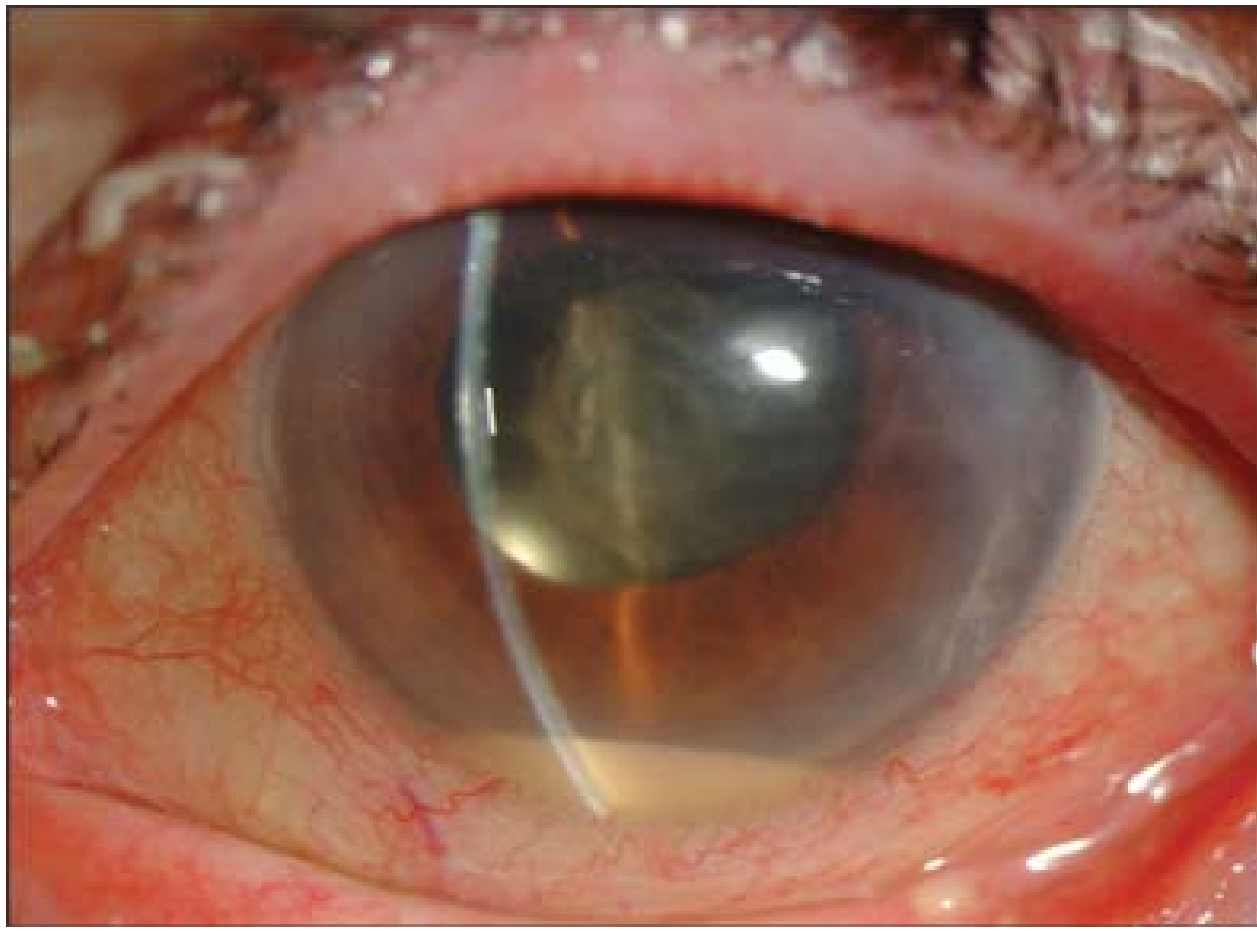
- *Acute* = Within [time frame]

- *Chronic* = More than [time frame]



A

- **Post-op Endophthalmitis after CE**
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Acute post-CE endophthalmitis



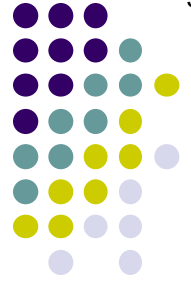
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- **Post-op Endophthalmitis after CE**

- *Acute* = Within **6 weeks** of surgery

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Is post-op CE endophthalmitis more likely to occur in right eyes, or left?



A

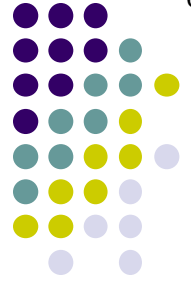
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Right



Q

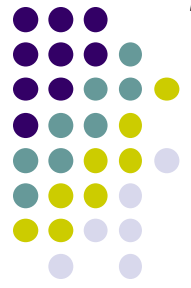
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What proportion of post-CE endophthalmitis cases occur in right eyes?



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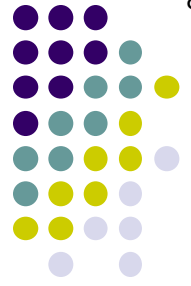
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*What proportion of post-CE endophthalmitis cases occur in right eyes?
Estimates run as high as 86%!*



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Why should it be more common in right eyes?



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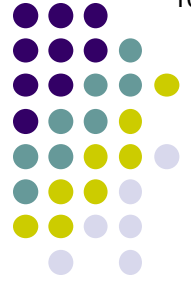
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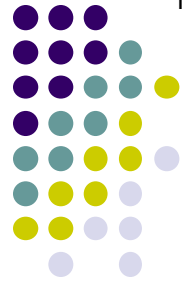
It's probably because most surgeons are right-handed, and therefore they place the main surgical wound OD at the inferior aspect of the cornea. Thus, this wound is in contact with the tear lake, meaning pathogens swimming therein have ready access to it. This increases the likelihood of pathogens entering the eye.



