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Author

Brodie, Frank

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Endogenous endophthalmitis is a rare, sight-threatening intraocular infection caused by the hematogenous spread of pathogens, including bacteria such as *Staphylococcus* or *Streptococcus* sp or fungi such as *Candida* or *Aspergillus*.^{1,2} Patients often have systemic risk factors such as immunosuppression, diabetes, prostheses, or intravenous drug use.² Methicillin-resistant *Staphylococcus aureus* (MRSA) is an uncommon and virulent cause of endogenous bacterial endophthalmitis. Reports have shown high rates of retinal detachment (RD) (53%–75%) in patients with endogenous MRSA endophthalmitis, which is known to portend a poor visual prognosis.^{3–5}

Little is known about the surgical approaches and outcomes of RD in the context of endogenous MRSA endophthalmitis. Herein, we present a retrospective case series involving 7 eyes of 6 patients diagnosed with RD caused by endogenous MRSA bacteremia that underwent repair between July 1, 2013, and November 30, 2019, at Duke University Hospitals. The Duke University institutional review board approved this study. Because of the retrospective nature of the study, informed consent was not required. Our study conformed to the tenets of the Declaration of Helsinki.

We collected data regarding initial visual acuity, intravitreal antibiotic choices, surgical approaches, and final visual acuity as well as anatomic outcomes (Tables S1, S2 [available at www.ophtalmologyretina.org]). Initial vision in the 7 eyes ranged from 20/200 to no light perception (NLP). Two eyes had total RD. There were both rhegmatogenous RDs with atrophic breaks and tractional RDs. Although iatrogenic breaks can be caused by intravitreal injections, none of the eyes in this series had breaks at the location of prior injections.

Three eyes initially underwent a scleral buckle with pars plana vitrectomy (PPV) and 4 eyes underwent PPV alone. Three of the 7 eyes required repeat RD repair, and the average number of surgeries was 1.7. Surgery was attempted on 1 NLP eye (patient 6) upon patient request, but it was found to have an inoperable total closed funnel. Three eyes received silicone oil during the first surgery, and 1 additional eye received silicone oil in a subsequent surgery. Three eyes required retinectomies to flatten the retina. All eyes that received operations, with the exception of the NLP eye, had attached retinas at the final visit. Three of 7 eyes had final visual acuity of > 20/200. Representative images are shown in Fig S1 (available at www.ophtalmologyretina.org). Five of 7 eyes presented with proliferative vitreoretinopathy (PVR), including the closed funnel RD. Two of these eyes went on to have recurrent RDs with PVR requiring additional surgery. One additional eye (patient 1, right eye) did not initially present with PVR but had recurrent RD with PVR after the initial PPV. Patients 2 and 5 required prolonged admission for the stabilization of systemic illness before RD repair.

To our knowledge, this is the first case series describing the characteristics, surgical approaches, and outcomes of RD associated with MRSA endogenous endophthalmitis (confirmed with a PubMed search that used the terms “*Staphylococcus aureus* endophthalmitis retinal detachment”).

The incidence of MRSA endogenous endophthalmitis has risen in the recent years because of a general increase in antibiotic resistance and is known to be associated with a high rate of RD. Dong et al⁶ found a rate of 4.6% rhegmatogenous RD in infectious endophthalmitis (not specifically MRSA), occurring on average 73 days after endophthalmitis diagnosis, with 58.8% of eyes that underwent surgery later developing PVR. In contrast, our group reported a 53% RD rate in endogenous MRSA endophthalmitis,⁴ occurring on average 36 days after endophthalmitis diagnosis, with 71% developing PVR. Ho et al³ presented a series of 8 eyes with MRSA endogenous endophthalmitis, in which 6 eyes had retinal detachments. Of these 6 eyes, 5 had PVR and 2 eyes had recurrent RD with PVR. These results are similar to the findings of our study, although our report also includes RD characteristics and surgical approaches. Given that intraocular inflammation and prior surgeries are predisposing risk factors for PVR, it is logical that PVR would be a common finding in MRSA endogenous endophthalmitis RD.

In our cohort, there were both early and late RD. Three eyes (of patients 1 and 4) with RD associated with atrophic holes in areas of previous retinitis and acute inflammation had onset within the prior 30 days, and the other 4 eyes had RDs associated with late contractile membranes that occurred after 30 days. This series also highlights the importance of a high index of suspicion for redetachment in patients with MRSA endophthalmitis. Redetachment can occur even after a long period of stability; for example, patient 1 had a repeat RD 6 months after the second repair.

