Original Article

Outcomes of Early Pars Plana Vitrectomy for Acute Post Operative Endophthalmitis with or without Silicone Oil

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Purpose: To evaluate the anatomical and functional outcomes of pars plana vitrectomy (PPV) in acute post operative endophthalmitis with or without endotamponade.

Study design: Quasi experimental study.

Place and duration of study: Lahore General Hospital, Lahore from March 2011 to March 2016.

Material and Methods: One hundred and twelve patients of acute post-surgical endophthalmitis were included in the study. Patients were randomized into two groups after no clinical improvement was seen post primary vitreous tap and intravitreal vancomycin and ceftazidime. In group 1 patients undergoing PPV with endotamponade (silicon oil) were included while in group 2 patients undergoing PPV without endotamponade were included. Study was divided in two phases. In first phase 30 patients underwent PPV without endotamponade and 30 patients with endotamponade. Considering the results of phase 1, rest of the 52 patients underwent PPV with endotamponade in phase 2. Removal of silicone oil in all patients was done at 12 weeks.

Results: In first phase of study 23 (76.66%) patients in Group 2 showed retinal detachment within four weeks of follow up, while no patient (0%) in Group 1 showed retinal detachment within four weeks of follow up. Later 6 (7.31%) patients in group 1 showed retinal detachment within four weeks of silicone oil removal. In second phase all 52 patients showed no retinal detachment after undergoing PPV with endotamponade as in group 1. Overall 82 patients underwent PPV with endotamponade including first and second phase and only 6 patients got retinal detachment.

Conclusion: Early PPV with endotamponade should be preferred to PPV without endotamponade in cases of acute postoperative endophthalmitis due to statistically significant improvement in anatomical and functional outcomes.

Key words: Endophthalmitis, Pars plana vitrectomy, Endotamponade, Retinal Detachment, Silicone oil.

Endophthalmitis is one of the most devastating vision threatening intraocular inflammation[1]. There are two main routes for inoculation of this condition i.e. exogenous and endogenous. Exogenous endophthalmitis can be due to post-operative, post- trauma, or post-intravitreal injections due to ocular contamination by infective agents from the external environment[1]. Endogenous endophthalmitis is less common and is caused by spread of microbes through blood from different parts

of the body. Endophthalmitis causes severe anatomical and functional damage of intraocular structures leading to marked visual deterioration[2].

Acute post-operative endopthalmitis usually occurs within 5-6 weeks of an intra-ocular surgery. Most of the cases occur after cataract surgery[3,4]. After cataract surgery the incidence of acute-postoperative endophthalmitis ranges from 0.03% to 0.2% in different publications[5-12]. Ocular surgeries other than cataract i.e. penetrating keratoplasty[5,13,14] scleral buckling[15] and glaucoma drainage device implantation[16] show less incidence of acute-postoperative endophthalmitis as compared with post cataract surgery.

There are many treatment options for this sight threatening condition including intra-vitreal antibiotics, pars plana vitrectomy (PPV) and adjunctive systemic antibiotics. Endophthalmitis vitrectomy study (EVS) provides us the guidelines for the treatment of endophthalmitis with respect to vision at presentation. PPV is generally recommended in patients presenting with light perception (LP) vision while in patients presenting with visual acuity of better than LP intra-vitreal antibiotics is recommended[17]. PPV can be performed with and without endotamponade (Silicon oil). A study was conducted to evaluate the efficacy of PPV with endotamponade (silicon oil) and they found silicon oil having intrinsic bactericidal properties[18]. Another study was conducted which showed silicone oil a beneficial adjunct to vitrectomy in the treatment of endophthalmitis. In pars plana vitrectomy with silicone oil endotamponade all the patients were found to have better visual outcomes[19].

As endophthalmitis causes diffuse tissue necrosis and post- operative retinal detachment so endotamponade plays an important role in securing visual and anatomical outcomes[19]. A study was done to compare the post PPV outcomes with and without endotamponade in the treatment of endophthalmitis. There was markedly increased incidence of post-operative retinal detachment in PPV without endotamponade[20].

This study was done to evaluate and quantify the effect of endotamponade, in preventing post PPV retinal detachment, done for endophthalmitis. The results will benefit the surgeons and patients in achieving good visual outcomes.

