10/9/2021 3:20PM

# Bacterial Dispersion Associated With Various Patient Face Mask Designs During Simulated Intravitreal Injections


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**OBJECTIVE** To investigate the amount of bacterial dispersion associated with various patient face mask designs during simulated intravitreal injections.

**PURPOSE** During the COVID-19 pandemic, universal precautions have been established for patients and physicians to wear face masks in order to decrease potential exposure to coronavirus. However, there is concern that face mask use by patients during an intravitreal injection may result in increased bacterial dispersion toward the eye, which may alter the risk of post-injection endophthalmitis.

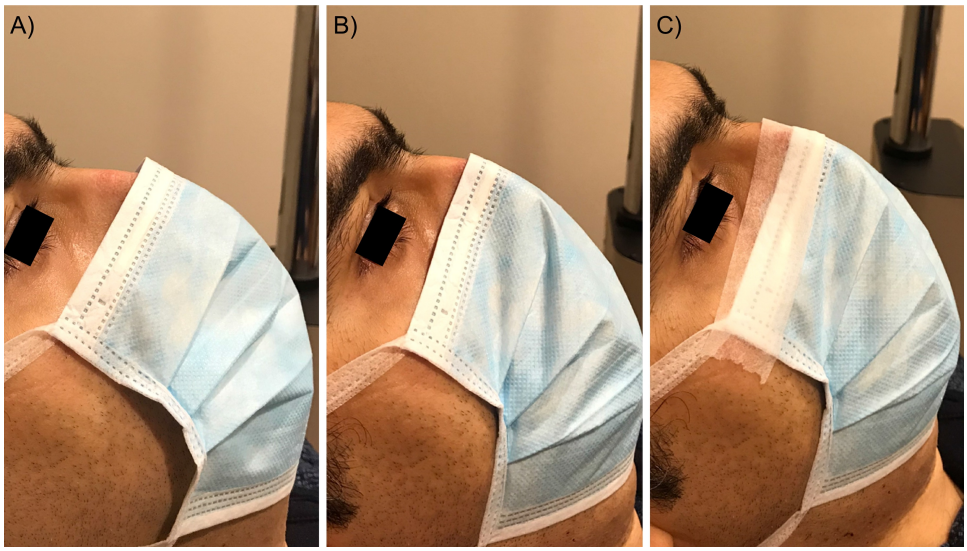
**METHODS** In this prospective, single-center, cross-sectional study, fifteen subjects were recruited and instructed not to speak for 2-minutes, simulating a “no-talking” policy, while in an ophthalmic examination chair with an blood agar plate secured to the forehead and wearing various face masks (no mask, loose fitting surgical mask, tight-fitting surgical mask without tape, tight-fitting surgical mask with adhesive tape securing the superior portion of the mask, N95 mask, and cloth mask). Each scenario was then repeated while reading a 2-minute script, simulating a talking patient. Outcome measures were the number of colony-forming units (CFU) and microbial species by masked microbiologists.

**RESULTS** Subjects wearing a tight-fitting face mask without tape grew the most CFUs in both the “no talking” (17CFU) and speech (21CFU) scenarios. During the “no talking” scenario, subjects wearing a tight-fitting surgical mask with tape developed fewer CFUs compared to subjects wearing the same mask without tape (difference, 0.93; 95%CI, 0.32–1.55; P=.003). During the speech scenarios, subjects wearing a tight-fitting surgical mask with tape had significantly fewer CFUs compared to subjects without a mask (difference, 1.07; 95%CI, 0.45-1.68; P=.001), subjects with a loose mask (difference, 0.67; 95%CI, 0.05-1.28; P=.034), and subjects with a tight mask without tape (difference, 1.13; 95%CI, 0.52-1.75; P<.001). There was no difference between those with a tight-fitting surgical

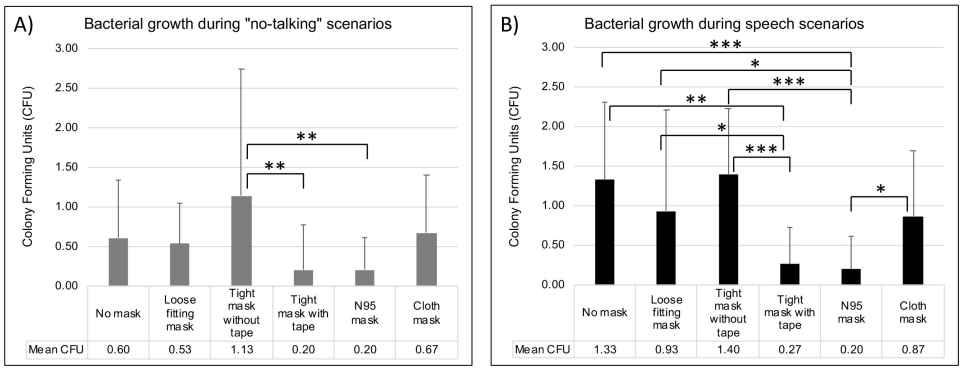
mask with tape and an N95 mask in the “no talking” (P>.99) and “speech” (P=.83) scenarios. No oral flora was isolated in the “no talking” scenarios, but was isolated in 8/75 (11%) cultures in the speech scenario (P=.02).

**CONCLUSION** Addition of tape to the superior portion of a patient’s face mask reduced bacterial dispersion during simulated intravitreal injections, and had no difference in bacterial dispersion compared to wearing N95 masks.

**IRB APPROVAL** Yes — *IRB Approval Letter may be requested*.




Design of face masks used during simulated intravitreal injections. 1A) Loose-fitting surgical mask that does not have the nosepiece conforming to the contour of the face and has large openings along the sides. 1B) Tight-fitting surgical mask with the nosepiece conforming to the entire contour of the face. 1C) Tight-fitting surgical mask with the enclosed nosepiece conforming to the entire contour of the face and tape securing the entire top portion of the mask.




Mean bacterial growth based on colony forming units under the various face mask conditions. 2A) “No talking” scenarios in which subjects were instructed to sit in silence for two minutes. 2B) Speech scenarios in which subjects were instructed to read a script for two minutes. Error bars represent standard deviation. * indicates P < 0.05; ** indicates P < 0.01; and *** indicates P < 0.001. CFU = colony-forming units.