Q

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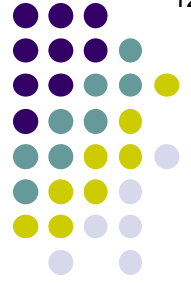
*Technically, endophthalmitis within 6 weeks post-op qualifies as 'acute.'
However, what is the typical time-to-presentation?*



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Technically, endophthalmitis within 6 weeks post-op qualifies as 'acute.'
However, what is the typical time-to-presentation?
Usually within 24 – 72 hrs of surgery



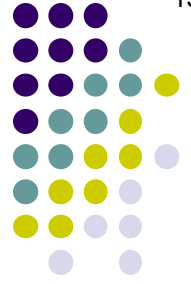
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A less virulent bacterial species, or a fungal pathogen, may be the agent*



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What should you consider if endophthalmitis presents in less than 24 hrs?



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*What should you consider if endophthalmitis presents in less than 24 hrs?
It may be **noninfectious** endophthalmitis*



Q

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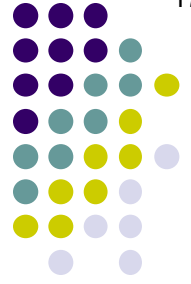
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What is the other name for noninfectious post-op endophthalmitis?



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*What is the other name for noninfectious post-op endophthalmitis?
Toxic anterior segment syndrome (TASS; more on this later in the set)*



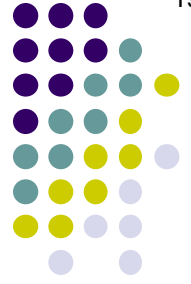
Q

- **Post-op Endophthalmitis after CE**

- *Acute* = Within **6 weeks** of surgery

- Bugs: , ,

- *Chronic* = More than 6 weeks after surgery



A

- **Post-op Endophthalmitis after CE**

- *Acute* = Within **6 weeks** of surgery
 - Bugs: **Coag (-) Staph**, **Staph aureus**, **Strep sp**
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Q

- **Post-op Endophthalmitis after CE**

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What is the source of these bugs (where do they come from)?



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What is the source of these bugs (where do they come from)?

The ocular surface, lids and lashes



Q

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Which bug is the most common cause of acute post-CE endophthalmitis?



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Which bug is the
Coag (-) Staph

What specific bug is this?

itis?



A

● Post-op Endophthalmitis after CE

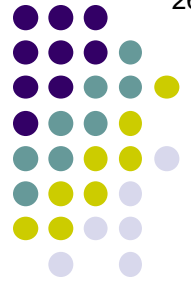
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Which bug is the most common cause of post-op endophthalmitis?
What specific bug is this?
S. epidermidis

Coag (-) Staph



Q

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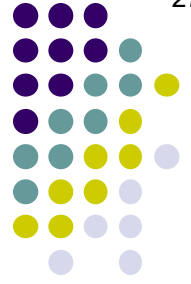
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What specific bug is this?

S. epidermidis

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What percent of acute post-CE infectious endophthalmitis does it account for?



A

● Post-op Endophthalmitis after CE

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 - Bugs: **Coag (-) Staph**, *Staph aureus*, *Strep sp*

What is the source of these bugs (where do they come from)?
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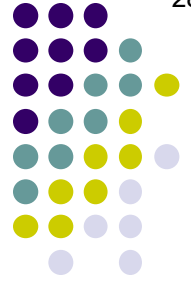
What specific bug is this?

S. epidermidis

itis?

What percent of acute post-CE infectious endophthalmitis does it account for?

About 70



Q

● Post-op Endophthalmitis after CE

- *Acute* = Within 6 weeks of surgery
 - Bugs: **Coag (-) Staph**, **Staph aureus**, **Strep sp**
- *Chronic* = More than 6 weeks after surgery

Generally speaking, what would be the typical timeframe for onset of endophthalmitis owing to each of these bugs?



A

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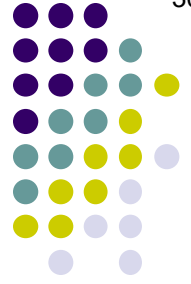
- *Chror*

The less virulent *S. epi*
will take **5-7 days** to
declare

we

The more virulent
S. aureus and *Strep sp.*
will declare within **4 days**

Generally speaking, what would be the typical timeframe for onset of endophthalmitis owing to each of these bugs?



Q

● Post-op Endophthalmitis after CE

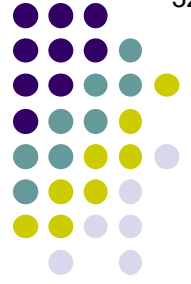
- *Acute* = Within 6 weeks of surgery
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 - Management: Per study (abb.)
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 - Bugs: Coag (-) Staph, Staph aureus, Strep sp
 - Management: Per EVS
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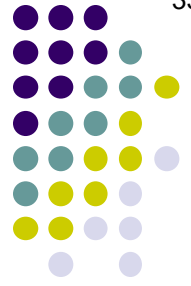


Q

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What does EVS stand for?

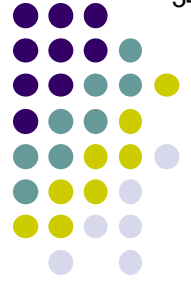


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*What does EVS stand for?
Endophthalmitis Vitrectomy Study*



Q

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*What does EVS stand for?
Endophthalmitis Vitrectomy Study*

*What questions did the EVS seek to answer?
With respect to the management of acute post-CE infectious endophthalmitis:
1) What is the role of... [surgical procedure]
2)*



A

● Post-op Endophthalmitis after CE

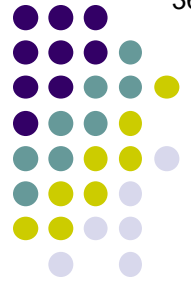
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What questions did the EVS seek to answer?

