

Propionibacterium acnes Endophthalmitis
George Papaliodis, M.D.

Chief complaint: decreased visual acuity OU

History of present illness: GJ is a 7 year old female with pmh of congenital cataracts OU who presented for evaluation of decreased visual acuity OU. One year ago her best corrected visual acuity was 20/30 OU.

ROS: normal full term delivery without complications during pregnancy or peripartum

Physical examination:

Visual acuity without correction 20/100 OD and 20/50 OS

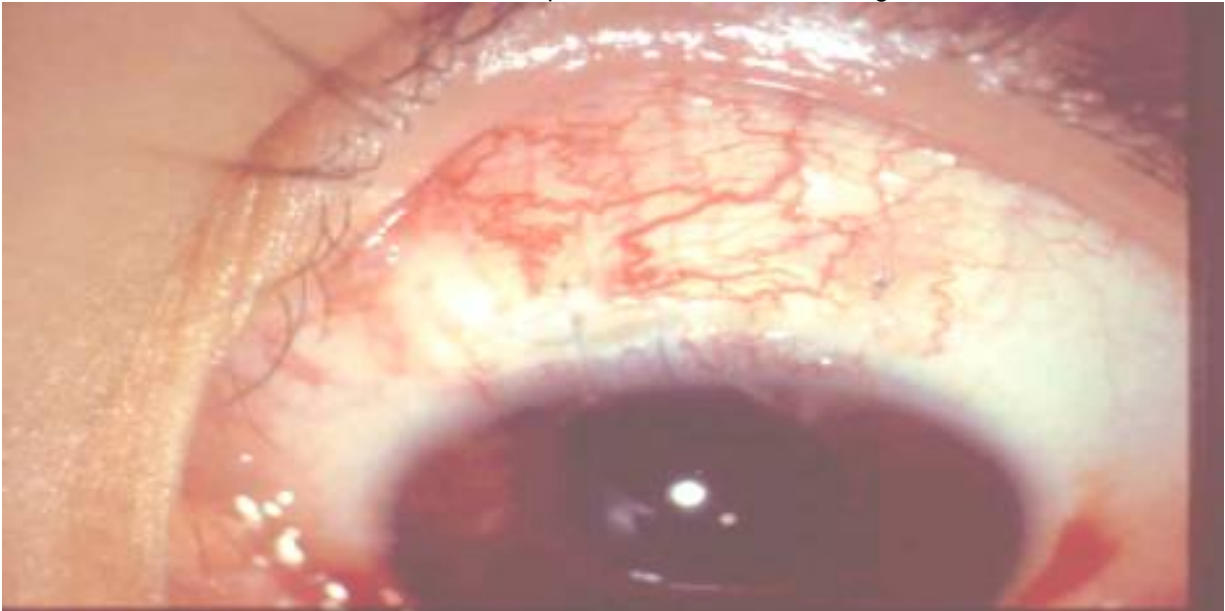
IOP of 12 OU. Normal extraocular movements and pupillary exam.

Slit lamp examination: 3+PSC cataract OD and 2+PSC cataract OS

Dilated fundus exam: within normal limits OU

Clinical Course: As the patient had documented 20/30 visual acuity one year ago, the decision was made to proceed with cataract surgery OU. She underwent phaco with PCIOL OD with 20/20 BSCVA 3 weeks after the procedure. 4 weeks after the first surgery, she underwent phaco with PCIOL OS. Post op day #1 her visual acuity was 20/50 with 4+ cells. She was placed on pred forte q 1 hour OS and cixolan qid and asked to return in one week.

At that time, her Va was 20/80 and her slit lamp exam showed the following:



Slit lamp exam / photo#1

Slit lamp exam/photo #2



Assessment: 7 y/o female s/p cataract surgery OU with pain, photophobia, and white deposits on IOL OS.

Plan: Given the concern for possible endophthalmitis, the patient underwent AC tap with broth culture growing Propionobacterium acnes.

Propionibacterium acnes Endophthalmitis

Background information

P. acnes is a pleomorphic Gram (+) bacillus which is normally found in and around hair follicles. The organism is anaerobic but can tolerate limited amounts of oxygen (microaerophilic). Industry has used this organism in the manufacture of certain cheeses. The organism was named *Propionobacterium* as the organism ferments lactic acid, alcohols, and carbohydrates to propionic acid. It has adapted several sophisticated features allowing the organism to establish a chronic infection without attack from the host immune system. *P. acnes* has a cell wall structure which prevents degradation from neutrophils and macrophages. Additionally, the organism can suppress T-cell activation. Both of these two mechanisms are responsible for the chronic indolent nature of the infection.

