Rhegmatogenous Retinal Detachment in Patients With Cytomegalovirus Retinitis: The Foscarnet-Ganciclovir Cytomegalovirus Retinitis Trial

THE STUDIES OF OCULAR COMPLICATIONS OF AIDS (SOCA) RESEARCH GROUP IN COLLABORATION WITH THE AIDS CLINICAL TRIALS GROUP (ACTG)*

- PURPOSE: To determine the incidence and risk factors for rhegmatogenous retinal detachment in a population of patients with newly diagnosed cytomegalovirus retinitis.
- METHODS: Analysis of selected baseline and time-dependent data on patients enrolled in a multicenter, prospective, randomized, controlled clinical trial of therapy with foscarnet vs ganciclovir.
- RESULTS: In 316 eyes with cytomegalovirus retinitis at baseline, the risk of rhegmatogenous retinal detachment in an eye involved by cytomegalovirus retinitis was 18.9% at 6 months (95% confidence interval [CI], 14.0% to 23.8%) and 37.9% at 1 year (95% CI, 30.5% to 45.3%). Retinal detachment was not associated with the type of anticytomegalovirus therapy (intravenous foscarnet or ganciclovir) to which the patient was assigned. Extent of retinal involvement by cytomegalovirus retinitis, higher patient age, and lower CD4+ T-cell counts were associated with an increased risk of retinal detachment; myopia was not.
- CONCLUSIONS: Retinal detachment in patients with cytomegalovirus retinitis is unrelated to the type of intravenous therapy used or to refractive error. The median time to retinal detachment in an involved eye with cytomegalovirus retinitis and free of retinal detachment at baseline was 18.2 months. Strategies to reduce the extent of retinitis and possibly the number of reactivations may reduce the incidence of retinal detachment.

RHEGMATOGENOUS RETINAL DETACHMENT IS A common complication of cytomegalovirus infection of the retina, the most frequently encountered intraocular infection in patients with the acquired immunodeficiency syndrome (AIDS).12
Serous macular retinal detachment caused by retinitis in the proximity of the optic nerve or fovea may also cause visual impairment; however, serous retinal detachments are uncommon, and they resolve with treatment of the retinitis. Published reports of large numbers of prospectively analyzed patients suggest that the frequency of retinal detachment in either eye among patients receiving anticytomegalovirus treatment for retinitis may range from 15% to 26% (references 4 through 6 and Heinemann MH, Williams RG, Wise-Campbell S, unpublished data, “CMV-associated retinal detachment in patients with AIDS,” presented at the IX International Conference on AIDS, Berlin, June 6–11, 1993). The cumulative probability of retinal detachment occurring in either eye 1 year after the diagnosis of cytomegalovirus retinitis has been reported to exceed 50% (references 4 through 6 and Heinemann MH, Williams RG, Wise-Campbell S, unpublished data, “CMV-associated retinal detachment in patients with AIDS,” presented at the IX International Conference on AIDS, Berlin, June 6–11, 1993).

Treatment of eyes with cytomegalovirus-related retinal detachment is difficult. Cytomegalovirus-associated rhegmatogenous retinal detachments are characterized by widespread areas of necrotic retina, multiple retinal breaks, vitreous traction, and, uncommonly, proliferative vitreoretinopathy. Most such retinal detachments can be treated surgically with vitrectomy and silicone oil tamponade, and recent studies have suggested a high initial success rate. Long-term visual outcomes have been disappointing in some studies for a variety of reasons, which include the formation of cataract, difficulties with postoperative refraction through silicone oil, variability of refraction and hyperopic shift, progression of retinitis, and the possibility of late postoperative optic atrophy in these eyes; however, more recent studies have suggested that good visual results can be obtained in a substantial proportion of patients. Because of the morbidity involved and the need for surgery, it is important to understand the risk factors for retinal detachment. Better understanding of the epidemiology of retinal detachment in cytomegalovirus retinitis should allow for a more informed patient counseling as well as aid in planning clinical trials designed to reduce the incidence of this important vision-threatening complication of cytomegalovirus retinitis.