Our surgeons used various surgical techniques. Five of the 6 successfully attached eyes received either a scleral buckle (3 eyes) or a retinectomy (3 eyes), with 1 eye receiving both. Ho et al³ reported usage of scleral buckling in 3 of 5 cases of successfully repaired RD. Some authors have shown that PPV with retinectomy and silicone oil without scleral buckles show similar single-surgery anatomic success rates for recurrent RDs with PVR compared to the same procedure with scleral buckles.⁷ This suggests that relief of peripheral traction, either by buckle or retinectomy, is important for long-term success in MRSA endogenous endophthalmitis RD. Four of 6 eyes received silicone oil as tamponade, including 3 initial PPVs and 1 subsequent PPV for redetachment; these findings are similar to those reported in the study by Ho et al,³ in which silicone oil was used in 4 of 5 patients with successful RD repair.

Although our report is limited by small sample size, successful surgical approaches for RD secondary to endogenous MRSA endophthalmitis will likely include vitrectomy with scleral buckle and a low threshold for retinectomy to help resolve peripheral traction. Silicone oil tamponade should be strongly considered in recurrent redetachments after surgery, although even primary

silicone oil tamponade does not prevent redetachments under oil, and patients should be carefully monitored. Even after these maneuvers, repeated, late redetachments are not unusual, and the possibility of additional surgeries should be discussed before surgical repair.

XINXIN ZHANG, MD¹
 JESSICA SEIDELMAN, MD, MPH^{2,3}
 DILRAJ GREWAL, MD¹
 TAMER H. MAHMOUD, MD, PhD^{4,5}
 PRITHVI MRUTHYUNJAYA, MD, MHS⁶
 ERIC POSTEL, MD¹
 XI CHEN, MD, PhD¹
 FRANK BRODIE, MD, MBA⁷

¹Department of Ophthalmology, Duke University, Durham, North Carolina; ²Division of Infectious Diseases and International Health, Department of Medicine, Duke University School of Medicine, Duke University, Durham, North Carolina; ³Duke Center for Antimicrobial Stewardship and Infection Prevention, Duke University Medical Center, Durham, North Carolina; ⁴Department of Ophthalmology, William Beaumont School of Medicine, Oakland University, Royal Oak, Michigan; ⁵Associated Retinal Consultants, Royal Oak, Michigan; ⁶Department of Ophthalmology, Stanford University, Palo Alto, California; ⁷Department of Ophthalmology, University of California San Francisco, San Francisco, California

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Author Contributions:

Conception and design: Zhang, Seidelman, Chen, Brodie
 Data collection: Zhang, Seidelman, Grewal, Mahmoud, Mnathyunjaya, Postel, Chen, Brodie
 Analysis and interpretation: Zhang, Seidelman, Grewal, Mahmoud,

Mnathyunjaya, Postel, Chen, Brodie

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Abbreviations and Acronyms:

MRSA = methicillin-resistant *Staphylococcus aureus*; **NLP** = no light perception; **PPV** = pars plana vitrectomy; **PVR** = proliferative vitreoretinopathy; **RD** = retinal detachment.

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Correspondence:

Frank Brodie, MD, MBA, UCSF Ophthalmology, 490 Illinois St, San Francisco, CA 94158. E-mail: frank.brodie@ucsf.edu.

References

1. Flynn HWJ, Scott IU, Brod RD, Han DP. Current management of endophthalmitis. *Int Ophthalmol Clin*. 2004;44:115–137.
2. Cunningham ET, Flynn HW, Relhan N, Zierhut M. Endogenous endophthalmitis. *Ocul Immunol Inflamm*. 2018;26:491–495.
3. Ho V, Ho LY, Ranchod TM, et al. Endogenous methicillin-resistant *Staphylococcus aureus* endophthalmitis. *Retina*. 2011;31:596–601.
4. Zhang X, Brodie FL, Postel EA, Seidelman JL. Endogenous methicillin-resistant *Staphylococcus aureus* (MRSA) endophthalmitis: a six-year series at a tertiary care center. *Ocul Immunol Inflamm*. 2021;(May):1–5.
5. Doft BM, Kelsey SF, Wisniewski SR. Retinal detachment in the endophthalmitis vitrectomy study. *Arch Ophthalmol*. 2000;118:1661–1665.
6. Dong LK, Shields RA, Subramanian S, et al. Features and outcomes of eyes that underwent surgical repair of rhegmatogenous retinal detachments after being treated for acute endophthalmitis. *Retina*. 2021;41:1612–1617.
7. Deaner JD, Aderman CM, Bonafede L, Regillo CD. PPV, Retinectomy, and silicone oil without scleral buckle for recurrent RRD from proliferative vitreoretinopathy. *Ophthalmic Surg Lasers Imaging Retina*. 2019;50:e278–e287.