Clinical Relevance

P. acnes endophthalmitis is a relatively new clinical entity first described in 1987 by Meisler et.al. and Jaffe et.al. Prior to this time the clinical scenario existed in the literature (chronic ocular inflammation with thick white deposits on the IOL), but the condition carried the nomenclature toxic lens syndrome presumably induced by retained lens proteins.

The organism has a predilection for the lens capsule and has been cultured from as early as 2 days post operatively up to 2 years. *P. acnes* is relatively rare as a cause of endophthalmitis. Upon review with the microbiologist at Massachusetts Eye and Ear Infirmary, *P. acnes* has been cultured from the aqueous or vitreous from 5 cases in the last 2 years. This represents 5 positive cases in 2 years at a tertiary high volume referral center with consults from across the world.

The hallmark of *P. acnes* endophthalmitis is the presence of the white plaque on the posterior capsule or the IOL (reported in 40-100% of cases depending on the series). Other common signs

include: hypopyon (30-60% of cases), granulomatous keratic precipitants (30-80% of cases), fibrin strands in the anterior chamber (20-30% of cases).

Diagnosis of P.acnes

P.acnes is a difficult organism to culture due to the slow growth time and the anaerobic conditions required for optimum growth. The generation doubling time for P.acnes is 5.1 hours compared to 24 minutes for S.aureus. Average cultures are positive in most microbiology labs by 8-10 days. Culture material should ideally be obtained from both aqueous and vitreous (under anaerobic conditions) to increase the yield of positive results. PCR has been utilized from aqueous samples, but this test has an exceptionally high false positive rate due to skin contamination.

Treatment

Treatment options are shown in the chart below along with recurrence rates of the infection with each proposed therapy:

<u>Proposed treatment</u>	<u>Recurrence rate</u>
1. intraocular antibiotics alone (vancomycin +/- amikacin or clindamycin)	93%
2. pars plana vitrectomy along with intraocular antibiotics	50%
3. PPV, partial capsulectomy, and intraocular antibiotics	26%
4. PPV, total capsulectomy, IOL removal or exchange, and intraocular antibiotics	0%

Overall, visual outcomes in P.acnes endophthalmitis are relatively good with patients in the larger case series retaining 20/40 Va or better despite the choice of initial therapy. The choice of initial therapy influenced the duration of inflammation but not the final visual outcome. Many patients developed a recurrence of P.acnes after YAG capsulotomy was performed.

Conclusions

P.acnes endophthalmitis is a rare clinical entity which should be considered in the correct clinical context. The diagnosis is a difficult one to make due to the slow growth time of the organism. The choice of therapy requires weighing the risk of recurrence versus the risk of the surgical procedure proposed.

Bibliography:

Deramo, Vincent, et.al. Treatment of Propionobacterium acnes endophthalmitis. Current Opinion in Ophthalmology. 12:225-229, 2001.

Aldave, AJ, et.al. Treatment strategies for postoperative Propionobacterium acnes endophthalmitis. Ophthalmology. 106:2395-2401, 1999.

Clark, WL, et.al. Treatment strategies and visual acuity outcomes in chronic postoperative Propionobacterium acnes endophthalmitis. Ophthalmology. 106:1665-1670, 1999.

Propionibacterium acnes Endophthalmitis

George Papaliadis, M.D.

Review questions:

1. P.acnes has a predilection for which structure of the eye:

- A) cornea
- B) optic nerve
- C) vitreous
- D) lens capsule

2. The treatment option associated with the lowest recurrence rate of P.acnes is:

- A) Intraocular antibiotics
- B) Pars plana vitrectomy along with intraocular antibiotics
- C) Pars plana vitrectomy, partial capsulectomy, and intraocular antibiotics
- D) Pars plana vitrectomy, total capsulectomy, removal of iol, intraocular antibiotics

3. True or False. Most patients with P.acnes endophthalmitis retain 20/40 or better visual acuity despite the choice of initial therapy.

4. True or False. P.acnes thrives best in culture enriched with growth factors and the presence of oxygen.

5. True or False. P.acnes can establish a chronic indolent infection in the eye due to adaptive mechanisms to avoid attack by the host immune system.

6. The clinical finding most commonly appreciated in patients with P.acnes endophthalmitis is:

- A) keratic precipitates
- B) hypopyon
- C) white plaque on posterior capsule

D) fibrin strands in the AC

7. True or False. PCR of the aqueous humor is an excellent test to establish the diagnosis of P.acnes endophthalmitis.

Answers: 1. D

2. D

3. true

4. false

5. true

6. C

7. false