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# Investigation of Microbial Content of Face Masks Used by Patients Receiving Intravitreal Injections


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**OBJECTIVE** Do patient face masks harbor bacteria that may increase infection rate while receiving intravitreal injections?

**PURPOSE** Due to the COVID-19 pandemic, the routine use of face masks is now common in the clinical setting, including during intravitreal injections. However, it is possible that an incomplete seal may propel bacteria upwards and onto the ocular surface that has been sterilized for intravitreal injections. We sought to investigate bacterial seeding of these face masks.

**METHODS** This was a prospective consecutive series of 70 face masks (35 surgical and 35 cloth) of patients receiving intravitreal injections in either one or both eyes. The masks were swabbed separately on the front and back in sterile fashion, and these swabs were sent for culture for aerobic bacteria and Gram staining. N95 and KN95 masks were excluded, along with respirators. Surgical masks were destroyed and replaced while cloth masks were swabbed and then returned to the patient. Patients receiving intravitreal antibiotics for endophthalmitis were excluded.

**RESULTS** All masks grew bacteria on both sides, regardless of age (1 day to 8 months old). The vast majority of these masks grew normal oral and nasopharyngeal flora. However, a subset of the masks also grew bacteria uncommon to the face, including Rothia and Bacillus species. We correlated time of use to quantity and variety of bacterial species. No patients in our study developed endophthalmitis.

**CONCLUSION** Face masks appear to be almost-instantaneously seeded with common oral and nasopharyngeal bacteria, regardless of material. It may be prudent to either remove the face mask or seal the nasal bridge prior to intravitreal injection administration.


**IRB APPROVAL** Yes — *IRB Approval Letter may be requested*.

**Table 1**
List of bacteria species discovered on face masks, in alphabetical order.

| Species | Found inside mask | Found outside mask |
|---|---|---|
| Corynebacterium spp. | x | x |
| Bacillus spp. | x | x |
| Enterococcus spp. | | x |
| Micrococcus spp. | x | x |
| Neisseria spp. | x | |
| Propionibacterium spp. | x | |
| Rothia spp. | x | |
| Staphylococcus spp.* | x | x |
| Streptococcus spp.** | x | x |

* includes coagulase-negative staphylococcus and staphylococcus aureus
** includes gamma-hemolytic streptococcus and streptococcus viridans

10/9/2021 3:32PM

# Genome-wide Cross-Phenotype Meta-Analysis of Age-related Macular Degeneration and COVID-19 Identifies One Novel Genetic Locus with PDGFB


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- Lindsay Farrer, PhD
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**OBJECTIVE** To determine shared genetic associations between age-related macular degeneration (AMD) and coronavirus disease 2019 (COVID-19)

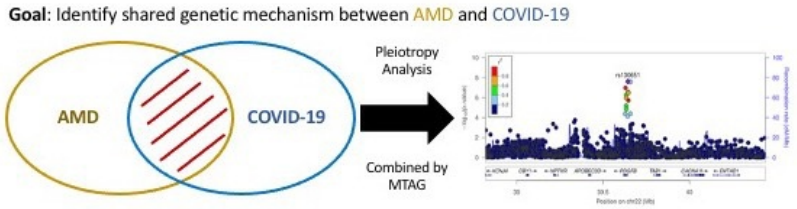
**PURPOSE** Patients with AMD have been shown to be at higher risk for developing complications from COVID-19. We hypothesized that cross-phenotype analysis (i.e., pleiotropy analysis) of these two diseases will identify shared genetic risk factors between AMD and COVID-19 and may explain the mechanism underlying severe manifestations of COVID-19 among AMD patients.

**METHODS** We used the most recent genome-wide association study (GWAS) for AMD (Fritsche et al. 2016) and COVID-19 infection (COVID-19 Host Genetics Initiative. 2021). Genetic correlation rG was computed using linkage disequilibrium score regression. Cross-phenotype meta-analysis of AMD and COVID-19 infection was conducted using "Multi-Trait Analysis of GWAS" (MTAG). We examined association of the most significant findings from MTAG with gene expression levels using the GTEx eQTL (expression quantitative trait locus) database and transcriptome data from well-characterized donor eyes. We performed Mendelian Randomization (MR) to evaluate if AMD genetically influences COVID-19 infection risk.

**RESULTS** AMD had a small and not statistically significant genetic correlation (rG = 0.11, P = 0.07) with risk for COVID-19 infection. The cross-phenotype analysis for the two diseases identified one novel genome-wide significant (P < 5x10-8) association at site 18.1kbp upstream of PDGFB (best SNP: rs130651; effect allele [EA]: G; EA frequency: 0.32; MTAG P = 2.4x10-8; AMD OR = 0.96, P = 1.4x10-7; COVID-19 OR = 0.90, P = 0.02). From the GTEx database, the risk allele A of rs130651 is significantly associated with increased level of the gene expression level of PDGFB (P = 1.8x10-11) in whole blood tissue (P < 1.8x10-11) and in in-vitro cultured fibroblast cells (P < 1.3x10-13). Moreover, transcriptome data from well-characterized donor eyes showed 14-fold greater PDGFB expression in macular retinal pigment epithelium (RPE) compared to macular neural retina (P = 7.4x10 -63). Our MR analysis provided evidence that higher genetic risk for AMD influences COVID-19 infection risk (β = 0.30; P = 0.03).

**CONCLUSION** Cross-phenotype study of AMD and COVID-19 infection identifies one novel gene, PDGFB, associated with both diseases. PDGFB plays a role in immune response activation, inflammation, and coagulation. Expression is high in the RPE where AMD is believed to manifest initially. Associations between COVID-19 and AMD may provide insights about at-risk populations, interventions, and prophylactic measures.

**IRB APPROVAL** Yes — *IRB Approval Letter may be requested*.




Cross-phenotype meta-analysis of AMD and COVID-19 identifies one novel genome-wide significant association in the PDGFB Locus: This image shows the novel genome-wide significant association (P < 5x10-8), SNP rs130651, found 18.1kbp upstream of PDGFB gene during joint analysis for AMD and COVID-19 (best SNP: rs130651; MTAG P = 2.4x10-8; AMD OR = 0.90, P = 1.4x10-7; Covid19 OR = 0.98, P = 0.02).