With respect to the management of acute post-CE infectious endophthalmitis:

- 1) What is the role of...PPV?
- 2) *(pars plana vitrectomy)*



Q

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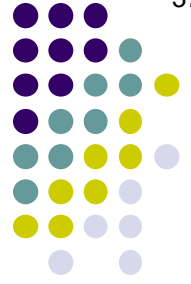
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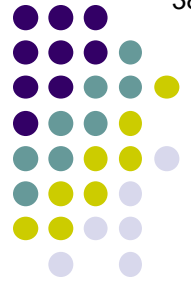
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Q

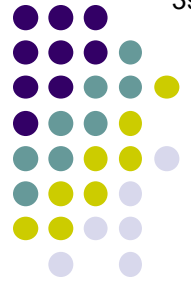
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In evaluating PPV, what was it compared to?



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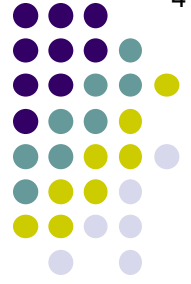
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What did the study show with respect to PPV efficacy? Did it improve visual outcomes?



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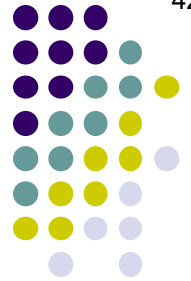
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Depends—if VA was LP or worse at presentation, visual outcome was better with PPV.
However, if VA was better than LP, there was no difference between the PPV and intravitreal-antibiotics-only groups with respect to final visual outcome.*



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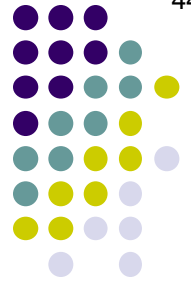
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Intravenous antibiotics did **not** improve final visual outcome*



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What did the study show with respect to systemic antibiotics and visual outcome?
Intravenous antibiotics did not improve final visual outcome

Why was this conclusion controversial?



Q/A

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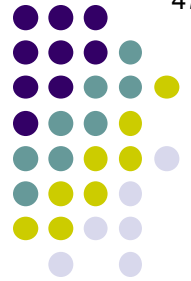
2) How effective are...systemic antibiotics?

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Why was this conclusion controversial?

The antibiotics used in the EVS were and .



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What did the study show with respect to systemic antibiotics and visual outcome?
Intravenous antibiotics did not improve final visual outcome

Why was this conclusion controversial?
The antibiotics used in the EVS were **ceftazidime** and **amikacin** .



Q

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Intravitreal antibiotics

What did the study show with respect to systemic antibiotics and visual outcome?

Intravenous antibiotics did not improve final visual outcome

Why was this conclusion controversial?

The antibiotics used in the EVS were **ceftazidime** and **amikacin**. The EVS was criticized for the choice of Ceftaz over , which has better coverage of Gram+ cocci.



A

● Post-op Endophthalmitis after CE

- *Acute* = Within 6 weeks of surgery
 - Bugs: Coag (-) Staph, Staph aureus, Strep sp
 - Management: Per EVS

What does EVS stand for?
Endophthalmitis Vitrectomy Study

What questions did the EVS seek to answer?
With respect to the management of acute post-CE infectious endophthalmitis:
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Q

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A patient s/p CE 6 months prior presents with endophthalmitis. Should EVS findings dictate management?



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A patient s/p trab 3 weeks prior presents with endophthalmitis. Should EVS findings dictate management?



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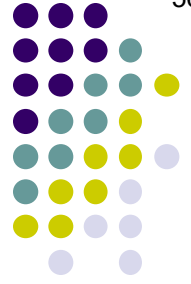
Again, not necessarily. The EVS addressed endophthalmitis after CE. As in the previous scenario, to extrapolate to this situation may not be justified or appropriate.



- **Post-op Endophthalmitis after CE**

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 - Presents w/ indolent course or progressive inflammation

(No question—proceed when ready)



Q

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Which one of these is the #1 cause of chronic endophthalmitis after cataract surgery?

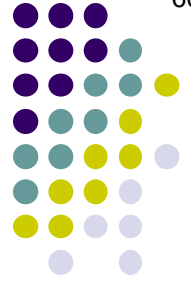


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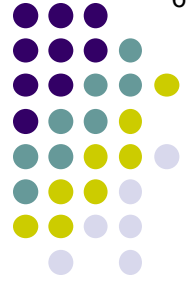
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Q

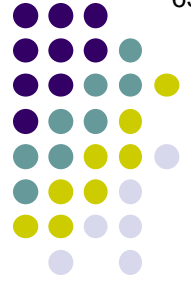
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Q

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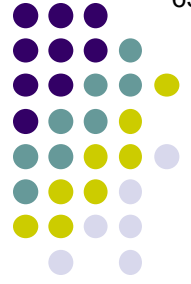
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*By definition, chronic endophthalmitis commences 6+ weeks after surgery. In terms of P acnes...
What is the average amount of time between surgery and presentation?*



A

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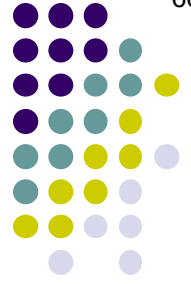
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*By definition, chronic endophthalmitis commences 6+ weeks after surgery. In terms of P acnes...
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Q

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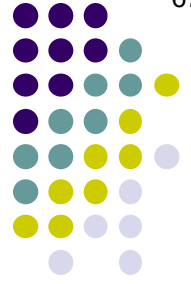
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What is the range?



