VITRECTOMY IN UVEITIS PATIENTS

PION B, VALYI ZS*•, JANSSENS X*, KOCH P*, LIBERT J*, CASPERS L*, WILLERMAIN F*•*

ABSTRACT

Purpose: To evaluate the causes and success rates of pars plana vitrectomy (PPV) in uveitis patients.

Methods: Retrospective study of the charts of 26 uveitis patients (28 eyes) who underwent PPV between the years 2008 and 2011. We examined surgical indications and success rates, based on visual outcomes, complications and diagnosis in case of vitreous biopsy.

Results: (1) Therapeutic PPV (TV) was performed in 36% of the eyes, (2) TV combined with epiretinal membrane (ERM) peeling in 21% and (3) diagnostic PPV (DiV) was performed in 64% of the eyes. Eight eyes (28,6%) underwent a combined cataract and vitreous surgery. Visual acuity (VA) improved in 16 eyes (57%), with a mean improvement of -0,9 log of the minimum angle of resolution (logMAR), although the effect was transient in 7% of the cases. VA remained stable in 11 eyes (39%) and decreased in 1 (4%). Post-operative complications were cystic macular oedema (CMO) in 3 eyes (11%), cataract in 5 eyes (18%) and retinal detachment in 2 eyes (7%). Diagnostic tests were performed in 18 eyes with a success rate of 55%.

Conclusions: In our series of patients with uveitis, a good and stable improvement of VA was found when PPV was performed with ERM peeling while the effect on VA was more transient in the other cases. A good success rate of diagnosis was also found in DiV. However, considering the possible severe complications, diagnostic vitrectomy should be limited to selected cases.

KEY WORDS

uveitis, diagnostic vitrectomy, therapeutic vitrectomy, vitreous analysis

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* *Department of Ophthalmology, CHU St-Pierre, Bruxelles, Belgium*
• *Department of Ophthalmology, CHU Brugmann, Bruxelles, Belgium*

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INTRODUCTION

Uveitis represents a heterogeneous group of diseases clinically characterized by inflammatory cell infiltration of the eye. In the vast majority of the cases, the inflammation is due to infectious agents or autoimmune diseases (1). However, neoplastic processes such as lymphoma can also rarely mimic uveitis. Similarly, intraocular non-inflammatory cell infiltration can sometimes be misdiagnosed as an intra-ocular inflammation. Chronic retinal detachment or intra-ocular hemorrhages are also important causes of uveitis masquerade syndrome (2).

Despite the major recent advances in the treatment of uveitis patients, intra-ocular inflammation remains a significant cause of visual loss. Sight loss is generally due to the development of ocular lesions secondary to the inflammatory process. Hence uveitis is associated with several ocular complications such as cataract, glaucoma, vitreous debris, macular pathology or retinal detachment (3).

PPV has become a very safe procedure and can be proposed in selected uveitis cases for diagnostic and/or therapeutic purposes. However, the results of DiV are controversial and depend on many factors (4,5). The goal of our study was to analyze the relative indications of vitrectomies in our patients with uveitis and to evaluate their relative success and complication rates.

METHODS

In this retrospective study, we reviewed successive clinical files of patients who underwent PPV for uveitis in the department of Ophthalmology at the CHU St-Pierre in Brussels between the years 2008 and 2011. Human Research Ethics Committee approval was obtained. Inclusion criteria for this study were: (1) presenting intermediate or posterior uveitis, (2) undergoing pars plana vitrectomy, (3) no prior vitreo-retinal surgery and (4) no retinal detachment. We excluded all patients who failed to meet these conditions.

Twenty-six patients (28 eyes) fulfilled the inclusion criteria. The causes of uveitis, pre- and postoperative VA, complications and diagnostic test procedures were collected (*Table I*).

VA was recorded with a Snellen chart and converted to logMAR. An improvement or decrease in vision was considered to be a change of at least 0,3 log of the minimum angle of resolution (logMAR) corresponding to +/- 2-3 Snellen chart lines.