**Table 1.** Summary of the statistical analyses including genetic correlation, cross-phenotype meta-analysis, eQTL, and Mendelian randomization **(132/400 characters)**

| **Genetic Correlation between AMD and COVID-19 Infection Risk** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $r_G$ (P-value) | | | | | 0.11 (0.07) | | | | |
| **Cross-phenotype/Pleiotropy Analysis of AMD and COVID-19 using MTAG** | | | | | | | | | |
| CHR | RSID | EA | NEA | EAF | AMD | | COVID-19 | | MTAG |
| | | | | | OR | P-value | OR | P-value | P-value |
| 22 | rs130651 | G | A | 0.318 | 0.90 | $1.4x10^{-7}$ | 0.98 | 0.024 | $2.4x10^{-8}$ |
| 22 | rs4820371 | G | A | 0.235 | 0.90 | $1.7x10^{-7}$ | 0.96 | 0.003 | $2.6x10^{-8}$ |
| **eQTL Analysis for SNP rs130651 in the GTEx database** | | | | | | | | | |
| Gene | | | | Tissue | | | P-value | | |
| *PDGFB* | | | | Cell-cultured fibroblasts | | | $1.3x10^{-13}$ | | |
| *PDGFB* | | | | Blood | | | $1.8x10^{-11}$ | | |
| **Mendelian Randomization Analysis (AMD → COVID-19 Infection Risk)** | | | | | | | | | |
| Effect (P-value) | | | | | 0.3 (0.03) | | | | |

Summary of the statistical analyses including genetic correlation, cross-phenotype meta-analysis, eQTL, and Mendelian randomization

10/9/2021 3:44PM

# A 10-Year Follow-up on Outcomes of Intravitreal Anti-VEGF Injections for Choroidal Neovascularization Secondary to Ocular Histoplasmosis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- Nicholas E Dudenhoefer, BA



**OBJECTIVE** Assess outcomes of intravitreal anti-VEGF injections (IVI) and verteporfin photodynamic therapy (PDT) for choroidal neovascularization (CNV) related to presumed ocular histoplasmosis syndrome (POHS).

**PURPOSE** Despite the effectiveness of IVI for CNV secondary to POHS, no long-term treatment outcomes have been reported. In addition, PDTs long term therapeutic impact for CNV secondary to POHS in the IVI era remains unclear. We report 10-year results of IVI therapy in CNV secondary to POHS with either IVI monotherapy or combination IVI/PDT).

**METHODS** Retrospective, comparative case series of 113 eyes in 101 patients treated for subfoveal or juxtafoveal CNV secondary to POHS from January 2006 to January 2021. Patients were treated with either IVI monotherapy or combination IVI/PDT. Exclusion criteria included extrafoveal CNV, prior vitrectomy surgery, retinal neovascularization, or CNV secondary to any other cause. Outcome measures included primarily visual acuity (VA) and secondarily the number of injections and disease-free interval (DFI) per year.

**RESULTS** A total of 57 eyes of 54 patients received IVI monotherapy, and 56 eyes of 53 patients underwent combination IVI/PDT treatment with a mean follow-up of 13 years. For all patients, the average logarithm of minimum angle of resolution (logMAR) VA was 0.65 (Snellen 20/89) at initial, 0.42 logMAR VA (Snellen 20/53) at 5 years, and 0.54 logMAR VA (Snellen 20/70) at 10 years. There was no significant difference in initial, 5 year, and 10 year VA, or number of eyes with a 3-line gain between the IVI monotherapy and IVI/PDT groups. Mean DFI for juxtafoveal CNVs was significant between IVI mono and IVI/PDT

29.94 vs 57.94 months (P=0.04) in year 9 and 21.78 vs 58.28 months (P=0.01) in year 10. Significantly fewer injections were needed for juxtafoveal CNVs treated with IVI/PDT vs IVI 1.8 vs 4.6 (P=0.01) in year 9 and 1.8 vs 4.1 (P=0.04) in year 10.

**CONCLUSION** Eyes treated with IVI/PDT achieved significantly longer DFI and needed less injections than IVI therapy alone for juxtafoveal CNVs after year 9. However, there is no significant difference in VA outcomes between the 2 groups.

**IRB APPROVAL** Yes — *IRB Approval Letter may be requested*.

10/9/2021 3:50PM

# Outcomes of Rhegmatogenous Retinal Detachment Repair Following Infectious Endophthalmitis


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- Leo A. Kim, MD, PhD



**OBJECTIVE** To determine the rates of and risk factors for redetachment after primary rhegmatogenous retinal detachment (RRD) repair in eyes with a history of infectious endophthalmitis.

**PURPOSE** Reported rates of RRD following infectious endophthalmitis are as high as 8-16%, whether the initial management is with vitreous tap or pars plana vitrectomy plus intravitreal antibiotics. RRD was associated with a poorer prognosis in the Endophthalmitis Vitrectomy Study. This study investigates the factors influencing outcomes of surgical repair for RRD following endophthalmitis.

**METHODS** For this retrospective case-control series, data were collected from the electronic medical record at a single academic center from the years 2008-2020. The study population consisted of eyes undergoing surgical repair of primary RRD following a clinical diagnosis of infectious endophthalmitis. Eyes with a history of trauma, prior RRD, keratoprosthesis, and less than 3 months of postoperative follow-up were excluded. Those that were deemed irreparable intraoperatively were also excluded from the analysis. Baseline demographic information, endophthalmitis treatment including available culture data, RRD characteristics, and details of the surgical procedure were collected.

**RESULTS** Thirty-six eyes of 35 patients met inclusion criteria. The time between diagnosis of infectious endophthalmitis and RRD ranged from 0 to 69.3 months, with a mean of 3.3 months. A total of 16 eyes (44.4%) experienced redetachment during the follow-up period. Significant risk factors identified were organism virulence and postoperative PVR in a multivariate analysis ($p<0.05$). Virulent organisms included Staphylococcus aureus, Streptococcus, and Gram negative bacteria, while less virulent organisms included Propionibacterium acnes and fungi. Other factors including endogenous or exogenous source of infection, prior vitreous tap or vitrectomy, time between endophthalmitis and RRD, combined vitrectomy and scleral buckle surgery, and choice of tamponade were not

associated with risk of redetachment. About one-quarter of all study eyes had a visual acuity of at least 20/200 or better at the final visit, and 4 eyes had no light perception.

