

# Retinal detachments in patients with AIDS and CMV retinopathy: a role for laser photocoagulation

Peter McCluskey, John Grigg, T Justin Playfair

## Abstract

**A retrospective review of all patients with a cytomegalovirus (CMV) related retinal detachment and HIV infection managed at the ocular immunology clinic at St Vincent's Hospital between January 1985 and June 1992 was performed. Over this period 142 patients with CMV retinopathy were managed and 17 eyes from 14 of these patients developed a retinal detachment related to CMV retinopathy. Fourteen eyes from 11 of these patients were treated surgically with combinations of laser photocoagulation, cryopexy, scleral buckling, vitrectomy, and silicone oil tamponade. The use of laser photocoagulation alone in five patients resulted in an excellent visual outcome. The majority of patients (90.9%) benefited from surgery in that vision was either stabilised or improved.**

(*Br J Ophthalmol* 1995; 79: 153-156)

Cytomegalovirus (CMV) retinopathy is the commonest sight threatening manifestation of HIV infection and treatment with ganciclovir or foscarnet significantly improves the visual prognosis and increases patient survival. Retinal detachment is common in patients with CMV retinitis and the surgical management is technically challenging. The lifetime risk of developing a retinal detachment in treated CMV retinitis has been estimated at up to 50%.<sup>1</sup> Patients with advanced HIV infection perceive maintenance of vision as crucial to their quality of life and therefore appropriate treatment for retinal detachment complicating CMV retinitis is important to maintain vision and quality of life in such patients.

This study reports the methods and results of treatment in 17 eyes of 14 patients with CMV related retinal detachment and HIV infection managed at a single institution.

## Patients and methods

A retrospective review was performed of all patients with HIV infection seen at the ocular immunology clinic, St Vincent's Hospital in Sydney, Australia, between January 1985 and June 1992, who developed a retinal detachment. Twenty such patients were identified; 14 of the patients (17 eyes) had a retinal detachment as a result of CMV retinitis, three other patients (four eyes) developed retinal detachment in association with acute retinal necrosis, and one patient developed retinal detachment

in association with *Candida albicans* endophthalmitis. Two further patients developed rhegmatogenous retinal detachments unrelated to HIV infection. For this study patients with non-CMV related retinal detachments were excluded.

The study population therefore consisted of 17 eyes from 14 male patients with a mean age of 37.8 years and a mean time from diagnosis of HIV infection to the development of AIDS of 4.1 years with a range of 0 to 8.3 years. The mean CD4 count was 30 cells per millilitre at the time of CMV retinitis diagnosis. For six patients CMV retinitis was the AIDS defining illness while the remaining eight patients developed CMV retinitis on average 13.7 months after the diagnosis of AIDS with a range of 1 to 31 months. The clinical features, management, and visual outcome of the patient group are detailed in Table 1.

Large areas of retina were usually involved by CMV retinitis in these patients. More than 50% of the retina was involved in eight eyes, between 25% and 50% in six eyes, and less than 25% of the retina in only three eyes. At the time of retinal detachment diagnosis, the CMV retinitis was active in 11 of the 17 eyes. The mean interval between CMV retinitis diagnosis and retinal detachment was 3.95 months. This included retinal detachments present in four eyes at the time of CMV retinitis diagnosis. The range for an eye to develop a retinal detachment was 0 to 12 months. In five eyes the CMV retinitis relapsed before the retinal detachment and in two eyes the CMV retinitis relapsed after the retinal detachment.

The CMV retinitis was treated from the time of diagnosis in all patients with a biphasic ganciclovir treatment regimen consisting of either a 14 or 21 day induction phase using a dose of 5 mg/kg twice daily, followed by indefinite maintenance therapy of 5 mg/kg daily 5 days per week. In seven eyes managed with this therapy the CMV retinitis relapsed. Relapse occurred 4.5 months after commencing therapy with a range of 2 to 7 months. Foscarnet was used when patients were unable to tolerate ganciclovir.

