

The results of pars plana vitrectomy in the fresh endophthalmitis cases of post cataract surgery in a tertiary hospital

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Abstract

Endophthalmitis is a serious ocular infection that can result in blindness. Approximately 70 percent of cases occur as a direct complication of intraocular surgery. Its management requires culture of intraocular contents and administration of an antibiotic. Vitrectomy surgery, which may help to manage endophthalmitis by removing infecting organisms and their toxins, has been shown to be of value in various animal/human models of endophthalmitis.

In the present study 25 cases of bacterial culture positive cases were operated and intravitreal injections were also applied. The effect of various factors like infecting organisms, capsular status, media clarity and time of presentation on the final visual outcome is analysed.

Introduction

Three port pars plana vitrectomy with intravitreal antibiotics (ceftazidime 2.5 mg per 0.1 ml & vancomycin 1.0 mg per 0.1 ml & dexamethasone 400 mg) is an effective technique in treatment of fresh post-operative endophthalmitis.

Management of fresh post-operative endophthalmitis has been the prime subject of considerable therapeutic innovation. Many of the clinical trials have established intravitreal injections as the main stay of treatment of post-operative endophthalmitis. Afterwards surgical treatment in the form of three port pars plana vitrectomy evolves as revolution for post-operative endophthalmitis. This study describes the management of fresh post-operative endophthalmitis with vitrectomy during a period of 3 years held in Ram Lal EYE & ENT hospital, Government Medical College Amritsar.

Materials & Methods

25 patients of culture positive bacterial endophthalmitis were included for the study of 30 clinically suspected post-operative endophthalmitis attending the outpatient department & indoor of Ram Lal EYE & ENT hospital, Government Medical College Amritsar. An informed written consent was obtained from the patient or the attendant.

Inclusion criteria for study were following:

1. Fresh post-surgical endophthalmitis cases.
2. Visual activity at least of perception of light & projection of rays.
3. Cornea clears enough to perform vitrectomy

Patients were excluded having

1. Sterile endophthalmitis
2. Retinal detachment on presentation as detected by USG imaging and / or indirect ophthalmoscopy as it effects the final outcome (visual acuity)

3. History of intolerance to intravitreal drugs (Ceftazidime/ Vancomycin)
4. Prior H/O intravitreal injections of antibiotics.
5. Patients with pre-diagnosed ocular disease limiting visual acuity to 6/36 as found before development of cataract.

The diagnose of post-operative endophthalmitis on clinical ground as

- Decreasing Visual acuity
- Increasing Pain
- Chemosis
- Conjunctival Congestion
- Lid edema

Detailed history like the date of operation undergone, mode of onset and severity of the symptoms were taken. Any pretreatment with antibiotics or any steroids any taken & the history of diabetes & hypertension was also considered.

Meticulous ocular examination was undertaken with special emphasis on Visual acuity, intraocular pressure (goldman applanation), Slit lamp evaluation of anterior chamber and lenticular status. Fundus examination by direct/ indirect ophthalmoscope to assess vitreous opacity & clarity of ocular media was also performed.

Technique: All Routine test (RBS, BT, CT, Urine Complete, opinion from physician & anaesthetist were taken & Three port pars plana vitrectomy done under suitable anaesthesia.

All the cases were operated within 2 hours of clinical diagnosis under peribulbar block with the mixture of 4cc 2% xylocaine with 1:200000 adrenaline, 8cc of 0.5% bupivacaine with hylase. Operative procedure is carried out under good illumination with a good operating microscope.

After painting and draping a paralimbal peritomy was done. By using myringotomy blade sclerotomies were made over pars plana region 3 to 3.5mm away

from limbus, one in the infra temporal region at 7:30° clock in the right eye or 5:30° clock in the left eye for infusion cannula and two at 2:30° clock & 9:30° clock. The supra temporal for vitreous cutter & superonasal for endoilluminator.

Sclerotomies were made by myringotomy blade with stop towards the vitreous cavity, it were made suitable for the passage of 20 gauge instrument. 1st is to pass is the infusion cannula through inferior temporal sclerotomy, inferior cannula's length is 6 mm i.e. longer than the ones used for other vitrectomies reason being absence the crystalline lens and the choroidal thickening which occur in the infected eyes, infusion cannula was retained in eye with 6'0 silk mattress suture, it is connected to BSS solution through an infusion line. Infusion is not started till the top of cannula is not visualized in the vitreous cavity through pupil.

