

WHAT PATHOGEN TYPE REVEALS ABOUT ENDOPHTHALMITIS



Certain types of bacteria may be linked to a more aggressive disease course post-procedure.

BY SAAGAR PATEL, MD; CHRISTOPHER CONRADY, MD, PHD; AND TALISA E. DE CARLO FOREST, MD

Post-procedure endophthalmitis is an emergency, and visual outcomes can vary tremendously.^{1,2} Retina specialists have long recognized that some cases follow a far more aggressive course than others, not only because of timing, host factors, and treatment decisions, but potentially because of the organism itself.

We recently designed a multicenter study to examine this factor more closely: In patients with acute endophthalmitis after an intraocular procedure, does pathogen type meaningfully affect visual and anatomic outcomes? In this retrospective interventional case series, we reviewed 240 adults diagnosed with postprocedural acute endophthalmitis between 2012 and 2022 at four tertiary university-based centers.³ Of this group, 208 had sufficient follow-up for comparative analysis. Organisms were grouped into surface commensals, primarily coagulase-negative *Staphylococcus*, and nonsurface commensals, such as *Streptococcus* and *Enterococcus*.

The purpose of the study was to determine whether differences in pathogen type translated into measurable differences in vision, need for intervention, and eye survival.

STUDY FINDINGS

The clearest finding was that pathogen type matters. Among culture-positive cases, infections caused by nonsurface commensal organisms were associated with a significantly worse final visual acuity compared with infections caused by coagulase-negative *Staphylococcus* (mean logMAR 2.14 vs 0.77). These infections were also associated with higher rates of third interventions (27.5% vs 10.1%), phthisis (15.4% vs 1.1%), and enucleation/evisceration (12.8% vs 0%).³

Importantly, in the postinjection subgroup, nonsurface commensal organisms remained independently associated with poorer outcomes, even after multivariable adjustment.³

IMPLEMENTING THESE FINDINGS INTO PRACTICE

The study helps explain why outcomes can vary so dramatically even among patients who appear, at first glance, to have the same diagnosis. For years, more aggressive pathogens have been linked anecdotally and in smaller series to worse outcomes.⁴⁻⁸ This larger multicenter cohort strengthens that association, suggesting some of the damage may reflect the biology of the organism itself, not just delays in presentation or differences in management.

Although this study does not establish a mechanism, it supports the idea that certain pathogens may be inherently more aggressive once infection occurs. Post-procedure endophthalmitis is not a single entity, but a spectrum in which organism type shapes prognosis in meaningful ways.

STUDY LIMITATIONS

This study does not establish a new treatment algorithm or show that clinicians can reliably identify the causative organism early enough to tailor initial management. It also does not conclude that primary vitrectomy improves outcomes in this setting. In fact, most patients were initially treated with intravitreal injections (92.1%), while initial vitrectomy was uncommon and not significantly associated with better visual outcomes.³

However, the results of this study do support a more focused clinical conclusion: If more virulent pathogens are associated with worse vision, more interventions, and higher rates of eye loss, then earlier organism identification becomes more than a microbiology goal.

IMPLICATIONS FOR COUNSELING AND FOLLOW-UP

When a patient develops post-procedure

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endophthalmitis, the initial conversation is necessarily urgent and broad. However, once microbiologic information becomes available, pathogen type may help frame prognosis more accurately. In some eyes, the clinical concern is not simply slower recovery or incomplete visual improvement but may include a higher likelihood of repeat intervention, phthisis, or enucleation.

Many retina specialists have felt for years that certain organisms, especially noncommensal pathogens, such as *Streptococcus* and *Enterococcus*, tend to produce a more fulminant and aggressive course.

If pathogen virulence is linked to outcome, then future advances in rapid identification may help clinicians determine earlier which eyes may require more aggressive monitoring, additional intervention, or more guarded counseling.

LOOKING AHEAD

The central conclusion from this study is straightforward: Pathogen type appears to matter in post-procedure endophthalmitis. More virulent nonsurface commensal organisms were associated with worse visual outcomes, more third interventions, higher rates of phthisis, and greater risk of enucleation or evisceration. Our findings give us stronger evidence that the organism itself is an important driver of what happens next, and that future efforts to identify the pathogen earlier may have real clinical value. ■

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SAAGAR PATEL, MD

- Retina Specialist, Austin Retina Associates, Austin
- Financial disclosure: None

CHRISTOPHER CONRADY, MD, PHD

- Retina and Uveitis Specialist, John A. Moran Eye Center, Salt Lake City
- Financial disclosure: None

TALISA E. DE CARLO FOREST, MD

- Assistant Professor and Medical Director of Imaging, Vitreoretinal Surgery Department, University of Colorado, Aurora, Colorado
- talisa.e.decarlo@gmail.com
- Financial disclosure: Advisory Board (Genentech/Roche)