Pars Plana Vitrectomy for Epiretinal Membrane Associated with Sarcoidosis

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Purpose: To examine retrospectively the visual outcomes in patients undergoing vitrectomy for epiretinal membranes secondary to sarcoid uveitis.

Methods: Eleven consecutive patients (11 eyes) with epiretinal membrane and uveitis associated with sarcoidosis underwent pars plana vitrectomy.

Results: Nine eyes (82%) gained two or more lines of Snellen visual acuity at 1–12 months after surgery. However, 4 of these 9 eyes lost two or more lines of Snellen visual acuity by the final visit. Overall, 5 eyes (45%) had attained at least two Snellen lines of visual acuity improvement, 5 eyes (45%) were unchanged, and 1 eye (10%) had worsened by two lines at the final visit. Nine eyes (81%) achieved visual acuity of 20/40 or better by the final visit. Slit-lamp biomicroscopy and fluorescein angiography showed that cystoid macular edema had resolved in 4 of 7 eyes postoperatively; vitritis improved in all cases. Postoperative complications included cataract formation, glaucoma, and membrane recurrence. Subsequent surgeries consisted of cataract extraction in 2 eyes and membrane peeling in 1 eye.

Conclusions: Pars plana vitrectomy appears to have a beneficial effect on restoring vision in eyes with epiretinal membrane and uveitis associated with sarcoidosis, but final visual acuity was limited by the development of cataract and membrane recurrence. **Jpn J Ophthalmol 2003;47:479–483** © 2003 Japanese Ophthalmological Society

Key Words: Epiretinal membrane, pars plana vitrectomy, sarcoidosis.

Introduction

Sarcoidosis is a multifocal inflammatory disease of unknown etiology. The prevalence of ocular involvement in sarcoidosis ranges between 25% and 50%,[1–4] and reportedly accounts for 7% of all cases of uveitis.[5] Chronic granulomatous inflammation typically affects older patients, and is seen in more than 50% of those with sarcoid uveitis.[1] It was reported that poor visual outcome (<20/40) was noted in 20% of such eyes due to posterior segment inflammation, glaucoma, and macular involvement after a 5-year follow-up.[6]

Corticosteroids, whether topical, systemic, or periocular, are the primary treatment for ocular sarcoidosis, although their side effects often preclude long-term use. Cyclosporin has been used as supplementary treatment in sarcoidosis with some efficacy.[7] Vitrectomy has been advocated for management of complications of uveitis, including vitreous hemorrhage, persistent dense vitreous inflammation, persistent cystoid macular edema, and epiretinal membrane formation.[8–17]

Epiretinal membrane formation is a known complication of ocular sarcoidosis and a cause of visual loss in patients with chronic posterior segment inflammation.[18] Membrane peeling has resulted in a favorable outcome in the management of idiopathic epiretinal membranes,[19–21]

but epiretinal membranes associated with chronic uveitis reportedly have a poorer visual prognosis after vitrectomy.[21] However, the visual results of vitrectomy for epiretinal membranes associated with ocular sarcoidosis have not been studied. The purpose of the study described herein was to examine the visual outcomes of vitrectomy for epiretinal membranes secondary to sarcoid uveitis and to note surgical complications and the effects of this surgery on postoperative inflammation.

Materials and Methods

We reviewed the records of 11 consecutive patients (11 eyes) with epiretinal membranes secondary to sarcoid uveitis who underwent pars plana vitrectomy at the Kyoto University Hospital between 1996 and 1999 (Table 1). Eight patients had an established diagnosis of sarcoidosis based on clinical findings and histologic confirmation by biopsy. Three patients, not subjected to biopsy, were diagnosed as having sarcoidosis[22] by negative purified protein derivative test result, elevated serum angiotensin-converting enzyme, and gallium scan findings consistent with sarcoidosis. Other requirements for inclusion were (1) visual acuity <20/30 due to visually significant epiretinal membranes; (2) no visually significant media opacities; (3) follow-up for a minimum of 12 months postoperatively. All patients gave their informed consent for the surgery.

Postoperative follow-up ranged from 12 to 38 months (mean, 24 months). The 11 subjects consisted of 1 man and 10 women, whose ages ranged from 54 to 78 years (mean, 61.5 years). Duration of visual loss ranged from 1 to 41 months (mean, 16 months). Eleven eyes were phakic. No visually significant media opacities were noted, although some eyes had vitreous cells and debris, as well as mild cataract. Seven eyes had preoperative cystoid macular edema unresponsive to medical treatment, including corticosteroids and acetazolamide.