Surgical procedure consisted in a classic 23 G, 2 or 3 port PPV. The applied cutting speed was 700 per minute in 79% and 2500 per minute in 21% of the cases. The surgeries were performed by 4 different surgeons. In 25% of the cases, a combined procedure of the anterior and the posterior segment was performed, with phaco-emulsification of the lens and implantation of an intra-ocular lens in the capsular bag. In 2 (7%) cases, triamcinolone acetonide was injected at the end of the surgery. In 6 eyes (21%), a removal of the epiretinal macular membrane and the internal limiting membrane was performed with an end-gripping intra-ocular forceps after applying indocyanine green dye. In all ERM cases, a prophylactic laser treatment was applied.

In 64% of the eyes, vitreous specimens were analyzed by cytological examination, polymerase chain reaction (PCR) or calcofluor staining for the detection of mycosis. Classic postsurgical treatment with topical corticosteroids and antibiotic drops were given in the first postoperative month.

RESULTS

Our patient group was composed of 17 women (65%) and 11 men (42%). Mean follow-up was 17.1 months (range 0.25 - 65). Average age at the time of surgery was 46,5 years (range 15 - 73).

Group division

Twenty-eight eyes of 26 patients were included in the study. In eighteen eyes (64%), diagnosis was not known before surgery. In those patients, the main goal of vitrectomy was to ob tain a diagnosis, but was also useful in some cases as a combined therapeutic vitrectomy (TV) if needed. All these patients were included in the diagnostic vitectromy group (DiV). In ten eyes (36 %), diagnosis was known beforeformed the TV-group. We could further divide the TV-group in a subgroup of 6 eyes (21%) undergoing vitrectomy for epiretinal membrane

Table I: *Patient characteristics of the three subgroups DiV (Diagnostic vitrectomy), VH (Vitreous Haze), ERM (epiretinal membrane)*
Groups and subgroups, demographic data, causes of uveitis (*: positive vitreous samples), follow-up time (months), change in visual acuity, newly added systemic treatment after PPV (°: corresponding treatment already initiated before PPV) and complications in 28 eyes. (CMO: cystic macular oedema, MTX: intravitreal injection of Metothrexate, RD: retinal detachment)

No.	*Age (years)*	*Sex*	*Underlying diseases*	*Follow-up*	*Change in VA*	*Added treatment*	*Complications*
Diagnostic Vitrectomy							
1	37	F	Rubeola*	0,25	n	None	None
2	47	M	Toxoplasmosis*	16	b	Antitoxoplasmic drugs	None
3	43	F	Unknown	5	b	None	None
4	50	M	Toxoplasmosis*	3	w	Antitoxoplasmic drugs	None
5	44	F	Unknown	3	n	None	Cataract
6	38	F	Mycosis*	1	n	None°	None
7	38	F	Mycosis*	1	n	None°	None
8	47	F	Lyme	6	n	None°	CMO
9	23	M	Toxocara	5	b	Steroids	None
10	65	F	Toxoplasmosis*	12	b	Antitoxoplasmic drugs	Cataract
11	73	F	Toxoplasmosis*	16	b	Antitoxoplasmic drugs	Cataract
12	60	F	Lymphoma*	16	n	None°	Cataract
13	40	F	Unknown	6	n	MTX	None
14	69	M	Lymphoma	25	b	None	RD
15	39	F	Cytomelagovirus	6	b	Antiviral agent	None
16	18	M	Pars planitis	5	b	None	None
17	65	M	Lymphoma*	6	b	MTX	Cataract
18	48	M	Mycosis*	0,25	b	Antifungal agent	None
Vitreous Haze group							
19	31	F	Sarcoidosis	48	b	None	CMO
20	61	F	Toxoplasmosis	48	n	None	None
21	31	M	Spondylarthritis	26	b	None	None
22	70	M	Phako anaphylactic uveitis	27	b	None	CMO
Epiretinal Membrane group							
23	46	F	Toxoplasmosis	60	b	None°	None
24	15	M	Sarcoidosis	54	b	None	None
25	43	F	Cytomegalovirus	65	n	None	RD
26	48	M	Toxoplasmosis	6	b	None	None
27	59	F	Sarcoidosis	6	b	None	None
28	59	F	Sarcoidosis	6	b	None	None

