



Chicago-based Multicenter Endophthalmitis Registry: Initial Loyola University Medical Center Data

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Introduction

Endophthalmitis is a rare, but devastating outcome after intraocular surgery, trauma, systemic or local infection. It is characterized by inflammation involving the vitreous cavity and the anterior chamber of the eye. Once suspected, patients are subjected to ocular tissue biopsies, with microbial cultures, antibiotics delivered in multiple routes, and sometimes surgery to remove the vitreous gel. Often the patients end up with profound and permanent vision loss.

The prevalence of endophthalmitis has been studied for several etiologies. The prevalence of endophthalmitis post-cataract surgery was found to be approximately 0.1%. [1] [2] [3] It was highest after secondary intraocular lens placement (0.366%) and corneal transplant surgery (0.178%) and lowest after vitrectomy (0.045%). [2] A recent study looked compared the two most common anti-VEGF agents and found a low endophthalmitis rate of 0.02%. [4] World-wide prevalence rates vary slightly, but for post-cataract surgery endophthalmitis the rates seem to be <0.2%. [5] [6] The most common organisms isolated after cataract surgery are coagulase-negative staphylococci, up to 70%. [2] [7]

Endophthalmitis can result from extension of local infection, such as a corneal ulcer, or from endogenous spread. [1] Endogenous bacterial endophthalmitis develops acutely, caused by streptococcus species from endocarditis, Staphylococcus aureus from cutaneous infections, and Bacillus from IV drug use. [8] [9] Fungal endogenous endophthalmitis is the most common form of endogenous endophthalmitis. Candidemia is the most common cause. [8]

Posttraumatic endophthalmitis is the most prevalent at 3-17%. [10] [11] The most common organisms isolated are staphylococcus species and Bacillus cereus. [1] The prevalence may have a wide range due to several risk factors, including contamination, retained foreign body, location/extent of laceration, time to closure, or globe rupture with extrusion of intraocular contents.

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Introduction

Endophthalmitis is suspected in a patient presenting with an ocular history aforementioned and symptoms of eye redness, pain, blurry vision. On exam patients often have injection, anterior chamber inflammation and vitritis. Once suspected, anterior or posterior chamber cultures are obtained. The Endophthalmitis Vitrectomy Study (EVS) studied the management of endophthalmitis with vitrectomy surgery, recommending vitrectomy surgery for end point visual outcome in patients with vision of no better than light perception. [12] [13] This data also helped determine antibiotic treatment strategies, and commonly used antibiotics are vancomycin and ceftazidime. [14] Treatment is delivered intravitreal, IV, oral, and/or topical. As ocular tissue destruction from endophthalmitis is largely due to the significant inflammatory process, steroids are used by some ophthalmologists routinely, but its use is controversial. Visual outcome will depend on several factors, such as etiology of endophthalmitis, trauma risk factors previously mentioned, virulence of organism, and host inflammatory response.

The goal of the project is to create a data repository of local cases of endophthalmitis from several large Chicago-area academic and private institutions. Once the registry is created we will be able to analyze the wealth of data and draw connections and common trends across the institutions. Different institution practices and management can be looked at and correlate with visual outcome to help determine an optimal course of treatment. We can determine the common infecting microorganisms in endophthalmitis in this area, which may direct treatment strategies and ultimately save patients' vision due to the importance of timely diagnosis and treatment.

Loyola University Medical Center will be the lead site for the study, and data gathered from other institutions will be sent to the Loyola primary investigators for compilation and subsequent analysis. The initial data presented here represents Loyola patients diagnosed with endophthalmitis since the initiation of EPIC medical records.

Methods

This project is intended to be part of a Chicago-area ophthalmology consortium with the intended purpose of gathering valuable data from the large pool of patients throughout several of Chicago's large academic and private institutions. Patients with endophthalmitis of all ages, ethnicity, and sex will be sought, and the time period will cover 10 years- from July 1st 1999 to June 30th, 2009. Exclusion criteria include any later change in the diagnosis of endophthalmitis.