Two groups have suggested that the extent of retinitis either at baseline (references 4 through 6 and Heinemann MH, Williams RG, Wise-Campbell S, unpublished data, “CMV-associated retinal detachment in patients with AIDS,” presented at the IX International Conference on AIDS, Berlin, June 6–11, 1993) or at a given examination is a strong predictor of retinal detachment, particularly when the extent of retinitis is large in the retinal periphery outside the major vascular arcades. The presence of retinitis activity has also been suggested to be a risk factor for cytomegalovirus retinitis–related retinal detachment, as has the presence of myopia.

The Foscarnet-Ganciclovir Cytomegalovirus Retinitis Trial was designed to compare foscarnet with ganciclovir as initial treatment for previously untreated cytomegalovirus retinitis in patients with AIDS. The primary outcomes of the trial were death, time to retinitis progression, and change in visual function. A total of 234 patients were randomly assigned to treatment with either foscarnet or ganciclovir, whereas six patients elected or were assigned to deferral of treatment. The trial was conducted from March 1990 through October 1991, when the treatment protocol was suspended after a significant survival difference favoring foscarnet was observed. In this report, we present the results of analyses of rhegmatogenous retinal detachment that occurred in 81 of 316 eyes with cytomegalovirus retinitis (and free of retinal detachment at baseline).

METHODS

ELIGIBLE PATIENTS HAD AIDS AND PREVIOUSLY UNTREATED CYTOMEGALOVIRUS RETINITIS, were aged at least 13 years, and had an absolute neutrophil count of greater than 1,000 cells per μl and a serum creatinine concentration below 2.0 mg/dl. The diagnosis of AIDS was based upon the Centers for Disease Control 1987 Revised Surveillance Case Definition. Cytomegalovirus retinitis was diagnosed when the characteristic necrotizing retinitis was present on examination by an ophthalmologist. The treatment protocol and consent procedures were reviewed and approved by the institutional review boards of the individual participating institutions, and all patients gave signed consent before randomization.
Patients were classified into one of two strata based on the location and the size of the retinal lesions. Lesions were classified according to their location in one of three zones of the retina. Zone 1 consisted of the area within 1,500 μm of the edge of the optic nerve or within 3,000 μm of the center of the fovea. Zone 2 extended from the limits of zone 1 to a circle defined by the ampullae of the vortex veins. Zone 3 extended from the limits of zone 2 to the ora serrata. The size of the lesion was estimated as a percentage of the total retinal area. When both eyes were involved, stratification was based on the extent of disease in the eye with more extensive disease.

Stratum 1 included subjects with lesions in zone 1 or lesions involving more than 25% of the retina. These patients were considered to be at imminent risk of visual loss and were started on the assigned treatment as soon as possible. Stratum 2 included subjects with lesions in either zone 2 or 3, or both, that involved less than 25% of the retina. Patients in stratum 2 were offered three options: immediate treatment (with ganciclovir or foscarnet, according to random assignment), deferral of treatment (until the retinitis progressed into zone 1 or involved more than 25% of the retina, and then initiation of randomly assigned treatment at the time of progression), or random assignment to either immediate or deferred treatment. Randomization schedules were designed to provide balance in treatment assignments within clinics and within strata.

The induction dose of foscarnet was 60 mg/kg of body weight given every 8 hours (that is, 180 mg/kg per day) for 14 days. The maintenance dose was 90 mg/kg per day, administered with 1 liter of normal saline solution. In December 1990, the maintenance dose of foscarnet was increased to 120 mg/kg of body weight per day after a repeat induction course for retinitis that had relapsed. The initial maintenance dose remained at 90 mg/kg per day. The induction dose of ganciclovir was 5 mg/kg given every 12 hours (that is, 10 mg/kg per day) for 14 days. The maintenance dose was 5 mg/kg per day.