due to uveitis (ERM-group) and a subgroup of 4 eyes undergoing vitrectomy for dense vitreous due to uveitis (VH-group). Table I shows the characteristics of the patients in those three subgroups.

Visual Acuity

Looking at the preoperative VA, we found that eight of 28 eyes (29%) had a VA of 0,4 Snellen chart lines or better (>=0,4 logMAR), 6 eyes (21%) had VA between 0,05 and 0,3 Snellen chart lines (1,29 - 0,41 logMAR), and 14 eyes (50%) had a VA lower than 0,05 Snellen chart lines (>=1,3 logMAR) (*Fig. 1*). The mean VA was 1,11 logMAR.
To assess the postoperative vision, we evaluated the best VA ever obtained during the whole follow-up period, the VA at six months after PPV as well as the VA at the end point of fol-

Table II: *Best visual acuity – Frequencies of best visual acuity after vitrectomy in numbers and percentage of the total of all eyes and the three subgroups: Diagnostic vitrectomy, Vitreous haze and Epiretinal membrane group.*

			Therapeutic vitrectomy	
Best VA Post-PPV	Total	Diagnostic vitrectomy group	Vitreous haze group	Epiretinal membrane group
B= better	16 (57%)	10 (56%)	2 (50%)	4 (67%)
N= no change	11 (39%)	7 (39%)	2 (50%)	2 (33%)
w= worse	1 (4%)	1 (5%)	0 (0%)	0 (0%)

Table III: *End-point visual acuity – Frequencies of end-point visual acuity in numbers and percentage of the total of all eyes and the three subgroups: Diagnostic vitrectomy, Vitreous haze and Epiretinal membrane group.*

			Therapeutic vitrectomy	
End point VA	Total	Diagnostic vitrectomy group	Vitreous haze group	Epiretinal membrane group
B= better	15 (54%)	10 (56%)	1 (25%)	4 (67%)
N= no change	11 (39%)	6 (33%)	3 (75%)	2 (33%)
w= worse	2 (7%)	2 (11%)	0 (0%)	0 (0%)

low-up. We considered postoperative vision to be better when it improved with 0,3 logMAR or more and worse if vision deteriorated with 0,3 logMAR or more. Otherwise vision was regarded unchanged.

Best visual acuity and visual acuity at six months post-PPV

Considering the best VA, we found that 19 eyes (68%) had a vision of 0,4 Snellen chart lines or more (>=0,4 logMAR), 2 eyes (7%) a vision between 0,05 and 0,3 Snellen chart lines (1,29 - 0,41 logMAR), and 7 eyes (25%) had a vision lower than 0,05 Snellen chart lines (>=1,31 logMAR) (*Fig. 1*).

The average VA was 0,61 logMAR with a mean improvement of -0,9 logMAR. The difference between the best VA and the VA at six months post-PPV was only 0,005 logMAR.

Comparing these results with the preoperative VA, 16 eyes (57%) presented a better vision, 11 eyes (39%) no vision change, and 1 eyes (4%) a decrease in vision (*Table II*).

End-point visual acuity

Analyzing the end point VA, we found that only 16 eyes (57%) had a vision of 0,4 Snellen chart lines or better (>=0,4 logMAR), 4 eyes (14%) had vision between 0,05 and 0,3 Snellen chart lines (1,3 - 0,41 logMAR) and 8 (29%) eyes had a VA lower than 0,05 Snellen chart lines (>=1,31 logMAR) (*Fig. 1*). The mean end-point VA was 0,7 logMAR.

