

Long Term Visual Outcomes of Pars Plana Vitrectomy for Infectious Endophthalmitis

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Introduction

- Infectious endophthalmitis is a severe intraocular infection that can be a vision-threatening emergency, and rapid intervention is critical for favorable visual outcomes¹.
- Source control with either pars plana vitrectomy (PPV) and/or intravitreal antibiotic injection represents the current mainstay of endophthalmitis treatment^{1,2,3}.
- It is commonly thought that if patients present with NLP vision, there is no longer appropriate vascular perfusion or there is optic nerve atrophy resulting in permanent vision loss^{5,6}.
- There are currently no established and published guidelines specifically for treating eyes with NLP vision and endophthalmitis. Most studies have been performed in eyes with Light Perception (LP) or better vision, including the well-known Endophthalmitis Vitrectomy Study (EVS), which specifically excluded NLP eyes⁴.

Aims and Objectives

- This study aims to assess whether performing standard interventions (intravitreal antibiotics and PPV) in NLP eyes should be advocated, which may challenge paradigms in current treatment algorithms.
- Investigate visual acuity improvement after surgical intervention in NLP eyes and determine whether the magnitude of improvement is comparable to that in LPB eyes.

Methods

A retrospective study of eyes with endophthalmitis seen at Associated Retinal Consultants between January 2015 and January 2024.

Inclusion criteria: diagnosis of endophthalmitis, follow-up of at least 6 months, receiving intervention which included PPV, and visual acuity (VA) data

Exclusion criteria: cases with missing data, cases with follow up records of less than 6 months.

Primary Outcome

12-month VA compared to presenting VA.

Secondary Outcomes

VA at 1, 3, and 6 months, and the proportion of VA change in each group

Continuous variables were analyzed using T-tests and Mann-Whitney U-Tests when appropriate. Categorical variables were analyzed using Fisher's Exact Tests. All tests used p value of 0.05.

Results

- 124 patients were included in the study. The eyes were stratified by having LP or better (LPB) vision or NLP vision prior to intervention. There was no significant difference between the two groups in terms of etiology (Table 1).
- 107 LPB eyes received an anterior chamber paracentesis and injection of intravitreal vancomycin and ceftazidime prior to PPV intervention and 4 eyes received PPV combined with intravitreal antibiotics.
- In the NLP group, all 13 eyes received intravitreal antibiotics and PPV concurrently (Table 1).
- Among the 124 total eyes with endophthalmitis, there was no significant difference in organism types between the two groups (Table 2).

Baseline Characteristics	NLP (N=13)	Other (N=111)	Total (N=124)	P-value
Age				0.89111
N	13	109	122	
Median (IQR)	81.0 (71.0, 85.0)	77.0 (68.0, 88.0)	77.0 (68.0, 88.0)	
Mean (SD)	76.7 (13.60)	76.9 (14.21)	76.9 (14.09)	
Range	46.0, 93.0	25.0, 102.0	25.0, 102.0	
Etiology, (%) eyes				0.89802
CEIOL	7 (53.8%)	37 (37.4%)	44 (39.3%)	
Intravitreal Injections	5 (38.5%)	39 (39.4%)	44 (39.3%)	
Endogenous	0 (0.0%)	5 (5.1%)	5 (4.5%)	
Trauma (open globe injury)	1 (7.7%)	4 (4.0%)	5 (4.5%)	
Surgery	0 (0.0%)	6 (6.1%)	6 (5.4%)	
bleb associated	0 (0.0%)	5 (5.1%)	5 (4.5%)	
post SIS	0 (0.0%)	3 (3.0%)	3 (2.7%)	
Missing	0	12	12	
Intervention, (%) eyes				1.00002
Tap/Inject & PPV	13 (100.0%)	107 (97.3%)	120 (97.6%)	
PPV	0 (0.0%)	3 (2.7%)	3 (2.4%)	
Missing	0	1	1	
Gauge of PPV, (%) eyes				1.00002
23	2 (16.7%)	24 (22.2%)	26 (21.7%)	
25	10 (83.3%)	81 (75.0%)	91 (75.8%)	
27	0 (0.0%)	3 (2.8%)	3 (2.5%)	
Missing	1	3	4	