Surgery was performed with the patients under local anesthesia with a sub-Tenon's parabulbar injection of 3 mL 2% lidocaine.[23] Pars plana vitrectomy was performed with standard three-port access to the vitreous cavity with sclerotomies 3.5 mm posterior to the limbus. A combined lensectomy-vitrectomy procedure was performed in 7 patients (7 eyes), who were between 55 and 78 years of age. A 3.5- to 5-mm sclerocorneal incision was made at the limbus, after which phacoemulsification was performed, and a posterior chamber intraocular lens was placed in the capsular bag. The posterior vitreous was detached in 5 eyes, and the epiretinal membrane was peeled using a microforceps in all eyes. Complete removal of the vitreous to the vitreous base was performed using

scleral depression. Endolaser photocoagulation and cryocoagulation were not performed. Vitrectomy was performed in only those eyes in which inflammation in the anterior chamber had been suppressed by topical steroid therapy. No patients received additional perioperative oral steroids; postoperative management consisted of topical corticosteroids alone. Systemic and/or periocular corticosteroids and/or acetazolamide were used only when cystoid macular edema had not resolved within 4 weeks after surgery.

All eyes underwent routine examination, including slit-lamp biomicroscopy, after surgery. Vitreous inflammation grade (quiet, 1+, 2+, 3+, or 4+) based on the presence of cells in the vitreous was recorded.[17] Fluorescein angiography was done postoperatively in all but 2 eyes.

Statistical analysis was performed by the Mann-Whitney U-test. A value of $P < .05$ was considered significant.

Results

Nine eyes (82%) gained two or more lines of Snellen visual acuity at 1–12 months after surgery. However, 4 of these 9 eyes lost two or more lines of Snellen visual acuity by the final visit. Three eyes developed recurrence of epiretinal membranes (2 eyes also developed cataract), and 1 eye had optic atrophy due to secondary glaucoma. Overall, 5 eyes (45%) had at least two Snellen lines of visual acuity improvement, 5 eyes (45%) were unchanged, and 1 eye (10%) worsened by two lines at the final visit. Nine eyes (81%) achieved visual acuity of 20/40 or better at the final visit.

Seven eyes underwent combined lensectomy-vitrectomy; 4 of these eyes (57%) gained two or more lines of Snellen visual acuity and 5 (71%) achieved visual acuity of 20/40 or better at the final visit. The other 4 eyes underwent vitrectomy alone, and 1 of these (25%) gained two or more lines of Snellen visual acuity, and all 4 achieved visual acuity of 20/40 or better by the final visit. No statistically significant difference was found in final visual acuity between eyes with lensectomy and those without lensectomy ($P = .77$).

Seven eyes had cystoid macular edema preoperatively; 3 of these eyes (43%) gained two or more lines of Snellen visual acuity and 5 (71%) achieved visual acuity of 20/40 or better at the final visit. The other 4 eyes presented without cystoid macular edema, and 2 of those eyes (50%) gained two or more lines of Snellen visual acuity, while 4 (100%) achieved visual acuity of 20/40 or better by the final visit. No difference was found in final visual acuity based on the presence or absence of preoperative cystoid macula edema ($P = .08$).

The preoperative cystoid macular edema (present in 7 eyes) cleared by slit-lamp and angiographic examination

Table 1. Patient Data

Patient No.	Sex	Age (y)	Duration of Symptom (mo)	Follow-up (mo)	Visual Acuity			Vitreous Cell		Additional Preoperative Retinal Findings and Surgical Indications‡	Surgical Procedures§	Complications‖	CME Resolution	Postoperative Medication¶	Subsequent Surgery#	PVD**
					Initial	Max (mo)*	Final	Initial	Final†							
1	F	62	1	20	20/33	20/33 (1)	20/50	2+	1+	CME	PPV+PEA+IOL	GLA	No	TS/ST/AC	–	No
2	F	54	23	38	20/40	20/22 (12)	20/40	2+	Q	CME	PPV	ERM, CAT	Yes	TS/AC	–	No
3	M	59	4	38	20/100	20/29 (6)	20/29	1+	Q	CME	PPV	GLA, CAT	Yes	TS	PEA+IOL	No
4	F	54	17	37	20/33	20/22 (1)	20/33	2+	Q	–	PPV	ERM, CAT	–	TS	–	Yes
5	F	72	41	29	20/200	20/40 (3)	20/100	2+	Q	CME	PPV+PEA+IOL	GLA	Yes	TS	–	Yes
6	F	56	10	25	20/33	20/29 (1)	20/33	1+	Q	CME	PPV	CAT	No	TS/SY/AC	PEA+IOL	No
7	F	78	1	22	20/67	20/17 (1)	20/17	2+	Q	–	PPV+PEA+IOL	–	–	TS	–	Yes
8	F	58	24	18	20/67	20/25 (12)	20/29	2+	1+	CME	PPV+PEA+IOL	GLA	No	TS/SY/AC	–	No
9	F	55	10	15	20/67	20/22 (12)	20/22	3+	Q	VO	PPV+PEA+IOL	–	–	TS	–	Yes
10	F	71	5	12	20/40	20/25 (1)	20/40	2+	Q	NVD	PPV+PEA+IOL	ERM	–	TS/SY	VIT	No
11	F	56	12	12	20/286	20/40 (12)	20/40	2+	Q	CME	PPV+PEA+IOL	–	Yes	TS/AC	–	Yes

*Values in parentheses indicate the months required to reach the maximal visual acuity after vitrectomy.
†Q: quiet.
‡CME: cystoid macular edema, VO: vitreous opacity, NVD: neovascularization on disc.
§PPV: pars plana vitrectomy, PEA: phacoemulsification aspiration, IOL: intraocular lens implantation.
‖GLA: glaucoma, ERM: epiretinal membrane, CAT: cataract.
¶TS: topical steroid, ST: sub-Tenon's steroid, AC: acetazolamide, SY: systemic steroid.
#PEA: phacoemulsification aspiration, IOL: intraocular lens implantation, VIT: vitrectomy.
**PVD: posterior vitreous detachment.

in 4 eyes within 3 months after surgery. Those patients with no decrease in macular thickening (3 eyes) in the early postoperative period received corticosteroids and/or acetazolamide, but the cystoid macular edema remained unchanged at the final visit.

