Case report

Acute-onset endophthalmitis caused by Staphylococcus lugdunensis

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ABSTRACT

Purpose: To report a series of patients with acute-onset bacterial endophthalmitis caused by culture proven Staphylococcus lugdunensis, and to characterize clinical outcomes and microbiologic susceptibilities of this organism.

Observations: The study included six eyes of 6 patients. The etiologies included cataract surgery (3), open globe injury (2), and intravitreal injection (1). Isolates of S. lugdunensis demonstrated sensitivity to vancomycin in all cases reported. Three of 6 isolates of S. lugdunensis demonstrated resistance to oxacillin and 1 isolate demonstrated resistance to ciprofloxacin. Best-corrected visual acuity was ≥20/400 in 5/6 (100%) of eyes and ≥20/40 in 3/6 (50%) of cases.

Conclusion and importance: Acute-onset endophthalmitis caused by S. lugdunensis is associated with variable visual outcomes. Vancomycin provides consistent coverage of acute-onset endophthalmitis caused by S. lugdunensis.

1. Introduction

Acute-onset endophthalmitis is a rare, but potentially devastating disease which can occur as a sequelae of intraocular procedures, trauma or from an endogenous source. Coagulase negative Staphylococci (CNS) are gram positive organisms that represent a common cause of bacterial endophthalmitis and have been isolated in as many as 62% of vitreous samples after cataract surgery or intraocular lens (IOL) exchange.1–2 The most frequently isolated CNS species from acute-onset endophthalmitis vitreous biopsy samples are Staphylococcus epidermidis (81.9%) and Staphylococcus lugdunensis (5.9%).2 Several investigations of patients with endophthalmitis caused by S. lugdunensis have been reported following cataract surgery and intravitreal injections.3–6 The current series characterizes the clinical presentation, antibiotic sensitivities, and treatment outcomes of all patients treated for acute-onset endophthalmitis caused by S. lugdunensis.

2. Findings

A review of all patients with a diagnosis of acute-onset endophthalmitis at the Bascom Palmer Eye Institute Microbiology Department from January 1990 through January 2017 was performed. Patients were included in this study if vitreous and/or aqueous samples taken at the time of diagnosis grew isolates of S. lugdunensis. In total, 7 patients (four men, three women; mean age 55.7 years, median age 68 years) presented with acute-onset endophthalmitis with culture proven S. lugdunensis. One immunocompromised patient with a history of HIV infection presented with a 6-month history of decreased vision, exudative retinal detachment and choroidal lesion with presumptive endogenous endophthalmitis. Pars plana vitrectomy with vitreous and subretinal fluid cultures each yielded S. lugdunensis. This patient was removed from the data analysis as this case was unique compared to the other cases in how the endophthalmitis was acquired. All remaining 6 patients presented with painless loss of vision. Three of the 6 patients had a recent history of cataract surgery with IOL implantation and presented on average 8 days after intraocular surgery. On examination, these patients generally demonstrated significant loss of vision, hypopyon, fibrin in the anterior segment and marked vitreous debris (Fig. 1). One case presented 21 days after an intravitreal injection with significant loss of vision, hypopyon and eye redness. Two of the 6 patients presented on average 2.5 days after an open globe injury with endophthalmitis, cataract, and retinal detachment. All patients received intravitreal vancomycin and ceftriaxone at time of globe repair with vitreous biopsy. Clinical data are summarized in Table 1.

Final vision was generally good (20/400 or better) in all 6 cases. The visual potential was limited by corneal decompensation due to a dislocated IOL in case 4, and macula off retinal detachment, aphakia and irregular astigmatism in cases 5 and 6. S. lugdunensis was isolated in microbiologic cultures in all six cases (Table 2). In 50% (3/6) of cases, oxacillin resistance was identified with minimal inhibitory concentration (MIC) > 4, and notably two of the oxacillin resistant strains were isolated from vitreous biopsy of eyes undergoing vitrectomy for...
MIC > 8. Each culture showed sensitivity to levo-

floxacin. Of the six cases, 83.3% were sensitive to cipro-

floxacin with MIC values of < 0.25 and 0.25, respectively. All isolates

were sensitive to tobramycin, ceftazidime and dexamethasone. The patient’s vision improved, but required an addi-
tional intravitreal injection of vancomycin two days after initial injection given persistent vitre-
ous inflammation. The patient's final visual acuity was 20/30.

Table 1
Clinical summary of patients with acute-onset endophthalmitis caused by S. lugdunensis.

| Case | Age/Sex | Eye | History | BCVA @ presentation | Final BCVA | Treatment | Comment |
|------|---------|-----|---------|---------------------|------------|-----------|---------|
| 1    | 68/M    | OS  | CE/IOL  | CF @ POD#10        | 20/30      | Van, Cef, Dex | Repeat Van POD#12 |
| 2    | 75/M    | OD  | CE/IOL  | HM@ POD#8          | 20/40      | Van, Cef, Dex | LOV 1 day prior |
| 3    | 79/F    | OS  | IVT Inj | CF @ POD#21        | 20/40      | Van, Cef  | LOV 3 days prior|
| 4    | 73/F    | OS  | CE/IOL  | HM @ POD#6         | 20/100     | Van, Cef  | Complex CE with ACIOL and RLF; PPV 2 weeks after; persistent cornea edema requiring DSEK and IOL repositioning |
| 5    | 13/M    | OD  | OGR     | HM @ 3 days after injury | 20/400 | Van, Cef | Cornea laceration repair/PPV/PPPL/MP/cryotherapy/EL/FAX/C3F8 for OGR, cataract, retinal dialysis |
| 6    | 33/M    | OS  | OGR     | LP @ 2 days after injury | 20/100 | Van, Cef | Cornea laceration repair/IOFB removal/PPV/PPC3F8/EL/SB for OGR, IOFB removal, and GRT repair with macula-off RD |