**CONCLUSION** The rate of redetachment was higher in eyes with concurrent or prior infectious endophthalmitis compared to published rates of redetachment in primary RRD repair, although no modifiable risk factors were identified. Further studies are needed to determine whether perioperative management can be optimized to increase the chances of successful repair.

**IRB APPROVAL** Yes — *IRB Approval Letter may be requested*.

| Variable | All | Redetached | Attached | p-value |
|---|---|---|---|---|
| Number of eyes, n (%) | 36 (100.0%) | 16 (44.4%) | 20 (55.6%) | - |
| Mean age, years (range) | 61.6 (21–90) | 67.7 (56–86) | 56.8 (21–90) | 0.75 |
| Male sex, n (%) | 24 (66.7%) | 11 (68.8%) | 13 (65.0%) | 0.81 |
| White, n (%) | 30 (83.3%) | 15 (93.8%) | 15 (75.0%) | 0.13 |
| Mean follow-up duration, months (range) | 26.4 (3.0–106.8) | 29.0 (3.9–106.8) | 24.4 (3.0–86.3) | 0.5 |
| Current smoker, n (%) | 5 (13.9%) | 1 (6.3%) | 4 (20.0%) | 0.24 |
| Cause<br>Endogenous, n (%)<br>Exogenous, n (%) | <br>14 (38.9%)<br>22 (61.1%) | <br>6 (37.5%)<br>10 (62.5%) | <br>8 (40.0%)<br>12 (60.0%) | 0.9 |
| Culture<br>Virulent, n (%)<br>Less virulent, n (%)<br>Unknown / no growth (%) | <br>21 (58.3%)<br>5 (13.9%)<br>10 (27.8%) | <br>13 (81.3%)<br>0 (0.0%)<br>3 (18.8%) | <br>8 (40.0%)<br>5 (25.0%)<br>7 (35.0%) | **0.01*** |
| Vitreous tap, n (%) | 29 (80.6%) | 12 (75.0%) | 17 (85.0%) | 0.5 |
| Early vitrectomy, n (%) | 25 (69.4%) | 12 (75.0%) | 13 (65.0%) | 0.5 |
| Delayed vitrectomy, n (%) | 5 (13.9%) | 2 (12.5%) | 3 (6.0%) | 0.8 |
| Systemic antibiotics, n (%) | 27 (75.0%) | 11 (68.8%) | 16 (80.0%) | 0.4 |
| Subretinal abscess, n (%) | 6 (16.7%) | 4 (25.0%) | 2 (10.0%) | 0.2 |
| Mean time to RRD, months (range) | 3.3 (0.0–69.3) | 0.9 (0.1–1.9) | 5.2 (0.0–69.3) | 0.35 |
| Hypotony, n (%) | 20 (55.6%) | 11 (68.8%) | 9 (45.0%) | 0.09 |
| Choroidal detachment, n (%) | 16 (44.4%) | 9 (56.3%) | 7 (35.0%) | 0.2 |
| Phakic, n (%) | 18 (50.0%) | 5 (31.3%) | 13 (65.0%) | **0.04** |
| Preoperative PVR, n (%) | 21 (58.3%) | 9 (56.3%) | 12 (60.0%) | 0.8 |
| Macula attached, n (%) | 9 (25.0%) | 4 (25.0%) | 5 (25.0%) | >0.99 |
| Large or multiple tears, n (%) | 13 (36.1%) | 6 (37.5%) | 7 (35.0%) | 0.9 |
| Operation<br>Vitrectomy only, n (%)<br>Buckle/vitrectomy, n (%) | <br>31 (86.1%)<br>5 (13.9%) | <br>15 (93.8%)<br>1 (6.3%) | <br>16 (80.0%)<br>4 (20.0%) | 0.2 |
| Membrane peel, n (%) | 23 (63.9%) | 11 (68.8%) | 12 (60.0%) | 0.6 |
| Retinectomy, n (%) | 13 (36.1%) | 7 (43.8%) | 6 (30.0%) | 0.4 |
| Tamponade<br>C3F8 gas, n (%)<br>Silicone oil, n (%) | <br>15 (41.7%)<br>21 (58.3%) | <br>5 (31.3%)<br>11 (68.8%) | <br>10 (50.0%)<br>10 (50.0%) | 0.3 |
| Postoperative PVR, n (%) | 19 (52.8%) | 14 (87.5%) | 5 (25.0%) | **<0.001*** |

Characteristics of eyes undergoing repair of RRD after diagnosis of infectious endophthalmitis. RRD=rhegmatogenous retinal detachment; PVR=proliferative vitreoretinopathy; C3F8=octafluoropropane. *p<0.05 in multivariate analysis

| VA category | Endophthalmitis diagnosis visit | RRD diagnosis visit | Final visit |
|---|---|---|---|
| 20/200 or better | 3 (8.3%) | 5 (13.9%) | 10 (27.8%) |
| 20/400 to LP | 29 (80.6%) | 30 (83.3%) | 22 (61.1%) |
| NLP | 0 (0.0%) | 0 (0.0%) | 4 (11.1%) |
| Unknown | 4 (11.1%) | 1 (2.8%) | 0 (0.0%) |

Visual acuity at the time of endophthalmitis diagnosis, RRD diagnosis, and final follow-up visit. VA=visual acuity; RRD=rhegmatogenous retinal detachment; LP=light perception; NLP=no light perception.

10/9/2021 3:56PM

# Acute Retinal Necrosis: Clinical Characteristics, Viral Etiology, and Risk Factors Associated With Retinal Detachment


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- Jessica Shantha, MD
- Ghazala Datoo O'Keefe, MD
- Steven Yeh, MD



**OBJECTIVE** We report a large cohort of patients with acute retinal necrosis (ARN) treated at an academic center and describe the demographics, clinical manifestations, and risk factors for retinal detachment.

**PURPOSE** ARN is a viral syndrome characterized by panuveitis and retinal necrosis, which is associated with a high rate of retinal detachment that often results in a poor visual outcome. Because of the high risk of severe vision impairment or blindness in the setting of RD associated with ARN, understanding the host and viral risk factors and treatment paradigms that may avert RD is paramount.