Table 1: Demographics

	NLP (N=13)	Other (N=111)	Total (N=124)	P-value
Organisms, (%) eyes				0.53602
Staphylococcus	3 (30.0%)	20 (22.0%)	23 (22.8%)	
Streptococcus	2 (20.0%)	18 (19.8%)	20 (19.8%)	
Enterococcus	3 (30.0%)	10 (11.0%)	13 (12.9%)	
No Growth	1 (10.0%)	24 (26.4%)	25 (24.8%)	
Gram Positive Cocci	0 (0.0%)	3 (3.3%)	3 (3.0%)	
Other	1 (10.0%)	16 (17.6%)	17 (16.8%)	
Missing	3	20	23	

Table 2: Causative Organisms

	NLP (N=13)	Other (N=111)	Total (N=124)	P-value
LogMAR Vision Prior to Endop				0.60291
N	5	51	56	
Median (IQR)	0.3 (0.1, 0.5)	0.4 (0.2, 0.7)	0.4 (0.1, 0.7)	
Mean (SD)	0.4 (0.40)	0.5 (0.48)	0.5 (0.47)	
Range	0.0, 1.0	0.0, 2.3	0.0, 2.3	
logMAR VA Prior to surgery				<.00011
N	13	110	123	
Median (IQR)	4.0 (4.0, 4.0)	2.3 (1.6, 2.8)	2.3 (1.8, 2.8)	
Mean (SD)	3.8 (0.45)	2.0 (0.86)	2.2 (0.99)	
Range	2.8, 4.0	0.1, 4.0	0.1, 4.0	
LogMAR Visual Acuity 12 mo				0.04441
N	8	58	66	
Median (IQR)	1.7 (1.2, 2.3)	1.0 (0.4, 1.6)	1.3 (0.5, 1.6)	
Mean (SD)	1.6 (0.70)	1.0 (0.73)	1.1 (0.75)	
Range	0.4, 2.3	0.0, 2.3	0.0, 2.3	
VA_Dif (VA at 12 Mo - VA Prior to Surgery)				0.01031
N	8	58	66	
Median (IQR)	-2.0 (-2.8, -1.4)	-1.1 (-1.6, -0.5)	-1.2 (-1.7, -0.5)	
Mean (SD)	-2.1 (1.04)	-1.0 (1.15)	-1.1 (1.18)	
Range	-3.6, -0.5	-3.7, 1.7	-3.7, 1.7	
p-values for Difference in VA	0.0078	<.0001		

Table 3: Visual Acuity

Visual Acuity Prior to Endophthalmitis

p=0.6

- The NLP group had a mean logMAR VA of 0.4 (20/50) (+/- 0.4)
- The LPB group had a mean logMAR of 0.5 (20/60) (+/- 0.48)

After Diagnosis Confirmed and Prior to Intervention

p<0.0001

- The NLP group had a worse mean logMAR VA of 4.0
- The LPB group had a mean logMAR VA of 2.0

12 months Post-Intervention

p=0.04

- The NLP group still had a significantly worse VA with mean logMAR VA of 1.6
- The LPB group had a mean logMAR VA of 1.0

Improvement Between Presentation and 12 Month Visit

- The NLP group had a mean improvement in logMAR VA of 2.1 (p=0.008)
- The LPB group had a mean improvement of logMAR 1.0 (p<0.001)

There were no significant differences in postoperative sequelae (p=0.77).

No eyes in either group progressed to phthisis.

Limitations

- Being a single center study and the relatively small sample size of NLP cases limits generalizability.
- As a retrospective study, it is limited by the possibility of missing data and non-standardized reporting.
- Further studies with larger sample sizes are needed to better define indications for surgical intervention in NLP eyes and to provide stronger evidence supporting the treatment approach of offering surgery in this setting.

Conclusions

- Patients presenting with infectious endophthalmitis and NLP vision can achieve significant improvement in VA following intravitreal antibiotics and PPV.
- No patients progressed to requiring an enucleation or evisceration at 12 months after intervention.
- These findings support an interventional approach in NLP endophthalmitis and underscore the need for evidence-based guidelines for this underrepresented patient population.

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