A

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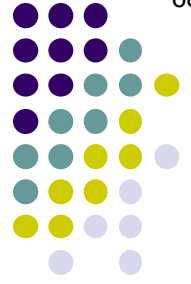
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*What is the range? Two weeks to **several years***

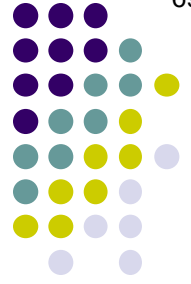


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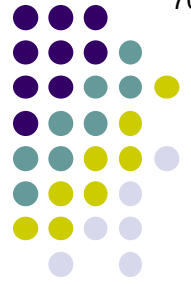
Is the inflammation in P acnes chronic post-op endophthalmitis granulomatous, or nongranulomatous?



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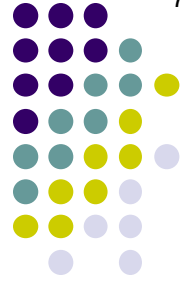
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What is the classic response to a trial of steroids?



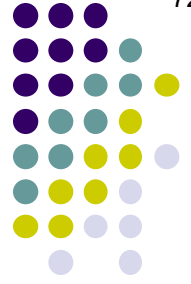
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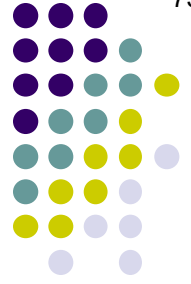
The inflammation will lessen, then recur (or even worsen) when the steroids are stopped



Q

● Post-op Endophthalmitis after CE

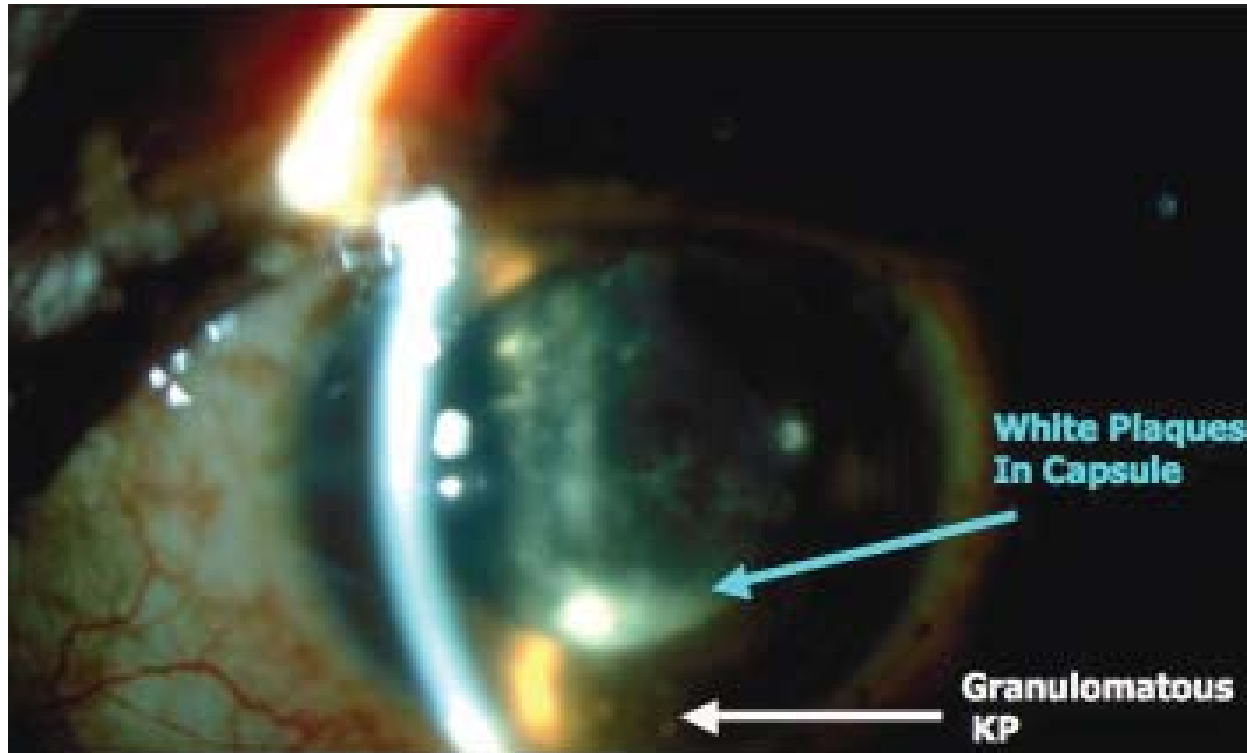
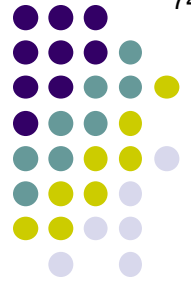
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 - Peripheral white plaque in bag = **one of the above bugs**



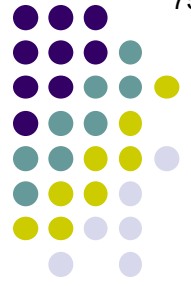
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P acnes post-CE endophthalmitis



P acnes post-CE endophthalmitis

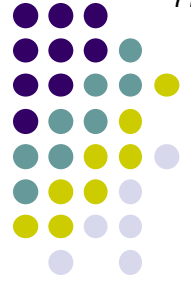


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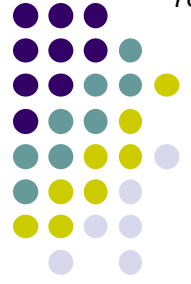
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The space between the IOL and the bag is relatively anaerobic, thus allowing P acnes to flourish, eventually forming a colony large enough to be seen at the slit lamp (ie, the notorious 'white plaque')



Q

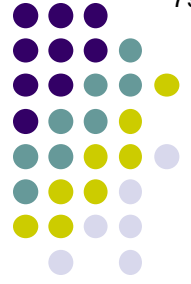
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Suppose you (mis)took a P acnes plaque for a PCO, and YAG'd it. What would likely result?