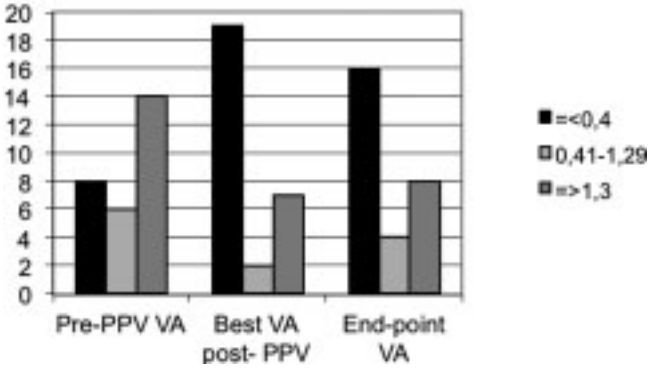

Fig. 1: Pre-PPV, best post-PPV and end-point visual acuities
Number of patients with visual acuities =<0.4 logMAR (=> 0,4 Snellen chart lines) (black), between 0.41 to 1,29 logMAR (between 0,05 and 0,3 Snellen chart lines) (light grey) and => 1,3 logMAR (below 0,05 Snellen chart lines) (grey).

Table IV: *Visual outcomes reported in literature – Percentage of improved, unchanged and decreased visual acuity groups*

Studies and year of publication	*Improved VA*	*Unchanged VA*	*Decreased VA*	*Remarks*
Pion et al.	57%	39%	4%	
Bovey and Herbort 2000	80.4%	5.8%	13.8%	
Svozilkova et al. 2011	45%	45%	10%	
Margolis et al. 2007	60%	15.6%	24.4%	
Androudi et al. 2005	72.2%	13.9%	13.9%	Phacovitrectomies
Molina-Prat et al. 2010	86%	9%	5%	Intermediate uveitis
Becker and Davis 2005	68%	20%	12%	Mean visual outcome (Review)

In comparison with pre-operative VA, 15 eyes (54%) had an improved VA, 11 eyes (39%) remained unchanged, and 2 eyes (7%) had a decreased VA (*Table III*).

Role of combined cataract and vitreous surgery on the end point visual acuity

Considering now the role of combined cataract and vitrectomy surgery, 8 eyes (28,6%) underwent a combined procedure, with 4 (50%) of these eyes experiencing an improvement of their end-point VA. Detailed group analysis showed that in the DiV-group 3 (17%) out of 18 eyes had also cataract surgery. Only one of these eyes (33,3%) had an improvement in the end-point visual acuity. In the VH-group, 2 (50%) out of 4 eyes had a combined surgery and 1 (50%) of them with a better end-point VA. In the ERM-group 3 (50%) out of 6 eyes underwent a combined surgery with 2 (66,6%) of them experiencing a better end-point VA.

Diagnosis

The different uveitis causes are listed in Table 1. Considering the total sample of 28 eyes, we found, that in our series of vitrectomies, toxoplasmosis is by far the most common cause of uveitis (7 eyes = 25%), followed by sarcoidosis (4 eyes = 14%). Individual analysis of the subgroups showed that toxoplasmosis was the most frequent cause of uveitis in the DiV-group (4 eyes=22%), in the VH-group each eye had a different pathology and sarcoidosis was the most frequent cause of uveitis in the ERM group (3 eyes=50%).
In the DiV- group, vitreous samples of 18 eyes were analyzed through laboratory tests. In 10 eyes (55%) we were able to establish or confirm the diagnosis. The different diagnoses of uveitis were toxoplasmosis in 4 eyes (40%) (by PCR), mycosis in 3 eyes (30%) (by calcofluor staining), lymphoma in 2 eyes (20%) (by cytology/ PCR) and rubeola in 1 eye (10%) (by PCR). In 5 eyes (28%) final diagnosis was made by systemic investigation and clinical analysis. Uveitis remained idiopathic in only 3 eyes (17%).