In seven eyes the retinal detachment involved one quadrant or less of the fundus. Two quadrants were involved in 10 eyes. Retinal breaks occurred in all quadrants and were seen most commonly in the temporal quadrants. Proliferative vitreoretinopathy was present in four eyes at the time of retinal detachment diagnosis. It was difficult to assess the relation between the vitreous and retina in this group of patients and it was not assessed in

Laboratory of Ocular Immunology, School of Pathology, University of New South Wales and Ophthalmology Department, Royal Prince Alfred Hospital, Sydney, New South Wales, Australia  
P McCluskey

Ophthalmology Department, St Vincent's Hospital, Sydney, New South Wales, Australia  
J Grigg  
T J Playfair

Correspondence to: Dr P J McCluskey, Laboratory of Ocular Immunology, School of Pathology, University of NSW, PO Box 1, Kensington, NSW 2033, Australia.

Accepted for publication 5 September 1994

Table 1 Outcome for retinal detachment in AIDS patients with cytomegalovirus retinitis

Patient	Age at retinal detachment (years)	Eye	CMV to retinal detachment (days)	Visual acuity at retinal detachment diagnosis	Retinal detachment location by quadrant	Location retinal break relative to equator	CMV infection % of retina involved	Treatment modality	CMV active at retinal detachment	Patient survival (months)	Final visual acuity
1	38-46	Right	166	6/12	Superior temporal	posterior	20	Laser	No	6-80	6/12
2	32-55	Right	0	6/5	Superior temporal	anterior	10	Laser	Yes	5-90	6/5
3	29-48	Right	142	6/12	Superior nasal	posterior	75	Encirclement	Yes	3-5	Hand movements
3		Left	224	6/18	Superior temporal	anterior	50	None	No		
4	38-41	Left	7	Count fingers	Superior temporal	anterior	30	None	Yes	6-97	No perception light
5	39-12	Left	0	6/7-5	Superior temporal	anterior	10	Laser	Yes	4-93	6/9
6	48-60	Right	268	6/12	Superior temporal	anterior	75	Encirclement and silicone oil	Yes	7-30*	Count fingers
6		Left	352	6/18	Inferior temporal	anterior	70	Encirclement and silicone oil	Yes		6/9
7	36-59	Left	122	6/4	Inferior nasal	posterior	40	Laser	No	28-60*	6/5
8	46-05	Right	44	6/9	Superior temporal	posterior	30	Encirclement and silicone oil	Yes	5-73*	Count fingers
9	31-21	Right	0	6/36	Inferior temporal	posterior	45	Encirclement and silicone oil	Yes	8-03*	Count fingers
10	33-39	Left	168	6/36	Superior temporal	posterior	40	Encirclement	No	9-57	6/12
11	37-80	Right	19	6/6	Superior temporal	posterior	70	Encirclement and silicone oil	Yes	5-30*	Light perception
11		Left	89	6/24	Inferior temporal	posterior	60	Encirclement and silicone oil	Yes		6/24
12	44-42	Left	357	Light perception	Superior nasal	anterior	60	None	No	1-80	No perception light
13	34-43	Left	0	6/18	Inferior temporal	posterior	40	Laser	Yes	18-37	Light perception
14	39-27	Left	58	6/9	Inferior temporal	posterior	75	Encirclement and silicone oil	No	4-37*	6/18

\*Patients alive at study endpoint. Patient No 6 had undergone cataract extraction and intraocular lens implantation to his right eye by the study endpoint.

detail routinely in these patients. In no patient was there a definite posterior vitreous detachment as evidenced by the presence of a Vossius ring. At the time of diagnosis 12 eyes (70.6%) had a visual acuity of 6/18 or better, four eyes (23.5%) had a visual acuity between 6/18 and counting fingers, and one eye (5.9%) had a visual acuity of hand movements.