**METHODS** A retrospective cohort analysis was performed for all patients diagnosed and treated for ARN at our center from 2010 through 2020. The extent of retinitis was graded by the number of total clock-hours of involvement and zones from posterior (zone I) to peripheral (zone III). Wilcoxon-Mann-Whitney test was used to compare the means of clinical variables between cohorts based on viral etiology and presence of RD. Log rank test was used to evaluate for differences in risk of RD over time according to viral etiology, and Kaplan Meier survival estimates were graphed. Logistic regression was used to create a multi-variate model assessing the risk factors for retinal detachment.

**RESULTS** 54 eyes were reviewed. 45% were female. The viral cause was VZV in 50% and HSV in 50%. Subjects with VZV-ARN were on average older (56 yrs) and more likely to be male compared to subjects with HSV-ARN (37 yrs). No difference in ARN diagnoses was found between months. The VA at presentation was similar between eyes with HSV- and VZV-ARN. 59% of eyes with VZV-ARN and 67% with HSV-ARN experienced RD ($p = 0.78$). The mean time from diagnosis to RD was similar in eyes with HSV- and VZV-ARN. A Kaplan-Meier curve demonstrates similar trends for time to RD for HSV-and VZV-ARN. Eyes that experienced RD during follow-up had worse VA at presentation (mean logMAR: 1.54) compared to eyes that did not experience RD (0.83) ($p = 0.0083$), and had more clock hours of retinitis (8.82) than eyes that did not develop RD (5.65) ($p = 0.0086$). In the multivariate model, worse VA at presentation ($p = 0.042$) and more clock hours of retinitis ($p = 0.025$) were found significantly associated with RD development.

**CONCLUSION** In this large cohort of PCR-confirmed ARN patients, we found that worse

presenting VA and greater extent of retinitis was associated with RD development. Our data also showed that despite ARN treatment with systemic and intravitreal antivirals, 63% of subjects experienced RD, largely within 1 year of disease onset; however, 3 patients developed first, non-recurrent, RD years after ARN diagnosis.

**IRB APPROVAL** Yes — *IRB Approval Letter may be requested*.

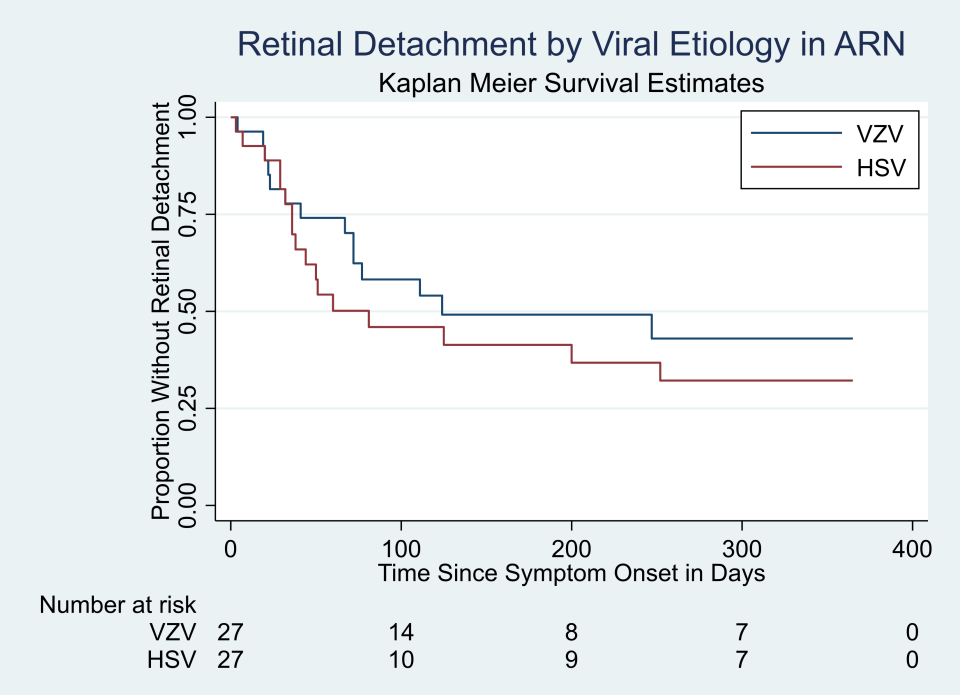


Fig. 1. Kaplan-Meier survival curve shows the retinal detachment (RD)-free survival for varicella zoster virus associated acute retinal necrosis (ARN) compared to herpes simplex associated ARN. The data is capped at 1 year of follow up to allow more detailed view of the first year, when most RD occurred in our study. Log rank test for retinal detachment free survival by viral etiology demonstrated no significant difference in RD-free survival p = 0.52.

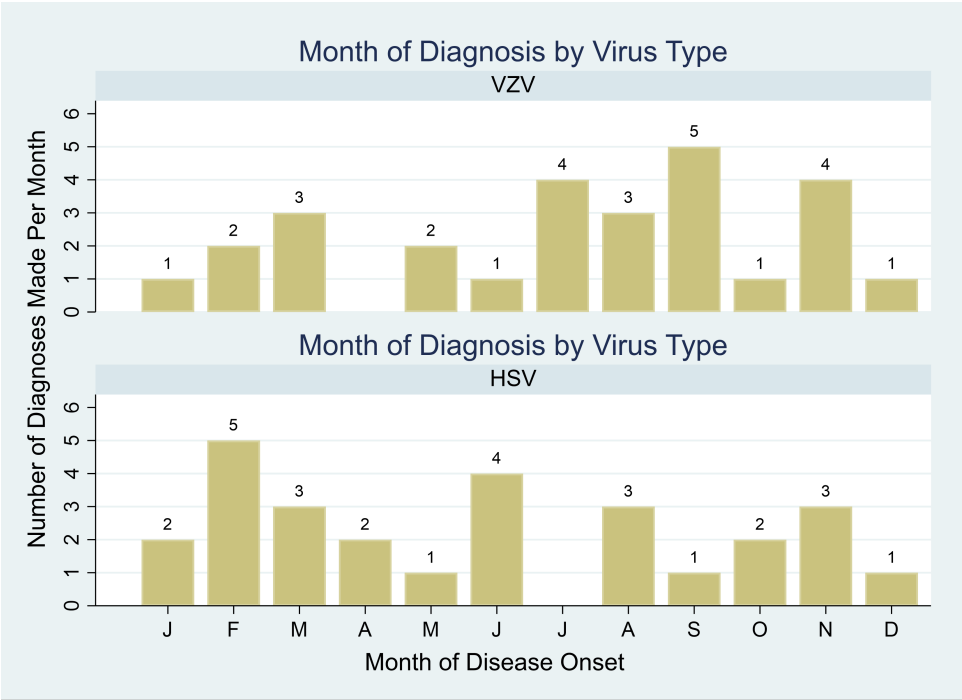


Fig. 2. Bar graph of the number of diagnoses of acute retinal necrosis (ARN) made in each month of the year, according to viral etiology. VZV: varicella zoster virus, HSV: herpes simplex virus. Chi square goodness of fit demonstrated no significant relationship between month and diagnosis p = 0.65.