A

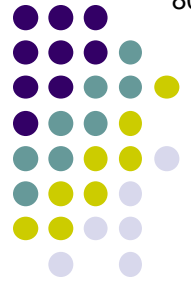
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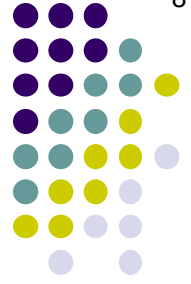
Suppose you (mis)took a P acnes plaque for a PCO, and YAG'd it. What would likely result?
Seeding of the vitreous with the organism, which would cause the vitritis to worsen



Q

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A

● Post-op Endophthalmitis after CE

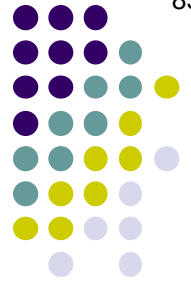
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Q

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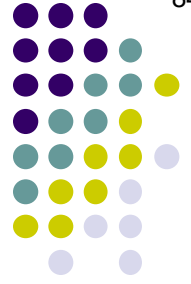
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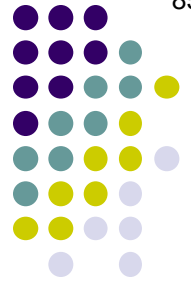
Q

● Post-op Endophthalmitis after CE

Which fungi are most commonly implicated in chronic post-CE endophthalmitis?

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mation



A

● Post-op Endophthalmitis after CE

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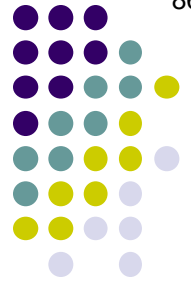
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Information



Q

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How does fungal post-CE endophthalmitis present?

-

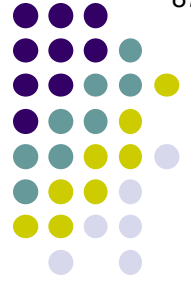
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- Management of *P acnes* post-op endophthalmitis:

- Intraocular antibiotics are usually **not** helpful, unless it follows **PPV** and **capsulectomy**--in which case, use **vancomycin**
- If recurs: **IOL removal or exchange**

Information



A

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- Which fungi are most commonly implicated in chronic post-CE endophthalmitis?
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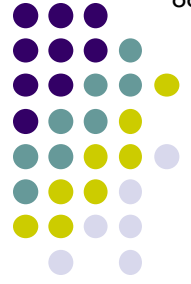
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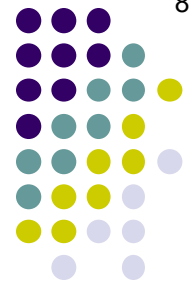
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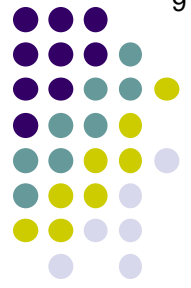
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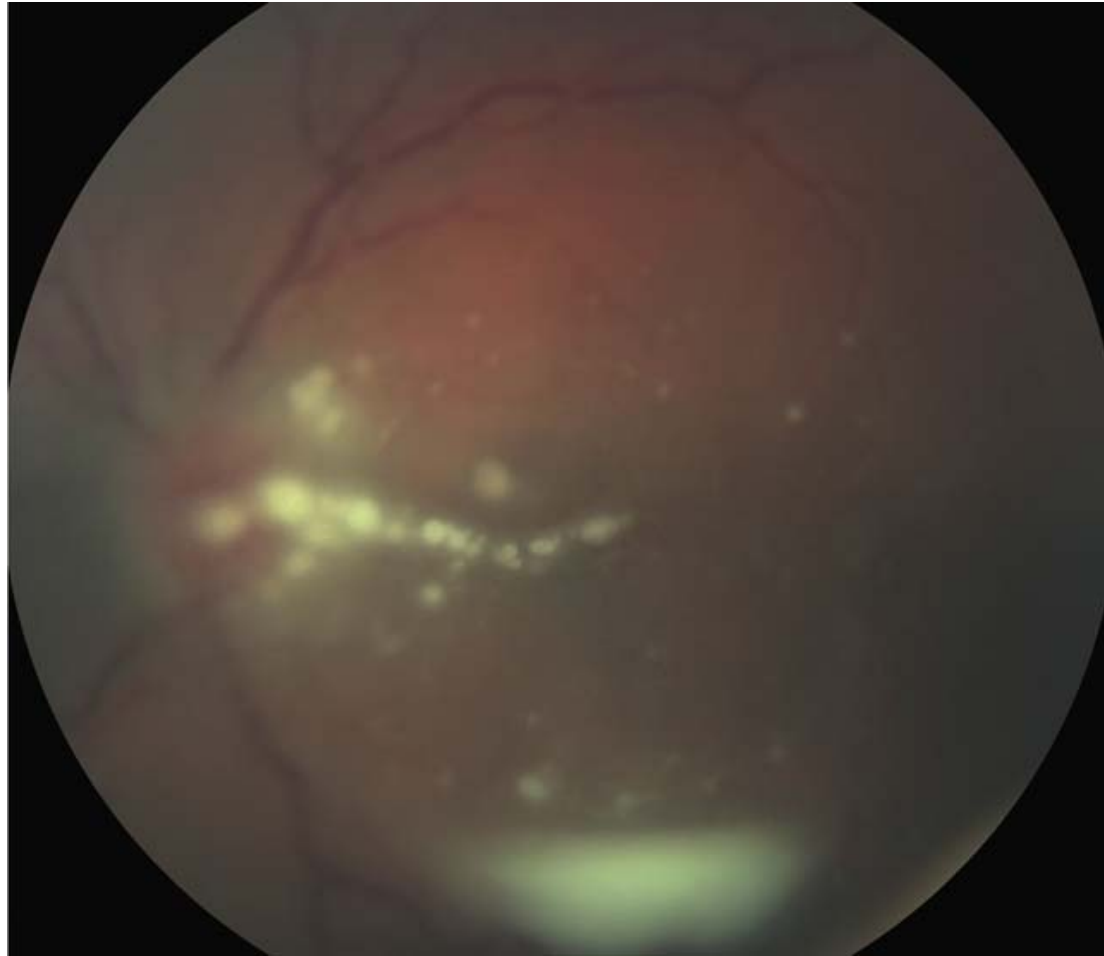