MATERIAL AND METHODS

A total of 112 subjects with acute post-operative endophthalmitis were enrolled in this study on the basis of EVS recommendations. This was a quasi experimental study conducted at Lahore General Hospital, Lahore Pakistan, from 2011 to 2016. Sample size was calculated by WHO standard formula with 95% confidence interval. Written and informed consent was taken from all participants. Approval of the Ethical Committee of Lahore General Hospital, Lahore was obtained. A detailed history and evaluation of all the participants was done systemically to identify any risk factors causing endophthalmitis. All participants were randomly divided in two equal groups. In first phase 30 patients of Group 1 underwent PPV with oil and 30 patients of Group 2 underwent PPV only. Second phase started 4 weeks after first phase and rest of all 52 patients underwent PPV with endotamponade (table 2). 23 G PPV with and without silicon oil was done and patients were evaluated at first day, first week, first month, third months and sixth months. Oil was removed after 2 months. On every follow up visual acuity, IOP and fundus examination were recorded. Statistical package SPSS version 15.0 was used for data analysis.

RESULTS

Total 112 patients with acute post-operative endophthalmitis were enrolled in this study. 75 (66.90%) were male and 37 (33.03%) were female. Mean age of participants was 48 years. 6 patients (7.31%) out of total 82 patients who underwent PPV with endotamponade in Group 1 showed retinal detachment on removing silicon oil after 4 post-operative weeks. 23 (76.66%) patients who underwent PPV alone in Group 2 presented with retinal detachment during first four weeks follow up (table 2).

In first phase of study 23 (76.66%) patients out of 30 who underwent PPV only (Group 2) showed retinal detachment within first four weeks of follow up, while among 30 patients of Group 1 who underwent PPV with endotamponade, no patient showed retinal detachment in first four weeks post operatively . Later 06 (7.31%) patients in group 1 showed retinal detachment within four weeks of silicone oil removal (fig 1).

In second phase rest of 52 patients underwent PPV with endotamponade. No patient showed retinal detachment at first 4 weeks follow up (fig 2). Patients

with detachment underwent redo surgery for PPV with endotamponade of silicone oil.

Oil was removed after 2 months. 76 (92.68%) participants showed improved vision (6/36-6/60) in Group 1 and in Group 2 07 (23.33%) participants showed improved vision (6/36-6/60).

Table 1: Patient distribution in the study phases.

First Phase		
	Group 1	**Group 2**
N	30	30
RD	6	23
%	20%	76.6%
Second Phase		
	Group 1	**Group 2**
N	52	0
RD	0	0
%	0%	0%

Table 2: Results of the two groups.

Combined	Group 1	Group 2
Total patients	82	30
RD	6	23
%	7.31%	76.6%

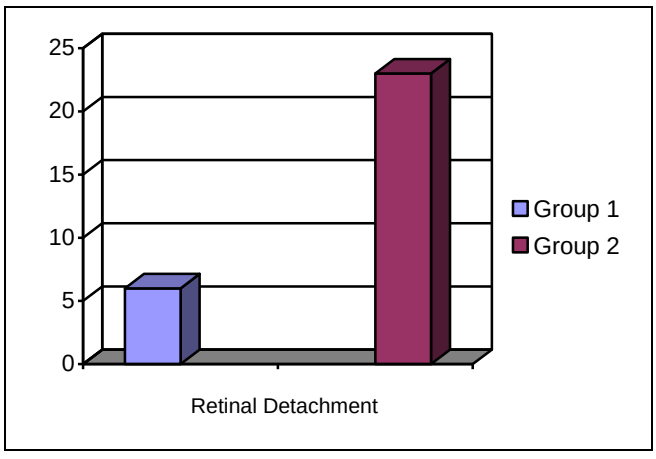

Figure 1: Retinal detachment ratio in two groups.

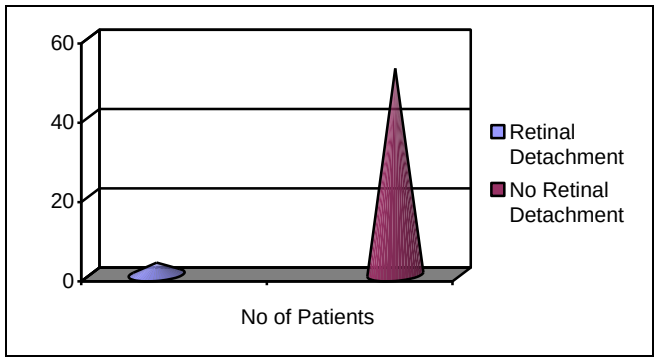

Figure 2: After removal of oil ratio of retinal detachment in second phase.