10/9/2021 4:07PM

# Prospective Use of Imaging Quantification of Inflammation: Determining Uveitis Activity and Correlating to Visual Acuity


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- Cindy Chen, BA
- Danielle Burton



**OBJECTIVE** Continuous automated imaging measures of intraocular inflammation correlates to measures of visual function and is effective at detecting inflammatory disease activity.

**PURPOSE** First, to establish a relationship between continuous automated imaging measures of intraocular inflammation with measures of visual function. Second, to determine if these measures of intraocular inflammation are efficacious in detecting disease activity compared to a trained uveitis specialist with clinical examination alone or clinical examination with standard imaging.

**METHODS** Phase 1 evaluated 3 continuous quantitative automated measures of inflammation, including anterior chamber cell density as measured on anterior segment optical coherence tomography, fluid index as measured on macula OCT, and leakage index as measured on ultra-widefield fluorescein angiography (UWFFA), and evaluated their relationship to logarithm of the minimal angle of resolution visual acuity (LogMAR VA) and visual function questionnaire (VFQ-25) scores. Phase 2 evaluated the automated measures' ability to detect clinically meaningful inflammatory activity compared to a trained uveitis specialist using standard uveitis nomenclature (SUN) criteria alone or SUN criteria and standard imaging.

**RESULTS** Phase 1 included 106 eyes from 43 patients followed over a total of 220 visits.

LogMAR VA was significantly correlated with fluid index on macula OCT (r=0.404, P<0.001) and with total leakage index (TLI) on FA (r=0.405, P<0.001). The LogMAR VA had a stronger correlation with the macula central 3 disk diameters or region of interest (ROI) 1 leakage (r=0.489, P<0.001). Similarly, TLI was associated with worse VFQ-25 scores (r=-0.156, P=0.015) with a stronger relationship between ROI1 leakage and VFQ-25 scores (r=-0.237, P<0.001). Likewise, TLI correlated with OCT macula fluid index (r=0.272, P<0.001) and ROI1 leakage correlated stronger with OCT macula fluid index (r=0.343, P<0.001). Phase 2 included 50 eyes from 25 patients followed over a total of 103 visits. The combined automated measures of inflammation were able to detect uveitis activity with 98.4% sensitivity and 90.6% specificity (C21=142.2, P<0.001) with strong agreement (k=0.854, p<0.001) to uveitis specialists.

**CONCLUSION** The combined automated measures of inflammation can be used to predict visual function outcomes and detect the presence of clinically meaningful inflammation with high sensitivity and specificity.

**IRB APPROVAL** Yes — *IRB Approval Letter may be requested*.

10/9/2021 4:13PM

# Optical Coherence Tomography Anatomic and Temporal Biomarkers in Uveitic Macular Edema


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- barry m kapik, MS
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**OBJECTIVE** This study assessed the relationship between longitudinal structure and functional correlations in macular edema (ME) associated with noninfectious uveitis (NIU).

**PURPOSE** To assess the relationship between best-corrected visual acuity (BCVA) and central subfield optical coherence tomography (OCT) anatomic and temporal features in patients with ME associated with NIU.

**METHODS** A post-hoc analysis was performed on data of 198 patients from two 24- week NIU Phase 3 clinical trials. Relationships between BCVA and cystoid spaces, presence of subretinal fluid, and ellipsoid zone (EZ) integrity in central subfield was assessed. Correlation analyses were performed to describe the relationship at baseline, and between change from baseline through week 24. A longitudinal treatment-response model was developed to analyze the temporal relationship between change in BCVA and central subfield thickness (CST), and an early CST anatomic response (CST reduction of ≥50 µm at week 4) was assessed for 24- week BCVA prognosis.

**RESULTS** At baseline, mean BCVA progressively worsened with deterioration in central subfield EZ grade. These trends were not evident for cystoid space or subretinal fluid gradations. Eyes with normal EZ experienced greater 24-week change in BCVA compared to eyes with abnormal baseline EZ (11.9 vs 9.4 letters, P=0.006). Among eyes with cystoid spaces and/or subretinal fluid those with center-involvement at baseline showed greater (13.7 letters, P=0.012 or 17.2 letters, P<0.001) improvement at 24 weeks, compared to those eyes without center-involvement (5.5 letters or 9.5 letters). Longitudinal modeling in

NIU showed that the frame of response was more rapid for CST than BCVA. CST required ~ 3 weeks to reach over 90% of full response whereas BCVA required ~ 9 weeks to reach the same magnitude of response. Eyes showing early anatomical response, experienced a greater 24-week improvement in BCVA, compared to those without early response (14.6 vs 6.5 letters, P=0.006).

**CONCLUSION** Eyes with normal EZ, presence of cystoid spaces, or SRF in the central subfield prior to treatment or an early anatomical CST treatment response predict improved therapeutic response in eyes with uveitic macular edema. Using mathematical modelling we determined that anatomic improvements identified using OCT imaging may precede improvement in BCVA by a month or more.

**IRB APPROVAL** Yes — *IRB Approval Letter may be requested*.

10/9/2021 4:17PM

# Post Hoc Analysis of Suprachoroidal CLS-TA Versus Real-World Rescue Therapies for Uveitic Macular Edema: Safety and Visual Function


- Steven Yeh, MD
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**OBJECTIVE** This post hoc analysis evaluated safety and visual function in unrescued subjects receiving suprachoroidal CLS-TA to rescued control subjects in the PEACHTREE Phase 3 trial for uveitic macular edema.