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Fungal endophthalmitis: 'String of pearls' in the vitreous



Q

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follows

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With intravitreal antifungals (usually amphotericin and/or voriconazole). Vitrectomy may be necessary as well.

information

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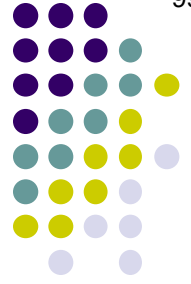
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What about systemic antifungals?

At this time, it is not clear what role (if any) systemic antifungals can/should play in managing post-op fungal endophthalmitis



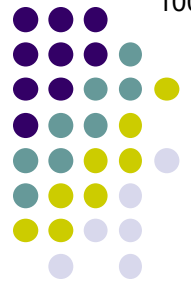
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If the identity of the organism is in question, how should the clinician proceed?

OWS



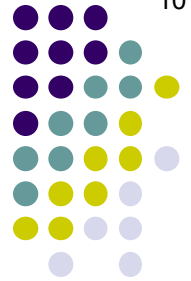
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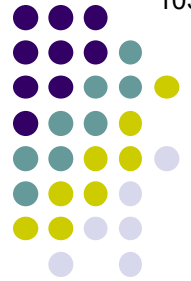
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Which three culture media should be employed?

- Aerobic
- Anaerobic
- Fungal

WS



Q

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OWS



A

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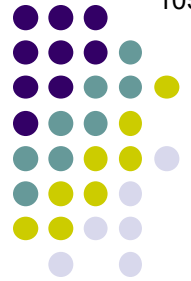
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Which two stains should be used?

- Gram
- Giemsa



Q

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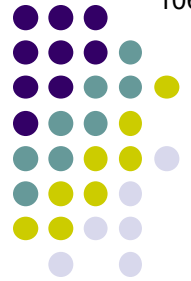
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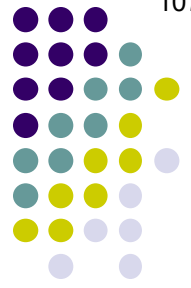
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Stains, definitely. Remember, these pathogens are slow-growing and fastidious; thus, it could be weeks before they reveal themselves via culturing. On the other hand, staining has the potential to identify the culprit **instantly**.

OWS



Q

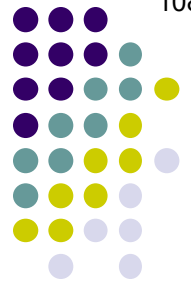
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It is important to bear in mind that certain noninfectious conditions can present in a manner very much like chronic post-op infectious endophthalmitis. What are some of these conditions?

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- If recurs: IOL removal or exchange



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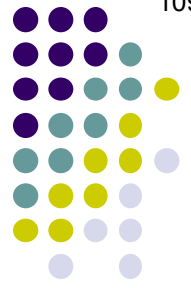
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--IOL-related issues (eg, a square-edged haptic malpositioned in the ciliary sulcus; UGH syndrome)

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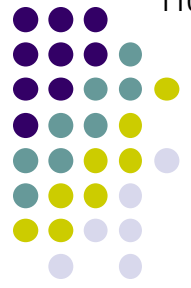
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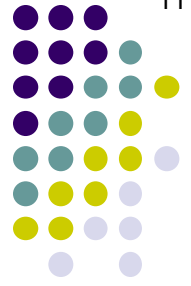
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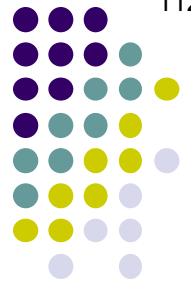
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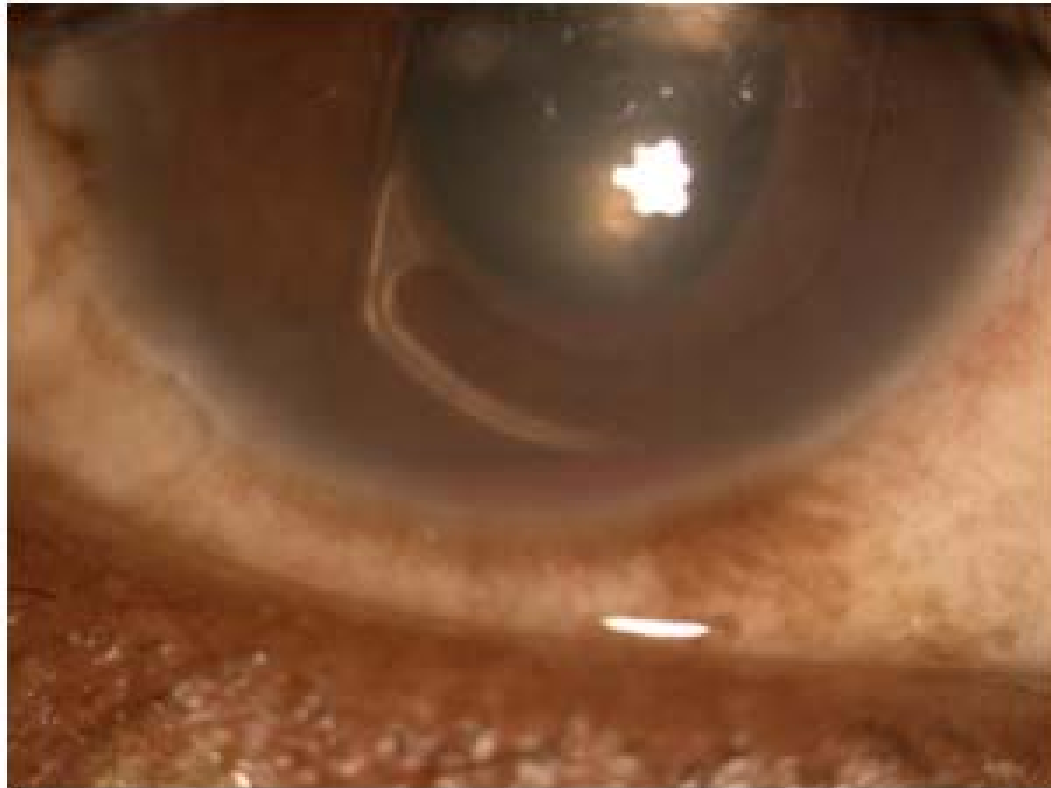
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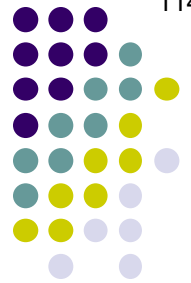
Uveitis-glaucoma-hyphema (syndrome)