Patients were seen for data collection at baseline, every 2 weeks for 2 months after randomization, every 4 weeks from 2 months to 6 months after randomization, and every 2 months thereafter. At each visit, patients gave a medical history and had a physical examination, an estimate of Karnofsky performance score, best-corrected visual acuity measurement, and ophthalmologic examination, and underwent fundus photography. At baseline, 1, 3, and 6 months after randomization and every 6 months thereafter, patients underwent visual field testing.

Standardized visual acuity measurements, visual field measurements, wide-angle fundus photography, and a photography reading were performed as previously described. Progression was defined as the movement of the border of the cytomegalovirus lesion 750 μm along a front more than 750 μm in length or the occurrence of a new lesion in either eye over 25% of the disk area in size and separated from previous lesions by more than 750 μm. The primary evaluation of retinitis progression was performed by the Fundus Photograph Reading Center personnel, who were masked to treatment assignment. At each visit, the ophthalmologist was asked to evaluate whether or not progression had occurred and to estimate the amount of progression. Decisions about reinduction were based on the clinician's estimate of progression.

At baseline only, the areas of zones 1 and 2 involved by retinitis were measured at the reading center using planimetry on a mosaic of the photographs created by computerized image processing. At baseline and at each follow-up visit, lesion size was also graded by the clinician as within one of four categories: less than 10% of the retinal area, 10% to 24% of the retinal area, 25% to 49% of the retinal area, or 50% or more of the retinal area involved by cytomegalovirus retinitis. At each visit, the ophthalmologist also recorded for each eye whether the retina was detached and, if so, the type of detachment, and whether surgery was planned and, if so, the date of surgery for repair of the retinal detachment.

For comparisons between the two treatment groups, this report uses data on the 234 patients randomly assigned to treatment on or before October 7, 1991, the date of the suspension of the treatment protocol. It does not include data from the six patients who either chose or were assigned to deferred treatment and whose retinitis had not progressed enough by October 7, 1991, to warrant randomization to treatment. Also for these analyses, data are included from all follow-up visits completed as of October 7, 1991, and from all data entered at the coordinating center by June 17, 1992. Comparisons between
treatment groups were performed according to each patient's original treatment assignment.

For evaluation of risk factors for retinal detachment, this report uses data on the 240 patients who were randomly assigned to treatment or who chose or were assigned to deferred treatment. For these analyses, data are included from all follow-up visits completed and data entered at the coordinating center as of June 17, 1992.

Data were analyzed with respect to eyes rather than patients. All eyes involved with cytomegalovirus retinitis at baseline and without a retinal detachment at baseline were included in the analyses. With respect to a question on follow-up forms, retinal detachments were counted as events. Cox proportional hazards models were used to estimate both crude and adjusted relative risks obtained by means of the sandwich variance estimator, which corrects for the correlation between two involved eyes in the same patient.21,22

Risk factors were defined as either time-independent, when the value of the risk factor did not change during follow-up, or as time-dependent, when the value of the risk factor did change during follow-up. Time-independent risk factors were the following: treatment group to which the patient was randomly assigned; Karnofsky score at baseline (at or above vs below the median of 90), age at baseline (at or above vs below the median of 37 years), race, sex, myopia at baseline (mild myopia defined as refractive error between −0.25 and −6.0 diopters, and severe myopia defined as 6.0 diopters or more), platelet count at baseline (at or above vs under the median of 200 × 10^9/μl), hemoglobin at baseline (at or above vs below the median of 11 g/dl), predicted creatinine clearance at baseline (at or above vs below the median of 1.2 ml/minute per kg), and CD4+ T-cell count at baseline (at or above vs below the median of 14 cells per μl).

Time-dependent risk factors had values defined in one of two ways relative to the visit at which retinal detachment was recorded: factors were updated with values from the previous visit, or factors were updated with values from the present visit. For example, when a patient had a retinal detachment recorded at the fifth follow-up visit, he or she by the first method would have values for time-dependent risk factors that were updated at the fourth follow-up visit, or, alternatively, he or she by the second method would have values that were updated at the fifth follow-up visit.