#### SURGICAL PROCEDURES

Although the macula was attached in all patients at the time of retinal detachment diagnosis, in two eyes the macula was involved by CMV retinitis and these detachments were not repaired. One further eye had CMV papillitis and this detachment was also not repaired. Thus 14 eyes of 11 patients underwent a surgical procedure for CMV related detachment. All treatment was carried out by the authors. The vitreoretinal surgery was performed by one of the authors (TJP).

The surgical technique used depended on the size and the location of the detachment. For small peripheral detachments involving less than one quadrant and no evidence of proliferative vitreoretinopathy, barrier argon laser retinal photocoagulation was used to surround the detachment. A total of five eyes were treated with laser therapy alone. One other eye was treated with laser therapy initially, but subsequently required further surgery. Laser was applied using either a slit-lamp or an indirect ophthalmoscope delivery system. Three rows of confluent burns were

placed in the retina around the detachment. The intensity of the laser burns was titrated carefully to the state of the retina which varied from thinned and diaphenous to thickened and oedematous; it was decided to treat cautiously and to retreat areas of retina rather than to risk overtreatment and the development of iatrogenic retinal breaks. Typical initial settings for the slit-lamp laser were 500  $\mu\text{m}$  spot size, 400 mW, and 0.1 seconds duration of argon green. With the indirect system similar initial variables were used except that the spot size was fixed at 200  $\mu\text{m}$ . Up to three treatment sessions were necessary to adequately treat individual patients.

Detachments involving more than one quadrant, detachments threatening the posterior pole, or detachments associated with proliferative vitreoretinopathy were managed by a vitrectomy, membranectomy, and retinotomy with internal drainage of subretinal fluid followed by fluid gas exchange and silicone oil injection. An encircling procedure was performed routinely. In seven eyes the detachment was treated by vitrectomy, silicone oil, and encirclement. In the two remaining eyes, an encirclement procedure alone was used.

#### Results

The majority of patients (90.9%) benefited from treatment in that vision was either stabilised or improved. Seven patients (50%) retained a visual acuity of 6/18 or better, while four patients (28.5%) had a visual acuity

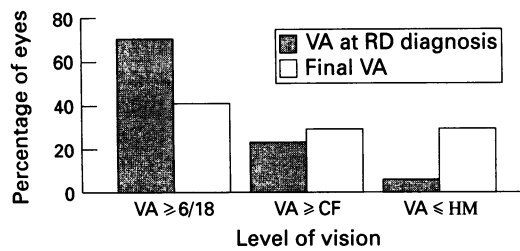


Figure 1 Visual acuity in cytomegalovirus retinal detachment before and after treatment.

between 6/18 and counting fingers. The remaining three patients (21.5%) had visual acuities of hand movements or worse. Four of the five eyes (80%) treated with laser achieved a final visual acuity of 6/18 or better, whereas only three of the nine eyes (33%) treated by surgery achieved 6/18 or better (Figs 1 and 2). All eyes treated with either laser or surgery were stabilised in that the retina was completely reattached or the detached area of retina was stabilised and did not increase in size over time. Redetachment occurred in one patient who had been treated by scleral buckling and cryotherapy. This detachment was not repaired as the macula had been destroyed by a relapse of CMV retinitis.

Complications related specifically to silicone oil occurred in two patients and consisted of one patient who developed bilateral cataracts approximately 3 months after surgery and subsequently underwent cataract surgery in one eye. A planned extracapsular lens extraction was performed without intraocular lens implantation. The other patient developed pupil block glaucoma as a result of intraoperative zonular dehiscence and resultant silicone oil migration into the anterior chamber. This patient required a surgical peripheral iridectomy and removal of silicone oil. In one other patient there was delayed progression of the detachment following initial laser therapy to an inferior temporal retinal detachment. This patient developed new superior temporal retinal breaks and detachment which required a vitrectomy, silicone oil tamponade, and scleral buckle to reattach the retina.

A modified Kaplan Meier survival analysis revealed a median survival time of 7.6 months after the initial treatment for retinal detachment. One patient remains alive 2½ years after treatment. At the study endpoint six of the 14 patients remain alive (Fig 3).