What is UGH syndrome?

A constellation of sequelae that can occur when an inappropriately-sized AC IOL chafes the iris and other anterior-segment structures. Advances in IOL manufacturing have made it an uncommon occurrence.



UGH syndrome



Q

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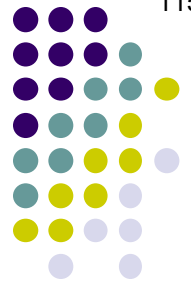
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● What are the main risk factors for post-CE endophthalmitis?

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ammation

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- *What are the main risk factors for post-CE endophthalmitis?*

- Capsular rupture

- Prolonged surgery time

- Retained lens fragments

- Clear cornea incision

- Sutureless closure

- Wound leak on post-op day 1

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- Sutureless closure?
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Which factor presents the largest increase in relative risk of post-op endophthalmitis?

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Which factor presents the largest increase in relative risk of post-op endophthalmitis?
Wound leak on POD1--one study pegged its increased relative risk at **44**



Q

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- *What are the main risk factors for post-operative endophthalmitis? What is the Infectious Dose 50 (ID₅₀) for Staph epi if the capsule is intact?*

--Capsular rupture

- Prolonged surgery time
- Retained lens fragments
- Clear cornea incision
- Sutureless closure
- Wound leak on post-op day 1

- Intraocular antibiotics are usually not helpful, unless it follows PPV and capsulectomy--in which case, use vancomycin
- If recurs: IOL removal or exchange



A

● Post-op Endophthalmitis after CE

- *Acute* = Within 6 weeks of surgery

- Bugs: Coag (-) *Staph*, *Staph aureus*, *Strep sp*

- Management: Per EVS

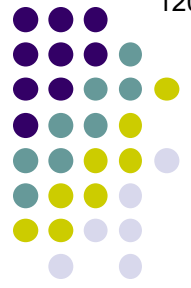
- *What are the main risk factors for post-operative endophthalmitis?*

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About one million organisms

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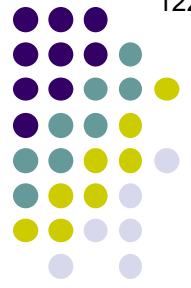
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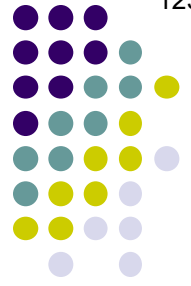
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What is the ID_{50} if the capsule is ruptured (ie, if the Staph epi gets into the vitreous)?
10. That's not a typo--only ten Staph epis need get in the vitreous to produce post-op endophthalmitis!

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- ***Noninfectious*** endophthalmitis after CE



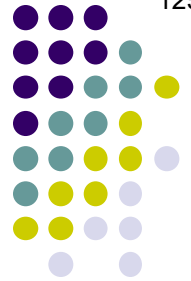
Q

- ***Noninfectious* endophthalmitis after CE**
 - Noninfectious endophthalmitis is also known as ()



A

- ***Noninfectious endophthalmitis after CE***
 - Noninfectious endophthalmitis is also known as **toxic anterior segment syndrome (TASS)**



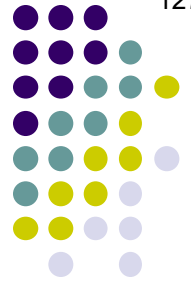
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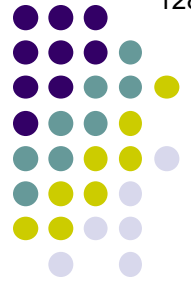
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Q

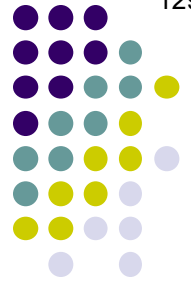
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sign (two words)



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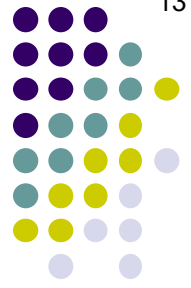