Some time-dependent risk factors used information from baseline as well as from follow-up visits. These were zone 1 involvement, zone 2 involvement, zone 3 involvement, area of retinitis (assessed clinically and photographically in four categories: less than 10%, 10% to 24%, 25% to 49%, and 50% or more), activity of retinitis borders (graded centrally as active, intermediate, or atrophic), lesion hemorrhage (clinically estimated as marked, moderate, minimal, or none), cumulative number of retinitis progressions (assessed clinically or photographically as advancement of the border by more than 750 μm or as development of a new lesion), and retinal detachment in the fellow eye (13 such retinal detachments).

Time-to-event plots were derived using the Kaplan-Meier method.21 All data analyses were performed using the Statistical Analysis System.24

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RESULTS

RHEUMATOGENOUS RETINAL DETACHMENT OCCURRED IN 81 (25.6%) OF THE 316 EYES INVOLVED WITH CYTOMEGALOVIRUS RETINITIS AT BASELINE DURING THE STUDY PERIOD. Kaplan-Meier analysis of probability of retinal detachment over time with the eye as unit of analysis showed an 18.9% risk of retinal detachment at 6 months (95% CI, 14.0% to 23.8%) and a 37.9% risk of retinal detachment at 1 year (95% CI, 30.5% to 45.3%).

There were no substantial differences in the risk of retinal detachments in involved eyes of patients assigned to ganciclovir vs foscarnet. At the suspension of the treatment protocol, there were 31 retinal detachments (18.7%) in 166 involved eyes in patients assigned to ganciclovir and 33 retinal detachments (23.2%) in 142 involved eyes in patients assigned to foscarnet. The crude and adjusted relative risks of retinal detachment comparing ganciclovir vs foscarnet were 0.85 (P = .540) and 0.65 (P = .184), respectively. Note the comparison between ganciclovir vs foscarnet shown in the Table uses all patients, including those randomized to observation, and thus reports slightly different results.

Clinical estimates of the area of retina involved at
Table. Risk Factors for Rhegmatogenous Retinal Detachment in Involved Eyes

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Baseline Visit</th>
<th>Visit Before RD</th>
<th>Visit With RD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RR1</td>
<td>p1</td>
<td>RR2</td>
</tr>
<tr>
<td>Time-dependent covariates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zone 1: yes vs no</td>
<td>1.34</td>
<td>.334</td>
<td>1.00</td>
</tr>
<tr>
<td>Zone 2: yes vs no</td>
<td>1.35</td>
<td>.419</td>
<td>1.20</td>
</tr>
<tr>
<td>Zone 3: yes vs no</td>
<td>1.73</td>
<td>.233</td>
<td>1.49</td>
</tr>
<tr>
<td>Area: 10%-24% vs &lt;10%</td>
<td>0.95</td>
<td>.893</td>
<td>1.40</td>
</tr>
<tr>
<td>Area: ≥25% vs &lt;10%</td>
<td>1.40</td>
<td>.445</td>
<td>2.50</td>
</tr>
<tr>
<td>Area: ≥50% vs &lt;10%</td>
<td>NA</td>
<td>NA</td>
<td>6.58</td>
</tr>
<tr>
<td>Retinal detachment in fellow eye: yes vs no</td>
<td>1.12</td>
<td>.809</td>
<td>1.93</td>
</tr>
<tr>
<td>Hemorrhage: marked, moderate vs minimal, none</td>
<td>0.99</td>
<td>.958</td>
<td>1.16</td>
</tr>
<tr>
<td>Activity: active vs atrophic</td>
<td>NA</td>
<td>NA</td>
<td>1.43</td>
</tr>
<tr>
<td>Activity: intermediate vs atrophic</td>
<td>NA</td>
<td>NA</td>
<td>1.31</td>
</tr>
<tr>
<td>Number of progressions</td>
<td>NA</td>
<td>NA</td>
<td>1.01</td>
</tr>
<tr>
<td>Time-independent covariates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myopia: mild vs none</td>
<td>0.98</td>
<td>.933</td>
<td>0.88</td>
</tr>
<tr>
<td>Treatment assignment: ganciclovir vs foscarnet</td>
<td>0.73</td>
<td>.240</td>
<td>0.84</td>
</tr>
<tr>
<td>Platelets: ≥200 × 10^3 vs &lt;200 × 10^3 cells/μl</td>
<td>1.34</td>
<td>.319</td>
<td>1.36</td>
</tr>
<tr>
<td>Hemoglobin: ≥11 g/dl vs ≤11 g/dl**</td>
<td>2.15</td>
<td>.007</td>
<td>2.22</td>
</tr>
<tr>
<td>Predicted creatinine clearance: ≥1.2 vs &lt;1.2 ml/min/kg</td>
<td>0.94</td>
<td>.900</td>
<td>0.96</td>
</tr>
<tr>
<td>CD4+ T cells: ≥14 vs &lt;14 cells/μl</td>
<td>0.35</td>
<td>.001</td>
<td>0.47</td>
</tr>
<tr>
<td>Karnofsky score: ≥90 vs &lt;90</td>
<td>0.56</td>
<td>.079</td>
<td>0.64</td>
</tr>
<tr>
<td>Age: ≥37 vs &lt;37 yrs</td>
<td>1.65</td>
<td>.067</td>
<td>1.45</td>
</tr>
<tr>
<td>Race: nonwhite vs white</td>
<td>0.90</td>
<td>.763</td>
<td>0.94</td>
</tr>
<tr>
<td>Sex: female vs male</td>
<td>2.03</td>
<td>.154</td>
<td>1.36</td>
</tr>
<tr>
<td>Antiretroviral therapy: yes vs no</td>
<td>1.19</td>
<td>.610</td>
<td>1.12</td>
</tr>
</tbody>
</table>