**PURPOSE** The purpose of this post hoc analysis was to characterize safety and visual function endpoints of suprachoroidally injected CLS-TA versus real world uveitic macular edema treatments by evaluating unrescued CLS-TA subjects versus rescued control subjects in the Phase 3 PEACHTREE trial for macular edema (ME) associated with noninfectious uveitis (NIU).

**METHODS** In PEACHTREE, subjects were randomized 3:2 to receive suprachoroidal injection of CLS-TA (proprietary formulation of triamcinolone acetonide) or sham at baseline and week 12, and rescue therapy if needed. Pre-defined criteria were established for rescue; type of rescue therapy was at the investigators' discretion. For the post hoc analysis, sub-groups were established based on receipt of rescue therapy. Endpoints of the unrescued treatment group and the rescued control group were evaluated, including best corrected visual acuity (BCVA), central subfield thickness (CST), and treatment emergent adverse events (TEAEs), serious adverse events (SAEs), and IOP and cataract-related safety events.

**RESULTS** For this analysis, 83/96 (86.5%) of CLS-TA subjects did not receive rescue and 46/64 (71.8%) of control subjects received rescue. In the unrescued CLS-TA group, 51.9% of subjects gained ≥15 letters in BCVA, compared to 37.0% in the rescued control (P=0.115). Unrescued CLS-TA subjects showed a mean gain of 15.7 letters vs. 10.9 letters

in rescued control subjects (P=0.080). A significantly greater mean reduction in CST was observed for unrescued CLS-TA subjects vs rescued control subjects (174.0 µm and 148.5 µm; P=0.040). The percentage of subjects with ≥1 TEAE in the study eye was 48.2% in unrescued CLS-TA subjects and 63.0% in rescued control subjects. Adverse events pertaining to elevated IOP occurred in 10.8% of unrescued CLS-TA subjects and in 21.7% of rescued control subjects. Cataract incidence appeared lower in the unrescued CLS-TA subjects than in rescued control subjects (4.8% vs. 8.7%, respectively). There were no IOP-related surgical interventions in either group.

**CONCLUSION** In this post hoc analysis, CLS-TA subjects experienced significantly greater reduction in CST and trended towards greater BCVA improvement compared with rescued control subjects. Suprachoroidally administered CLS-TA was associated with a lower incidence of IOP elevation than therapies utilized for rescued control subjects.

**IRB APPROVAL** Yes — *IRB Approval Letter may be requested*.

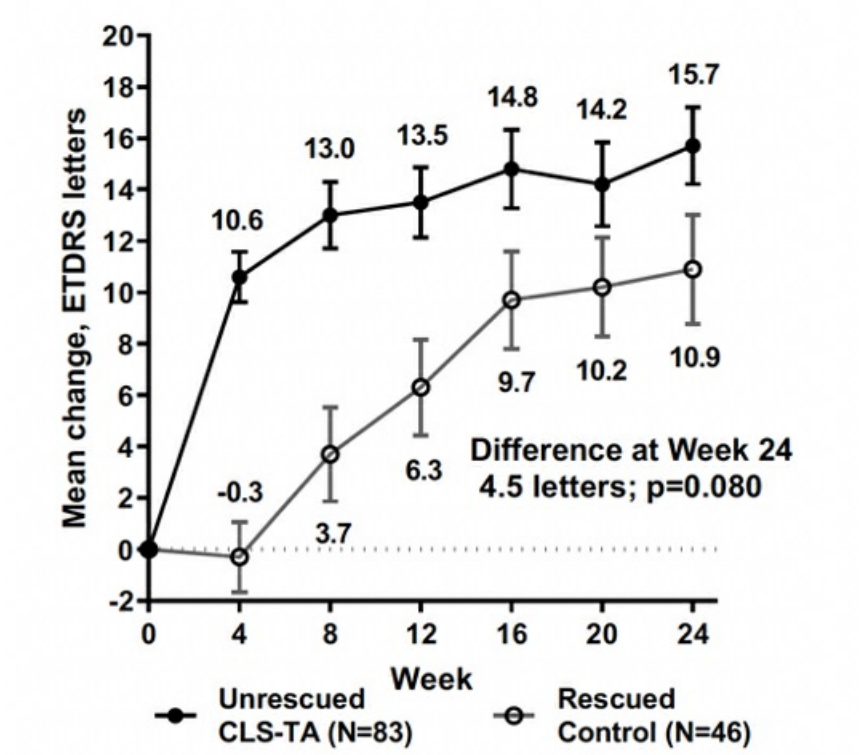


Figure 1: Mean change in BCVA by week for unrescued CLS-TA subjects and rescued control subjects. At baseline, mean BCVA was 55.6 letters for unrescued CLS-TA subject and 53.8 letters for rescued control subjects. At Week 24, a difference of 4.5 letters was observed between the two groups (P=0.080).