The vitreous cutter & is entered & vitrectomy initially was conducted out as through the upper temporal sclerotomies without endoilluminator. Once exudates were sufficiently cleared and needle was replaced by endoilluminator and the infusion cannula was started.

If anterior chamber is having significant amount of fibrin & hypopyon which prevent the visualization of vitreous then an attempt was made to clear the anterior chambers of its content first.

Inflammatory debris, if present over the pseudophakos was also removed from the surface. Attempt was made to preserve the pseudophakos. It was removed under following circumstances.

1. It has been dislocated or subluxated.
2. Presence of severe pigment/exudative deposits over it which cannot be removed.

3. During secondary vitrectomy for uncontrolled endophthalmitis.

Observations

25 clinically suspected post-operative endophthalmitis patients were subjected to vitrectomy and intravitreal antibiotics.

All 25 patients after vitrectomy received intravitreal injection of Ceftazidime (2.25mg/0.1 ml), Vancomycin (1.0mg/0.1ml) & Dexamethasone (400 mg).

The vitrectomy samples were subjected to microbial examination for culture & antibiotic sensitivity. Out of total 25 patients, 12 were male & 13 were females. Youngest patient was of 30 years age & oldest was 70yr. Out of 25 patients, 10 patients were having right eye & 15 were having left eye involved.

Out of all the patients operated for cataract surgery, only 6 patients were having absent Posterior capsular with anterior chamber intraocular lens & 19 patients were having intact posterior capsule & posterior chamber intraocular lens. All patients were subjected to the extra capsular cataract extraction surgery.

All the patients were present with diminution of vision & out of 25, 10 were having pain as other complaint. Out of total 25, 14 patients presented within a week of surgery & 11 patients presented after 1 week of surgery.

Out of 25 only 3 patients were having visual acuity of Hand movement & other 22 were having only PL / PR.

Out of 25 patients 6 were having IOP of 10-15Hg, 15 were having 16-20 Hg and 4 were having 21-25 mmHg.

Vitrectomy samples were taken & subjected to KOH & gram stain & also send for culture sensitivity.

Table 1: The Comparison of organism suspected at the time of presentation vs the result of vitreous tap after culture report

S. No.	Smear Identification	Culture Report
1	Staphylococcus species	Coagulase negative Staphylococcus
2	Staphylococcus species	Coagulase negative Staphylococcus
3	Staphylococcus species	Coagulase negative Staphylococcus
4	Staphylococcus species	Coagulase negative Staphylococcus
5	Staphylococcus species	Coagulase negative Staphylococcus
6	Staphylococcus species	Coagulase negative Staphylococcus
7	Staphylococcus species	Coagulase negative Staphylococcus
8	Staphylococcus species	Coagulase negative Staphylococcus
9	Enterococcus	Proteus
10	Enterococcus	Proteus
11	Staphylococcus species	Staphylococcus aureus
12	Staphylococcus species	Staphylococcus aureus
13	Staphylococcus species	Staphylococcus aureus
14	Staphylococcus species	Coagulase negative Staphylococcus
15	Staphylococcus species	Staphylococcus aureus
16	Staphylococcus species	Staphylococcus aureus
17	Staphylococcus species	Coagulase negative Staphylococcus

18	Staphylococcus species	Staphylococcus aureus
19	Staphylococcus species	Staphylococcus aureus
20	Staphylococcus species	Staphylococcus aureus
21	Staphylococcus species	Staphylococcus aureus
22	Staphylococcus species	Coagulase negative Staphylococcus
23	Staphylococcus species	Coagulase negative Staphylococcus
24	Staphylococcus species	Coagulase negative Staphylococcus
25	Staphylococcus species	Staphylococcus aureus

So Staphylococcus aureus & Proteus were present in the patients which presented within 7days & Coagulase negative staphylococci were present in patients presented after 7 days of presentation. 2 out of 25 patients underwent secondary vitrectomy with injections of ceftazidime & vancomycin with causative organism as Staphylococcus aureus.

Pseudophakos was removed in 5 out of 19 patients due to extensive deposits of fibrinous material & pigment on it.