No intraoperative complications were noted. Postoperative complications included cataract formation in 4 eyes, glaucoma in 5 eyes with optic nerve atrophy in 1, and epiretinal membrane recurrence in 3 eyes. Postoperatively, vitreous inflammation had been eliminated or reduced in all eyes, and no patients required oral prednisone to manage postoperative inflammation. Elevated intraocular pressure in 5 eyes was successfully controlled with topical steroids and antiglaucoma agents. Subsequent surgeries consisted of cataract extraction in 2 eyes and membrane peeling in 1 eye.

Discussion

Removal of epiretinal membranes associated with ocular inflammation has resulted in poorer visual results than has removal of idiopathic membranes.[21] Margherio et al[21] reported that 82% of operated eyes with idiopathic epiretinal membranes gained two or more lines of Snellen visual acuity, compared with only 64% of those with membranes due to other causes, including uveitis. Dev et al[17] reported 7 eyes of 5 patients with pars planitis that underwent vitrectomy and removal of epiretinal membranes. Five of these eyes (71%) had improved visual acuity of three or more Snellen lines, with a mean improvement of 3.1 lines.

Visual results of vitrectomy for epiretinal membranes associated with sarcoid uveitis have not been studied. The current study included 11 patients (11 eyes) who underwent pars plana vitrectomy to remove epiretinal membranes due to sarcoidosis. Nine of these eyes (82%) gained two or more lines of visual acuity within 12 months after vitreous surgery, but after 24 months of mean follow-up, only 5 eyes (45%) retained at least two lines of visual improvement. This poor visual recovery was likely due to recurrence of epiretinal membranes, or to development of cataract or glaucomatous optic nerve atrophy.

Recurrence of epiretinal membranes was seen in 3 eyes (27%), which is close to the recurrence rate (20%) for patients with chronic uveitis.[21] In contrast, Dev et al[17] reported no recurrences were in eyes with pars planitis after removal of epiretinal membranes. Margherio et al[21] has suggested that incomplete removal of portions of membranes or layers may account for "regrowth" after vitrectomy. They also pointed out that recurrences tended to occur in eyes with thick, vascularized membranes. It is possible that the type of uveitis plays an important role in the process of membrane recurrence.

Cataracts developed in all 4 patients who underwent vitrectomy alone. The development of nuclear sclerosis following vitrectomy for epiretinal membranes, especially in older patients, is well known.[24] This is part of the reason that we performed combined vitrectomy-lensectomy for patients who were 50 years or older and who had epiretinal membranes with even mild lens opacities. Lensectomy also facilitated complete removal of the vitreous gel, which may improve the long-term prognosis.[8,15] Two eyes developed significant cataracts and subsequently underwent successful cataract extraction with intraocular lens insertion. Given strict control of inflammation, visual outcome after cataract surgery was excellent. The visual improvement seen in the current study is thought to be a combination of the effect of removal of the epiretinal membranes and cataract surgery, although we cannot differentiate the contribution of each. It was our impression, however, that the recovery of vision was due primarily to membrane peeling, because none of the patients had significant cataracts before vitrectomy surgery. It is likely that cataract surgery, whether combined or subsequent, is necessary to achieve the best final visual results.

Vitrectomy has been advocated to improve intraocular inflammation,[9,13,17] and in fact, all of our patients had a reduction of vitreous inflammation after vitrectomy. It has been reported that T-cell clones derived from the vitreous humor of patients with sarcoidosis produce a large amount of cytokines, including interleukin-1α and interleukins-6 and -8, and that this increased production of cytokines is not suppressed by corticosteroids.[25] Thus, removal of inflammatory cells as well as of cytokines may lead to suppression of the ocular inflammation and to recovery of responsiveness to corticosteroids.

Cystoid macular edema in 4 of 7 eyes (57%) cleared after vitrectomy. Improvement of cystoid macular edema after vitrectomy has been reported also for patients with chronic uveitis.[14] It is likely that reduced inflammation in the vitreous contributed to the resolution of macular edema. Alternatively, removal of the epiretinal membrane may have resulted in absorption of the cystoid macular edema through relief of tangential foveal traction.

Although this pilot study is limited by its retrospective nature and by the small number of patients, it suggests favorable visual results from surgical removal of epiretinal membranes associated with sarcoid uveitis. Accordingly, a prospective and controlled clinical trial is needed to ascertain the actual effectiveness of pars plana vitrectomy for this condition.

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