DISCUSSION

Considerable differences were observed between two groups in our study. At fourth post-operative week and sixth post-operative month after surgery, Group 1 (who underwent pars plana vitrectomy with silicone oil endotamponade had better visual and functional outcomes and less need to repeat surgery. The results were in favor of conclusions from previous studies[19].

It shows the significance of endotamponade with silicone oil for endophthalmitis. Pars plana vitrectomy has improved the anatomical and functional outcomes of endophthalmitis from a success rate of 33%[21] to 40%[22]. Role of surgical management (PPV with endotamponade) in improving visual function has been shown by many studies and plays an important role in securing the useful vision of patients. As compared with the surgical outcomes from similar studies our study showed more acceptable results. Success rate of this study 92.68% in Group 1 compared with 30% by another study showed the importance of endoteponade[23].

Improved functional and anatomical outcome of pars plana vitrectomy with endotamponade (silicon oil) could be explained as follows: Eradication of microbes by antibiotics is assisted by silicon oil[18]. A study was published which showed that silicone oil has inhibitory effect on most of the microorganisms including aerobes, facultative aerobes and anaerobes[18]. Postoperative examination and additional laser treatments can be done effectively as silicon oil keeps the media clear. Because of good surface tension, silicon oil pushes the retina against the eye wall, hence giving a good tamponade and sealing the retinal breaks effectively[19]. In severely infected eyes to perform pars plana vitrectomy carries some hazards. Unexpected damage to the retina can occur due to

obscuration of the view because of opaque media. In endophthalmitis retina becomes infected, necrosed and fragile and can undergo iatrogenic injury or traction during surgery. After surgery there can be necrosis of retina secondary to persistant intraocular inflammation. Postoperative hypotony can result due to ciliary body damage. These issues may cause retinal detachment[19,24].

Considerable difference in retinal detachment after pars plana vitrectomy was seen in our study in eyes with endophthalmitis. 76.66% participants showed retinal detachment at first post-operative week in Group 2. All eyes required re-operation with silicone oil endotamponade to obtain better visual outcomes by restoring the anatomical aspects. In the Group 1, there were 6 cases of retinal detachment that occurred later after removing silicon oil.

Proliferative vitreo-retinopathy (PVR) plays an important role in the late complications in treating endophthalmitis. In Group 1 all the six cases who got retinal detachment where repaired with silicone oil endotamponade and PVR was the main cause for retinal detachment[24]. Among 82 participants with oil-filled eyes of Group 1, silicon oil was removed in all cases at 2 months. Progressive PVR was responsible for recurrent retinal detachment, causing new breaks or tractions emphasizing the need for endotamponade with silicon oil[25].

Retinal breaks and tractions were responsible for recurrent detachments after surgery[25]. These recurrent detachments had very poor prognosis and these eyes became phthisical. In group 2 the parameters which show guarded prognosis i.e. macular fibrosis, inoperable retinal detachment, phthisis bulbi, evisceration were considerably higher than that of group 1.

In every case vitreous and aqueous tap was done and sent for culture sensitivity and gram/giemsa staining. Vitreous examination provided more positive results as compared to aqueous sample examination (92% in vitreous tap; 78% aqueous tap). Staphylococcus aureus was isolated in most of the cases (41.5%), followed by Streptococcus pneumoniae (20.5%), and Pseudomonas aeruginosa (25%). In South East Asia region, the most common pathogens were Gram negative rods Klebsiella from hepatobiliary infections are the major cause of endophthalmitis in South East Asia region while gram positive cocci i.e. Staphylococcus and Streptococcus are the leading cause of endophthalmitis in the region of Europe and America[18].

In the study, we found that endotamponade with silicon oil is an important tool for adequate attachment of retina after pars plana vitrectomy. Severity of endophthalmitis is determined by certain signs like preoperative visual acuity, hypopyon height, vitreous opacity, and fundus involvement. These signs signify poor visual, functional and anatomical outcomes. Early pars plana vitrectomy for post-surgical endophthalmitis with poor red reflex and vision of light perception show dramatic effects, already shown by Endophthalmitis Vitrectomy Study[17].

CONCLUSION

Early pars plana vitrectomy with endotamponade resulted in statistically significant improvement in anatomical and functional outcomes compared to pars plana vitrectomy without endotamponade in cases of acute postoperative endophthalmitis.

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