DISCUSSION

Surgical techniques of vitrectomy have become more reliable during the past decades. Indications for vitrectomy have consequently been enlarged. One of the first indications for vitrectomy was for diagnostic purposes in patients with severe uveitis of unknown origin in the late 1970s (6, 7). Since complication rates of vitrectomy have decreased, surgical indications have also included therapeutic interventions in uveitis patients with severe vitreous haze or vitreous opacities resistant to medical treatment (8). ERM peelings have also been progressively performed in patients with intraocular inflammation, who present frequently these complications.

In the present study, we found that the most common indication in this series of uveitis patients was DiV (64%), followed by therapeutic vitrectomy (36%) and ERM peeling (21%). This distribution is in disagreement with the literature that reported with bigger TV than DiV groups (9, 10, 11). This could be explained by different group classification and inclusion criteria of the studies.

However, ERM group numbers are in the same range for most studies including the present series with 21% (9, 11, 12, 13).

Considering the effect of vitrectomy on the visual outcome, we found that there was an overall improvement of vision in 57% while only 4% of the eyes experienced a marked decrease in VA. A detailed group analysis suggest that in the DiV-group, the VA improvement possibly was not due to a combined cataract-vitrectomy surgery and that this visual gain remained stable during the whole follow-up period. This might reflect a better-adjusted medical treatment to the diagnosis made on the vitreous sample. The VH-group showed also an improvement in vision. However, more combined surgeries were performed in this subgroup leading to a more delicate interpretation of the benefit of the surgery. Furthermore, this improvement was of shorter duration, as inflammation was more likely to recur in this particular group. Similarly, in the ERM group, combined surgeries were frequently performed with good and stable visual improvement.

Although any comparison is difficult, these data were consistent with the visual outcomes we found in other series: the range of improved VA varies between 45 - 80.4%, the range of unchanged VA between 5.8 - 45% and those of decreased VA between 8.1 - 24.4% (*Table IV*) (9, 10, 13, 14, 15, 16).

In our study, vitreous analysis could provide the diagnosis in 55% of the cases. Diagnostic yield found in the literature varied between 22% to 61, 5% (4, 5, 9, 10, 11, 14, 17, 18). This could be due to differences in patient selection, applied vitreous analyses and different accessibility to diagnostic tests.

In the literature, the most common reported diagnoses differ greatly from one study to the other. However, some diagnoses are more frequently mentioned, such as: viral uveitis (4, 9, 11), lymphoma (4, 5, 14) and endogenous endophthalmitis (4, 5, 9). This is comparable to our findings.

The most severe complication noted, in the present series, was retinal detachment in 9% of the cases. This is in accordance with the rates reported in literature: retinal detachment rates varied between 0 and 17% (4, 5, 19, 20, 21, 22). Because of this, we should not consider vitrectomy as a mild treatment and only perform it when there is no alternative.

The present work is a retrospective study without control group in line with other papers reviewed in literature. Its further limitations are irregular follow-up periods and the lack of uniformity in laboratory testing. A welldesigned, prospective and controlled clinical study should be done.

In conclusion, our study confirms the previous reports that had indicated that vitrectomy has a place in the management of uveitis patients. ERM removal, if performed in well-controlled eyes, appears to be safe with stable improvement outcomes. TV performed in uveitis patients with severe vitritis might significantly improve the VA in the postoperative period, but recurrence is more frequent. Similarly, if laboratory tests are correctly tailored to the patients, DiV has a high rate of success and is of great value to establish or confirm the diagnosis. This clearly offers a unique opportunity to achieve an adequate medical treatment.

However, considering the possible severe complications, DiV should be limited to selected cases.

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Adress for correspondence:
Dr. Bart PION,
Department of Ophthalmology, CHU St-Pierre
322 Rue Haute, 1000 Bruxelles, Belgium
E-mail: bartpion@hotmail.com