NA = not applicable; RD = retinal detachment; RR = relative risk.

*Time-dependent covariates defined at the baseline visit are actually time independent because they contain the value of the covariate at baseline and do not vary over time.

†Relative risks and P values were estimated by means of Cox regression models with robust variance estimation that included all risk factors as covariates and clinic as a stratification variable.

*Area was categorized as <10%, 10%-24%, ≥25% at baseline and <10%, 10%-24%, 25%-49%, ≥50% during follow-up.

†Activity was always recorded as high at the baseline visit.

‡A model substituting number of resections for number of progressions had an RR = 0.96, P = .743 for the model with time-dependent covariates defined at the visit before the RD, and an RR = 1.15, P = .343 for the model with time-dependent covariates defined at the visit with the RD. An additional model substituting number of major (movement of the border ≥1.500 μm or a new lesion) progressions for number of progressions had an RR = 1.28, P = .186 for the model with time-dependent covariates defined at the visit before the RD, and an RR = 1.40, P = .083 for the model with time-dependent covariates defined at the visit with the RD.

**An analysis with hemoglobin trichotomized produced similar results.

Baseline showed little or no relation to the development of retinal detachment, but larger areas of involvement at the visit when retinal detachment was noted or at the preceding visit were associated with increased risk (Table). Eyes with 50% or more of the retina involved by retinitis at the visit preceding that when retinal detachment was noted had about six times the risk of detachment compared to eyes with less than 10% of the retina involved. At the visit when retinal detachment was noted, the comparable risk was about 14-fold. When the photographic assessment (using planimetry on a mosaic of photographs) of the percent of zones 1 and 2 involved with retinitis at baseline was modeled in place of the
clinical assessment, the adjusted relative risk of detachment for the area between 10% to 24% vs the area less than 10% was 0.84 (P = .695) and, for the area greater than or equal to 25% vs the area less than 10%, was 2.28 (P = .050). The cumulative 6-month risk (unadjusted for covariates) of retinal detachment was 12% for eyes with less than 10% of zones 1 and 2 involved at baseline, 22% for those with 10% to 24% involved, and 37% for those with 25% or more involved (Figure).