Search Criteria
Patients matching the inclusion criteria are determined through a retrospective chart review search of the institution's medical record system using diagnostic ICD-9 codes for various types of endophthalmitis

The form details patients' history, including inciting etiology of endophthalmitis, and symptoms- eye pain, vision changes, and exam findings. Pertinent exam findings include vision pre-op, post-op/post-trauma vision, vision at diagnosis of endophthalmitis, and vision 6 months following diagnosis. Other initial exam findings are noted.

Diagnosis and management will be recorded. Data is collected on method of diagnosis- anterior chamber and/or vitreous tap for culture or vitrectomy. Results of cultures are an important component of the data, specifically what organism grew as well as antibiotic sensitivities. Medications used to treat the patients will be documented- topical, intravitreal, intravenous, oral antibiotics and any steroid use. The goal of the form is to provide as much data about each patient's case as possible to give depth to the data repository.

Results

7 patients have been identified thus far. The ages ranged from 23-81, median 47, with 4 males and 3 females. Of the 3 patients that had post- cataract surgery endophthalmitis, 2 had post-surgical complications of lens capsule tear, and 1 of these underwent a vitrectomy to remove lens material the same day. Only one of these patients grew an organism: Propionibacterium acnes. All 3 had vitrectomy and all 3 retained good vision (2/3 >20/40, 1/3 with 20/60) after being treated with vancomycin +/- ceftazidime intravitreally. 3 patients had endogenous endophthalmitis. Each were immunocompromised- 2 with leukemia, 1 post lung transplant for cystic fibrosis. All three were clinical diagnoses based on blood or lung culture. Organisms suspected were Aspergillus and Candida albicans and glabrata. All three expired (two within 1 mo, the third had resolution of infection with IV antifungals but subsequently expired within 1 yr). We were unable to assess vision in these critically ill patients. The last patient had Streptococcus viridans endophthalmitis after an intravitreal Avastin injection to treat a fluid leak from a neovascular membrane beneath the retina. She had a poor visual outcome, but not significantly different than before the onset of endophthalmitis.

Conclusion

From the initial Loyola Data, the most common etiologies of endophthalmitis are post-cataract surgery and endogenous. The post-cataract surgery patients retained good vision, whereas the eye findings in the immunocompromised endogenous endophthalmitis patients reflected their critical health conditions. Endogenous cases are more likely to be diagnosed clinically and from blood cultures rather than anterior chamber or vitreous tap/biopsies. Standard treatment of intravitreal vancomycin/ceftazidime was initiated in the post-cataract and post-avastin injection patients, but treatment was systemic with antifungals for the cases of fungal endophthalmitis. Subsequent data will be collected from Loyola with an estimated 25 cases, and added from other Chicago-area academic and private centers.

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Graph or image title

patient	biology	WTR/PCR	ICVA post-ix	findings	organism	outcome
1M	endogenous	ALL	stable	slow subretinal mass	aspergillus	expired soon after tx initiated
1M	endogenous	conjugal ix	stable	gray choroidal lesions, tennis	staphylococcus aureus	vision resolved w/ 2 mo
1F	endogenous	history AMLE	no hx	PCV, vititis, yellow pre-retinal lesion	staphylococcus aureus	expired 1 mo after dx
1M	cataract dx	cataract dx	20/40	PCV, vititis, CMLE, HAD Vx	propionibacterium acnes	retinal flare, good vision
1F	cataract dx	IC tears/retinal IOL, YAG cap	20/100-20/30	PCV, vitreous debris, HAD Vx	no growth	vision improved w/ vitrectomy
1M	cat dx VALLX	cat dx, tx for dropped lens	20/40	PCV, 3+ vititis, HAD Vx	no growth	best vision
1F	cat Avastin inj	IC with CNV membrane	2+ vitice	PCV/PC/PCV, HAD Vx, HD	strep viridans	single closure cat, epistaxis, poor VA