Abbreviations: ACIOL, anterior chamber intraocular lens; BCVA, best corrected visual acuity; Cef, ceftriaxone; CE, cataract extraction; CF, count fingers; Dex, dexamethasone; DSEK, Descemet’s stripping endothelial keratoplasty; EL, endolaser; FAX, fluid-air exchange; GRT, giant retinal tear; HM, hand motion; IOFB, intraocular foreign body; IOL, intraocular lens; IVT, intravitreal; LOV, loss of vision; LP, light perception; MP, membrane peel; OD, right eye; OGR, open globe injury; OS, left eye; POD, post-operative day; PPL, pars plana lensectomy; PPV, pars plana vitrectomy; RD, retinal detachment; RLF, retained lens fragment; SB, scleral buckle; Van, vancomycin.

Table 2
Antibiotic susceptibility data of patients with acute-onset endophthalmitis caused by S. lugdunensis.

| Case | Oxacillin | Ciprofloxacin | Levofloxacin | Moxifloxacin | Vancomycin |
|------|-----------|---------------|--------------|--------------|------------|
| 1    | S (2)     | S (< =0.5)    | S (0.25)     | S (< =0.25)  | S (< =0.5) |
| 2    | R (> 4)   | S (< =0.5)    | S (0.25)     | S (< =0.25)  | S (1)      |
| 3    | S (1)     | S (< =0.5)    | S (0.25)     | S (< =0.25)  | S (1)      |
| 4    | S         | R (> =8)      | S (0.25)     | S (< =0.25)  | S (1)      |
| 5    | R         | S             | S            | S            | S          |
| 6    | R         | S             | S            | S            | S          |

Abbreviations: S, sensitive; R, Resistant; Minimum inhibitory concentration, if available, is in parentheses.

3. Discussion

Staphylococcus lugdunensis has been isolated in the past as a cause of skin and soft tissue infections, but has also been implicated in serious life threatening infections such as meningitis, chronic osteomyelitis and endocarditis. In ophthalmic surgery cases, the majority of reported cases of bacterial endophthalmitis from S. lugdunensis are characterized by an insidious onset about 1 week after intraocular surgery with se-
ver, painless vision loss. Acute-onset endophthalmitis was noted with open globe injuries as well. Good visual outcomes can be obtained with prompt recognition and treatment.

Acute-onset endophthalmitis caused by S. lugdunensis is usually insidious in onset when associated with prior intraocular surgery. The organisms are generally sensitive to most antibiotics including vanco-
mycin but can be resistant to oxacillin, especially if associated with an open globe injury, and rarely show resistance to ciprofloxacin.

In this review, final visual outcomes were generally good in cases of acute-onset endophthalmitis associated with intraocular procedures. The favorable outcomes demonstrated in this investigation are in contrast to results found by previous investigations. Murad-Kejbou and colleagues reported three cases of acute-onset en-
dophthalmitis associated with intravitreal injections for age-related macular degeneration with poor final visual outcomes. These poor visual outcomes may partially be explained by pre-existing ocular dis-
ease including advanced glaucoma and advanced macular degeneration limiting the original visual potential of the eye. In a report of five pa-
ients with S. lugdunensis associated acute-onset bacterial en-
dophthalmitis after cataract surgery, Chiquet et al. described two pa-
tients with good vision after successful medical treatment of endophthalmitis, but also several patients with poor visual outcomes after surgical treatment with pars plana vitrectomy which resulted in retinal detachment. Given the variability in their results, it is possible that the surgical intervention may have impacted the final visual out-
come and intravitreal injections of antibiotics alone could have resulted in more favorable outcomes. Similarly, in the current review, patients that underwent only medical interventions had more favorable out-
comes than patients who needed surgical intervention.

MIC breakpoints for S. lugdunensis for vancomycin and methicillin are often higher when compared to other coagulase negative Staphylococcus species and are more similar to MIC values of S. aureus. As evident in this series, S. lugdunensis tends to parallel S. aureus in-
fec tions that originated from the skin; those associated with cataract surgery or intravitreal injections demonstrated overall less antibiotic resistance than when the infectious origin was from an exogenous source, specifically associated with open globe injury. While vanco-
mycin resistance is emerging in certain Staphylococcus species,
vancomycin provides consistent coverage with no known resistance for *S. lugdunensis* and should remain a first line agent in treating acute-onset endophthalmitis caused by coagulase-negative *Staphylococcus*.9

4. Patient consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patients. An IRB approval with protocol number 20070960 was obtained for this series, granted through the University of Miami.

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Conflicts of interest

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Authorship

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