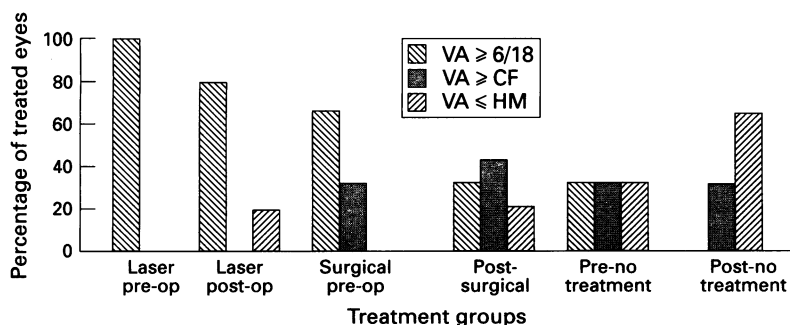


Figure 2 Visual outcome for each treatment modality.

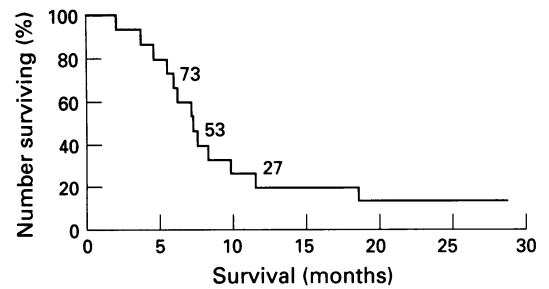


Figure 3 Survival after treatment. (Mean survival 7.6 months.)

### Discussion

Since 1985 the incidence of CMV retinitis has been increasing and this has been followed by an increase in CMV related retinal detachment. In this series the prevalence of CMV related retinal detachment was 10.6%, which is lower but comparable with other published series where rates from 11.7% to 29% have been observed.<sup>3-8</sup> There were two distinct ocular presentations in this study: four eyes which presented with a retinal detachment and active CMV retinitis at the time of initial CMV diagnosis and 13 eyes which developed a retinal detachment at some time following CMV retinitis diagnosis. In these eyes, the retinitis was active in seven eyes and regressed in six eyes. Jabs *et al*<sup>1</sup> have data which shows that retinal detachment is related to the extent of retinal involvement by CMV and that treatment delays the onset of retinal detachment. In the 13 eyes which developed detachments after CMV retinitis diagnosis, the mean time to the development of retinal detachment was 155 days. Other studies<sup>4,7</sup> have suggested that antiviral drugs hasten the development of the retinal detachment. This study suggests that retinal detachment occurs once the retinitis has been treated for a considerable period in the majority of patients and that treatment delays the onset of detachment.

Visual acuity remained relatively stable after surgical or laser intervention (Figs 1 and 2). Dramatic improvement in postoperative visual acuity rarely occurred. The best predictor of visual outcome in this series, as in other series, was the preoperative visual acuity.<sup>3,5</sup> Patients with CMV related retinal detachments survived for a mean of 7.6 months after treatment. The increasing survival time for patients with CMV related retinal detachments means that appropriate treatment can greatly improve their quality of life by reducing morbidity without affecting the long term visual outcome. Good vision can be maintained in 63.7% of the treated patients, and mobility vision achieved in 90.9% of the treated patients.

This study agrees with other series<sup>1,2,4,10</sup> in that the preferred treatment option for extensive retinal detachments, those involving or threatening the macula, or those with proliferative vitreoretinopathy, is a vitrectomy and silicone oil tamponade. With this technique, the retina remained attached in the seven eyes treated in this way. The visual results with silicone oil tamponade are poorer than with other forms of detachment surgery and there may be significant visual loss at the time of surgery or

postoperatively from compromise to the retinal and optic nerve circulation. There is also a large refractive shift following silicone oil surgery which impairs vision postoperatively. The visual results from the silicone oil treated group in this study show an obvious reduction in vision postoperatively, but five of the seven eyes retained mobility vision after surgery.