Table 2: Summary of the patients treated with vitrectomy for endophthalmitis

S. No.	Name	Age	Sex	Eye Involved	Inciting Operation	Presenting visual acuity	Time of presentation (in days)	Corneal Infiltrate	Presenting IOP	Media Clarity (Grade)	Pseudophakos explants	Visual Acuity (Day 42)	Complications	Secondary Vitrectomy
1	K	38	M	Right	ECCE	PL, PR	2	-	17.3	4	-	6/36	-	-
2	R	40	F	Right	ECCE	PL, PR	3	-	18.9	5	-	6/60	-	-
3	H	38	F	Right	ECCE	PL, PR	2	-	19.6	4	-	6/36	-	-
4	S	38	M	Right	ECCE	PL, PR	3	-	15.9	4	-	6/24P	-	-
5	N	40	M	Left	ECCE, ACIOL	HM	2	-	18.9	5	-	6/60	-	-
6	K	58	M	Right	ICCE	PL, PR	3	+	12.2	5	-	HM	-	-
7	S	49	F	Right	ECCE	HM	3	-	18.9	4	-	6/24	-	-
8	M	67	M	Right	ICCE	PL, PR	2	+	12	5	+	PL, PR	-	-
9	S	65	M	Left	ECCE	PL, PR	4	-	17.3	4	-	6/24P	-	-
10	V	63	M	Right	ECCE	PL, PR	5	+	12.2	5	-	PL, PR	RD	+
11	J	48	F	Right	ECCE	HM	4	-	17.3	4	-	6/18P	-	-
12	J	47	F	Left	ECCE	PL, PR	5	-	15.9	4	-	6/24P	-	-
13	R	52	F	Right	ECCE	PL, PR	6	+	17.3	5	+	HM	-	-
14	K	66	M	Right	ECCE	PL, PR	12	-	18.9	4	-	6/24	-	-
15	A	68	F	Right	ICCE	PL, PR	5	+	12.2	5	-	PL, PR	RD	+
16	D	67	F	Left	ECCE	PL, PR	8	-	21.3	5	+	4/60	-	-
17	N	55	F	Right	ICCE	PL, PR	9	+	10.2	5	-	PL, PR	-	-
18	G	53	F	Right	ICCE	PL, PR	8	+	22.3	5	-	3/60	-	-
19	H	64	F	Right	ECCE	PL, PR	10	-	15.9	5	-	4/60	-	-
20	T	55	M	Right	ECCE	PL, PR	8	-	15.9	4	-	6/24P	-	-
21	S	46	M	Left	ECCE	PL, PR	11	+	13.4	5	+	1/60	-	-
22	A	53	F	Right	ECCE	PL, PR	8	-	17.3	4	-	6/36	-	-
23	K	48	M	Left	ECCE	PL, PR	10	-	21.3	5	-	4/60	-	-
24	S	62	F	Left	ECCE	PL, PR	9	+	22.3	5	+	3/60	-	-
25	M	49	M	Left	ECCE	PL, PR	8	-	18.9	5	-	6/60	-	-

ECCE - Extra Capsular cataract extraction

PCIOL-Posterior Chamber Intra ocular lens

ACIOL-Anterior Chamber Intra ocular lens

Patients presented with corneal infiltrate show poor visual outcome as compare to patient with no corneal infiltrate.

Patients with early presentation were having good visual outcome i.e. 14 patients that presented with in 72 hrs having vision 2/60 to 6/18 & rest of 11 patients that presented after 72 hrs having vision PL negative to 6/60.

Patients with less than 15mm Hg had comparatively poor outcome as compared to patient more than 15mm Hg.

Visual outcome to Secondary Vitrectomy out of 2 patient underwent Secondary Vitrectomy both were having PL absent final visual outcome.

So the patients with intact posterior capsule are having relatively better visual outcome as compare to the patient having no Posterior capsule.

Impression: Early presentation (i.e. within 72 hrs) with coagulase negative staphylococcus aureus infection, having intact Posterior capsular at the time of presentation and absence of corneal infiltrate are having better visual outcome.

Discussion

The endophthalmitis vitrectomy study group (EVS, 1995) is the bench mark study regarding the role of initial pars plana Vitrectomy in the management of post-operative bacterial endophthalmitis and the role of intravitreal antibiotics i.e. Vancomycin 1mg, Amikacin 0.4 mg.