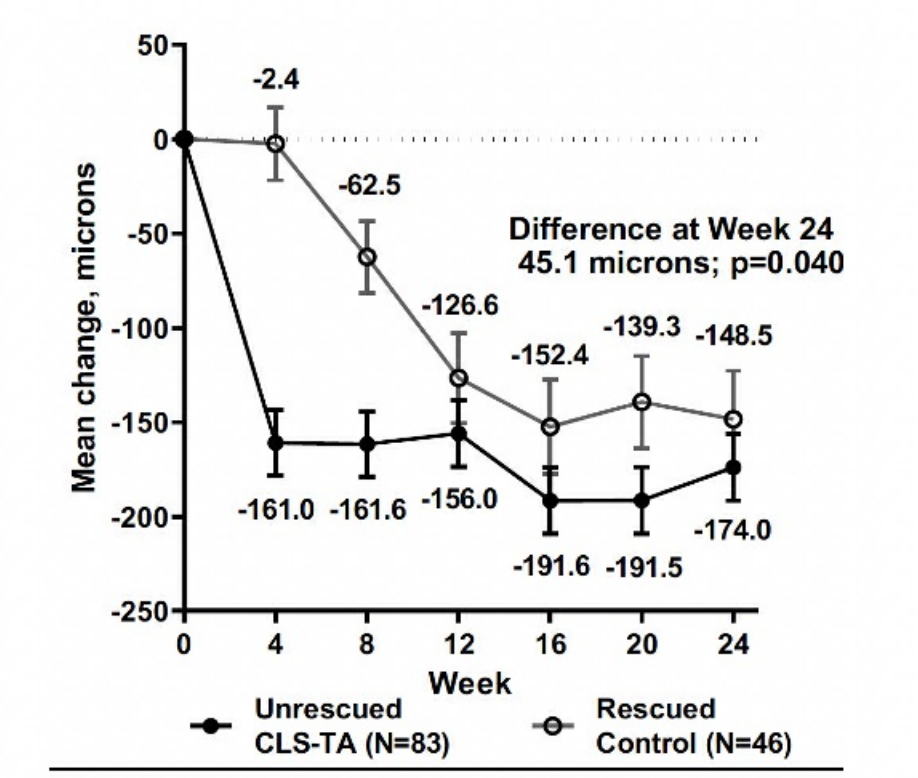


Figure 2: Mean chance in CST by week for unrescued CLS-TA subjects and rescued control subjects. At baseline, mean CST was 480.6 microns for unrescued CLS-TA subject and 519.7 microns for rescued control subjects. At Week 24, a statistically significant difference of 45.1 microns was observed between the two groups (P=0.040).

10/9/2021 4:21PM

# Survey of Practice Patterns of Screening and Management of Candida Endophthalmitis and the Impact of the COVID-19 Pandemic


- Albert Li, MD
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**OBJECTIVE** What are current practice patterns for screening and managing Candida endophthalmitis and how have they been affected by the COVID-19 pandemic?

**PURPOSE** Consultations are routinely requested in patients with Candida fungemia to rule out endophthalmitis, though the yield is low in patients without eye symptoms or signs of eye involvement. As candidemia is being recognized as a secondary complication of COVID-19, understanding practice patterns for screening and management is an important step toward optimizing the yield for such consultations.

**METHODS** A voluntary online survey to assess protocols and recommendations for screening candidemia patients, management patterns for Candida endophthalmitis, and the impact of COVID-19 on these practice patterns, was developed on Survey Monkey and distributed to ASRS regular members via email at the end of April 2021. The survey had 231 respondents, of whom 169 (73%) performed inpatient consultations.

**RESULTS** 90% responded that they do not recommend routinely screening asymptomatic patients with candidemia. For unresponsive patients with candidemia that lack visible signs of endophthalmitis, 65% still did not recommend routine screening. However, 85% report their affiliated hospitals do not have a policy in place to defer these screening consultations; this proportion did not change when asked if such a policy was implemented in response to the COVID-19 pandemic. For patients with a dilated fundus examination (DFE) and no signs of endophthalmitis, 89% surveyed would recommend continuing systemic antifungals and

reconsult PRN, while the remainder would recommend repeat examinations until off antifungals. For initial management of Candida endophthalmitis, 55% indicated systemic antifungals only (with escalation if documented worsening); 43% indicated systemic antifungals with tap & inject, and 2% indicated systemic antifungals with vitrectomy and intravitreal antifungals.

**CONCLUSION** A discordance exists between the prevailing recommendation among retina specialists for Candida endophthalmitis screening and hospital consultation policies, which do not appear to be impacted by the COVID-19 pandemic. Even with diagnosed endogenous endophthalmitis, a majority of surveyed retina specialists would not initiate treatment in addition to systemic antifungals.

**IRB APPROVAL** No — I **did not receive IRB approval** or a determination that the study/activity was exempt or that it did not require IRB approval. **Complete a Human Subject Research application** for review by the ASRS Human Research Committee. **Your abstract will not be considered without a completed application.** The ASRS HRC will review the information provided to determine whether the study qualifies as exempt or otherwise not requiring IRB approval. The ASRS HRC is not constituted as an IRB and thus cannot provide IRB approval for activities that require such.

10/9/2021 4:25PM

# Evaluation of Prevalence and Risk for Vitreoretinal Involvement in Fungemic Patients at a Tertiary Care Hospital


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- Rupak K Bhuyan, M.D.
- Jonathan Levenson, M.D.
- Robin Nina Ginsburg, MD
- Alexander Barash, MD
- Avnish Deobhakta, MD
- Gareth Lema, MD, PhD
- Niathi Kona



**OBJECTIVE** This study seeks to assess the disease burden of and risk factors for fungal vitreoretinal involvement among patients with systemic fungemia

**PURPOSE** The purpose of this study is to identify the prevalence of fungal ophthalmic involvement and assess risk factors for positive screening among inpatients at a large academic tertiary care hospital. The goal is to assess whether screening examinations are indicated, and if so, what a priori screening criteria may be established to best determine which patients to screen.

**METHODS** This is a retrospective review of 291 inpatients with fungemia and a documented ophthalmicevaluation from January 2015 to September 2019. Vitreoretinal involvement was defined as evidence of chorioretinitis, and endophthalmitis as those with additional findings of intravitreal inflammation. Variables assessed included presence of visual complaint, numberand duration of positive blood cultures, history of gastrointestinal (GI) surgery in preceding 6 months, solid organ transplant, human immunodeficiency virus (HIV) infection, diabetes mellitus (DM), intravenous (IV) drug use, and concomitent central venous access. Student's t-test and chi-squared statistical analysis were performed.

**RESULTS** Of the 291 patients included, 6 had vitreoretinal involvement, 3 of which had endophthalmitis, and 2 of those required intravitreal antifungal injection. No patients with isolated chorioretinitis required intravitreal injection or pars plana vitrectomy. Those with vitreoretinal involvement had an average of 3 positive cultures over 0.69 weeks, while those with normal findings averaged 2.85 positive cultures over 0.59 weeks. Among the endophthalmitis group 33.3% had a visual complaint compared to 4.20% of the non-endophthalmitis group ($p<0.001$). When major screening criteria were grouped together, visual complaints, positive blood cultures for 3 or more days, and history of recent GI surgery were found to be significant predictors of ocular involvement. For patients with no major risk factors, the negative predictive value was 98.7%.

**CONCLUSION** Patients who have visual complaints at time of positive fungal blood culture are significantly more likely to have a positive screening examination. A positive examination is exceedingly rare in patients not meeting grouped major risk criteria for screening. Ubiquitous ophthalmic examination among fungemic patients not meeting major criteria is therefore not recommended.

**IRB APPROVAL** Yes — *IRB Approval Letter may be requested*.