The results of this study are similar to those reported by Orellana *et al*<sup>3</sup> in that a large percentage (35.7%) of the retinal detachments were treated by laser photocoagulation alone, and the results of both studies differ from other recently reported series,<sup>5,9</sup> where only the results of operative surgical procedures have been reported. The eyes treated with laser photocoagulation in this study form a group of patients who had localised retinal detachments involving less than one quadrant and with less than 50% of the retina involved by CMV retinitis. Visual acuity was 6/18 or better in all eyes. The results show that these patients had an excellent visual prognosis when compared with those treated by other modalities. In four patients in this study, retinal detachment was diagnosed at the time of CMV retinitis diagnosis and in three eyes the detachment was suitable for laser photocoagulation. Thus, there may be at least two subsets of patients who develop CMV related retinal detachment. One group, who present with peripheral CMV retinitis associated with retinal breaks and localised retinal detachment with no past history of CMV retinitis or treatment, who are suitable for laser treatment, and have a good visual prognosis. The second group are known to have extensive CMV retinitis and present a considerable time after retinitis diagnosis with more extensive retinal breaks and detachments.

These patients have a poorer visual prognosis and usually require a vitrectomy and silicone oil tamponade to reattach the retina.

It is therefore important to identify peripheral, localised detachments which may be effectively managed with laser photocoagulation. Good vision is a major concern in patients with advanced HIV infection and laser photocoagulation is a useful treatment modality in selected patients which prevents progression of retinal detachment and maintains vision without the need for operative surgery.

- 1 Jabs DA, Enger C, Haller J, DeBustros S. Retinal detachment in patients with cytomegalovirus retinitis. *Arch Ophthalmol* 1991; **109**: 794-9.
- 2 Regillo CD, Vander JF, Duker JS, Fischer DH, Belmont JB, Kleiner R. Repair of retinitis related retinal detachments with silicone oil in patients with acquired immunodeficiency syndrome. *Am J Ophthalmol* 1992; **113**: 21-7.
- 3 Orellana J, Teich SA, Lieberman RM, Restrepo S, Peaire R. Treatment of retinal detachments in patients with the acquired immune deficiency syndrome. *Ophthalmology* 1991; **98**: 939-43.
- 4 Freeman WR, Henderly DE, Wan WL, Causey D, Trousdale M, Green RL, *et al*. Prevalence, pathophysiology, and treatment of rhegmatogenous retinal detachment in treated cytomegalovirus retinitis. *Am J Ophthalmol* 1987; **103**: 527-36.
- 5 Sidikaro Y, Silver L, Holland GN, Kreiger AE. Rhegmatogenous retinal detachments in patients with AIDS and necrotizing retinal infections. *Ophthalmology* 1991; **98**: 129-35.
- 6 Orellana J, Teich SA, Friedman AH, Lerebours F, Winterkorn J, Mildvan D. Combined short- and long-term therapy for the treatment of cytomegalovirus retinitis using ganciclovir (BW B759U). *Ophthalmology* 1987; **94**: 831-8.
- 7 Holland GN, Sidikaro Y, Krieger AE, Hardy D, Sakamoto MJ, Frenkel LM, *et al*. Treatment of cytomegalovirus retinopathy with ganciclovir. *Ophthalmology* 1987; **94**: 815-23.
- 8 Jabs DA, Newman C, DeBustros S, Polk BF. Treatment of cytomegalovirus retinopathy with ganciclovir. *Ophthalmology* 1987; **94**: 824-30.
- 9 Chuang EL, Davis JL. Management of retinal detachment associated with CMV retinitis in AIDS patients. *Eye* 1992; **6**: 28-34.
- 10 Holland GN. The management of retinal detachments in patients with the acquired immune deficiency syndrome. *Arch Ophthalmol* 1991; **109**: 791-3.