In present study 40% of patient has visual outcome $\geq 6/36$ while in EVS study 84% of patients had visual acuity $\geq 6/36$ & 62% of cases are having visual acuity $\geq 6/12$. The difference is due to enrollment of culture negative cases also which has far better result than the culture Positive endophthalmitis cases.

In present study final visual acuity $\geq 3/60$ in 16/25 (64%) of cases which is comparable to the result of forster et al (1980) in which 9 series of 17 cases which was managed by vitrectomy and intravitreal antibiotics are having visual acuity of $\geq 3/60$.

The final visual outcome results $\geq 6/60$ varies from 22-77% in various studies in the literature. Comparison of these studies is however confounded by the use of widely differing management regimen at different centres and different inclusion & exclusion criteria.

Study group	Vision $\geq 6/60$
Bohigian et al, 1996	77%(39/51)
Driebe et al, 1986	60%(14/25)
Doftet al, 1994	22%(13/60)
Present study	60%(15/25)

In a study by Puliafito et al (1952), a series of 36 cases of infectious endophthalmitis were treated in similar manner, the 70% of cases were PL negative even in the patients reported within 24 hrs after the

surgery. While in the present study 4 out of 11 (36.38%) in whom the time delay was > 72 hours were having final visual acuity as no perception of light. This marked difference may be due to efficacious intravitreal antibiotics & refinement of vitrectomy techniques over the time.

In Present study coagulase negative staphylococcus endophthalmitis having better visual outcome $\geq 4/60$ in 92.3% of case (12out of 13) and is better that the study done by Devis et. al (1988) where 87% of culture proven coagulase negative cases achieved vision $\geq 3/60$. it may be due to better intravitreal injection used. Study outcome even better than Ormerod and associates (1993) study where final visual acuity of 68% of cases $\geq 3/60$ vision in coagulase negative study.

Many studies show similar trend of a good prognosis with coagulase negative staphylococcus endophthalmitis compared to other causative organisms irrespective of the mode of treatment undertaken.

It only differs from Ormerod et al study; this is possibly because in the present study only patient with post-operative endophthalmitis with in 2 week has been taken.

Culture Isolation: The Donahue et al (1993) worked on 138 eyes with endophthalmitis have shown culture positive sample in 80% of all the cases, the result is comparable to this study in which 25 out of 30 suspecting cause were culture positive (83.33%).

A study by Driebe et.al (1986) on culture isolation taken of vitrectomy sample in pseudophakic endophthalmitis, 62 of 83 patients i.e. 75% cases show a positive vitreous culture.

Causative Organisms: In present study 52%(13 of 25) of cases accounted for Coagulase negative staphylococci, 40% (10 of 25) accounted for staphylococcus aureus & gram negative bacteria (Proteus) for 2 cases (8%) only.

Nearly all the studies supported the coagulase negative staphylococci the main causative organism in endophthalmitis. Endophthalmitis Vitrectomy study shows 70% of the cases of endophthalmitis to be caused by coagulase negative Staphylococcus.

In Rausel and Colleague (1987) & Meisler & associate (1989) showed proteus to be most common organism accounting for delayed onset pseudophakic endophthalmitis.

In present study there is no case of delayed onset pseudophakic endophthalmitis as the present study deals only with fresh post-operative endophthalmitis.

In study of forester et.al (1980) 19% of cases are having gram negative organism in present study only 2 (8%) are having gram negative organism. This is because of less number of cases that was enrolled in the study.

Antibiotic sensitivity pattern: Davis and co-workers (1988) reviewed 48 cases of Coagulase negative isolated from 1982-1986 and compared these with 28 from 1973 to 1981, they found an increase resistance to

gantamicin & also an increased resistance to methicillin. 8 cases were resistant to both the antibiotic & included 3 clinical failures.

Endophthalmitis vitrectomy study (1996) showed that after vitrectomy in patients with a vision of light perception & accurate projection had 33% of cases achieved a final visual acuity 6/12 (56%) of cases achieved vision 6/36 as final outcome and with severe loss was of 20% patients. While in this study, after vitrectomy no patient had vision 6/12, 40% had vision of \geq 6/36 and 8% had severe visual loss. This is possibly because of different inclusion & exclusion criteria in the present study.

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