TASS: Limbus-to-limbus corneal edema



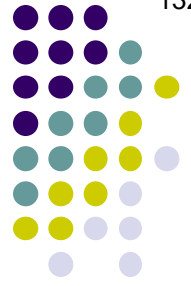
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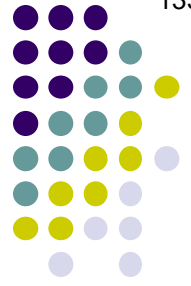
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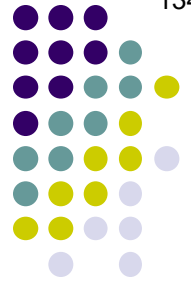
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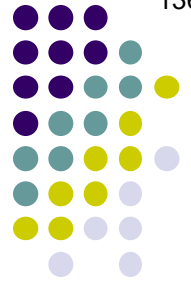
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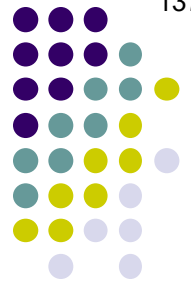
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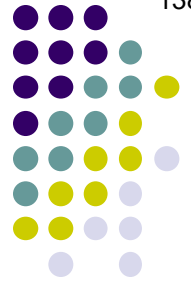
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- Pa

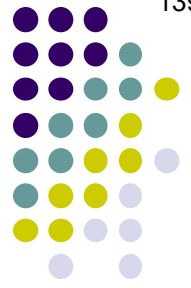
su

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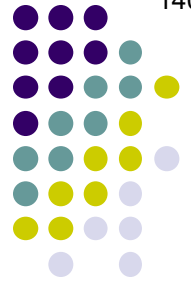
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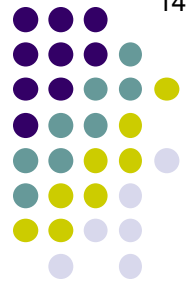
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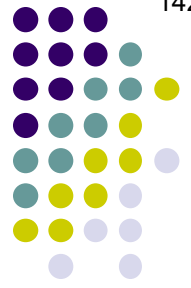
Steroids

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Q

**Infectious vs Noninfectious Post-op Endophthamitis:
Compare and Contrast**

Signs and Symptoms	TASS	Acute Bacterial Endophthamitis
Onset latency	?	?



A

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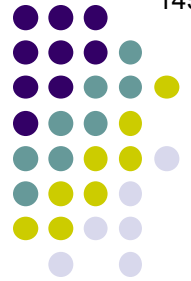
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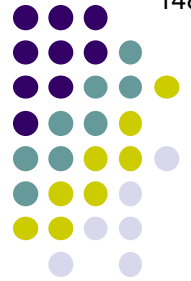
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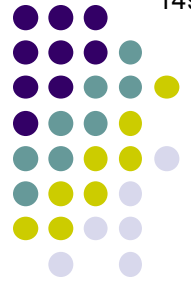
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Q

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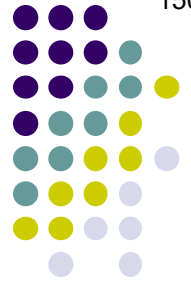
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Response to steroids	?	?



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Pain	?	?



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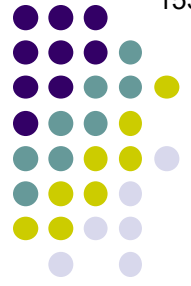
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A

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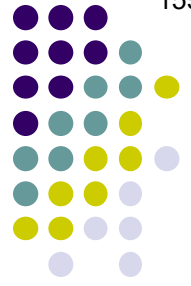




Q

With regards to cataract extraction (CE) surgery...

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- What is the only pre-op routine proven to reduce endophthalmitis risk?



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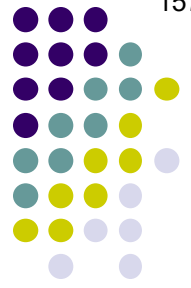
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A

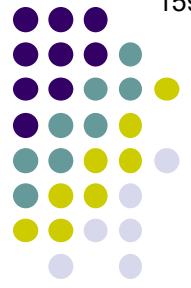
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 - YES if (use PO)



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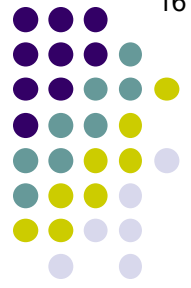
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 - NO for **heart valves** or **MVP** (not necessary because CE does not produce a **bacteremia**)

(MVP = Mitral valve prolapse)

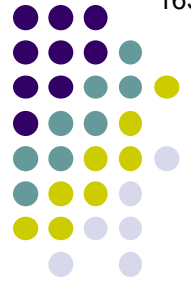
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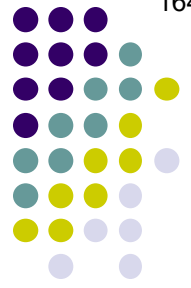
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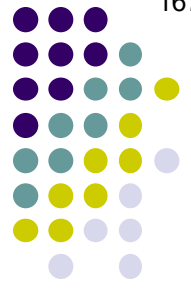
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A

With regards to cataract extraction (CE) surgery...

- Do intracameral antibiotics reduce the risk of endophthalmitis? **Possibly**

The efficacy of intracameral antibiotics for endophthalmitis prophylaxis in CE surgery is a complex and contentious issue at this time. A recent enormous multicenter prospective study in Europe found that infiltrating cefuroxime into the AC at the end of CE surgery resulted in a five-fold decrease in post-op endophthalmitis rates compared to placebo infiltration.

So case closed then—intracameral cefuroxime is the way to go, right?

Not so fast. While cefuroxime was better than placebo, it might not fare any better than the common American practice of perioperative prophylactic antibiotics (usually a fourth-generation fluoroquinolone).

So case closed then—perioperative fluoroquinolone is the way to go, right?

Not so fast. The Europeans argue that it is irresponsible to use these agents for prophylaxis, as this will lead inevitably to resistance (in fact, resistance has already appeared).

So case closed then—intracameral cefuroxime is the way to go, right?

Not so fast. Cefuroxime doesn't cover *Pseudomonas* and (especially) MRSA. Additionally, intracameral-appropriate doses of cefuroxime are not available in the US, and Big Pharm is not anxious to provide them (poor profit margin).

Like I said: A complex and contentious issue...