Patient-specific baseline covariates associated with an approximately 1.5-fold to 2-fold increase in the risk of retinal detachment were the following: older age, higher hemoglobin value, lower CD4+ T-cell count, and lower Karnofsky score (Table). The relative risk of retinal detachment in eyes with more than 6 diopters of myopia was 1.2 to 1.4, but this was not statistically significant. Given the observed number of retinal detachments in the no myopia and mild myopia groups, and with a two-sided type I error level of 5% and 80% power, the minimum detectable relative risk of retinal detachment between the severe myopia and the combined no myopia and mild myopia groups was 2.1.

Forty-one eyes had surgery for retinal detachment during follow-up. The outcome of retinal detachment surgery was not analyzed because data were not collected in a way that allowed methodical evaluation of vision at all visits before and after surgery. The median visual acuity in the 30 eyes with data 2 months after surgery was 20/160 +1. The median change in visual acuity (ETDRS letters) from before surgery to 2 months after surgery was a loss of 10 letters (two lines).

DISCUSSION

THE AIM OF THIS REPORT WAS TO EXAMINE RISK FACTORS for retinal detachment in patients with AIDS and newly diagnosed cytomegalovirus retinitis. The study database contains information from 240 patients and 316 eyes with cytomegalovirus retinitis studied in 11 centers across the United States. It is important to note that there was no association between treatment assignment to foscarnet vs ganciclovir and retinal detachment. The median time to retinal detachment (by eye involved with cytomegalovirus) in our study was 18.2 months. The cumulative probability of development of a retinal detachment in involved eyes was 19% at 6 months and 38% at 1 year. This result agrees with the results of other studies, suggesting that rhegmatogenous retinal detachment is a major problem in eyes with cytomegalovirus retinitis. Although our study on visual outcomes reported a 27% to 28% cumulative probability of retinal detachment at 6 months and a 57% to 66% probability at 1 year after randomization, that report used patients as the unit of analysis, and the reported figure is the probability of a detachment in either eye. In contrast, in this report, we document the probability of a detachment in an eye affected by cytomegalovirus retinitis, a figure expected to be lower.

The strongest risk factor for development of retinal detachment was an increased area of retinal involve-
ment by cytomegalovirus retinitis. Other studies also have found that the size of the cytomegalovirus lesion, both at diagnosis and at the visit before detachment, is a risk factor for retinal detachment. Our study used semiquantitative estimates of retinal area, whereas other studies quantitated area and zone involvement at each visit. Freeman and associates reported that zone 2 plus zone 3 involvement was a risk factor when assessed at the visit before detachment. The presence of active borders of the cytomegalovirus lesion was not associated with retinal detachment. The results of the analyses of the number of progressions are difficult to interpret in the present study: at the visit before the detachment, there was no association, whereas at the time of retinal detachment, there was an association with the number of progressions (relative risk = 1.31, \( P = .023 \)).

The anecdotal experience of many is that bilateral retinal detachments in patients with AIDS and cytomegalovirus retinitis are common. In this study, 13 (19.1%) of 68 patients had bilateral retinal detachments. Although the crude (unadjusted) relative risk of retinal detachment when a fellow eye had a detachment was 4.37 (\( P < .001 \)), this association was weakened when a multivariate analysis was used, which suggests that retinal detachment in the fellow eye is a surrogate marker for other risk factors, such as zone and area of involvement. One previous study suggested that myopia may be a risk factor in cytomegalovirus-related retinal detachments. In our study, the relative risks, analyzing either mild or severe myopia, did not demonstrate a statistically significant increase in the relative risk for eyes with myopia. Older age at baseline did have a statistically borderline association with an increased risk of retinal detachment; changes in vitreous that occur with age may allow the passage of liquid vitreous through the necrotic area in cytomegalovirus retinitis cases.

Systemic factors associated with increased risk of retinal detachment included a low baseline CD4+ T-cell count and Karnofsky score below 90%. The reason for this result is uncertain. Such patients may have a more rapid retinitis progression, but this was adjusted for. The association of a greater blood hemoglobin at baseline with an increased risk of retinal detachment is unexplained.

Although this trial was not designed to evaluate the outcomes of surgery for retinal detachment, most studies have suggested that there is a variable loss of vision after the repair of the detachments by vitrectomy with silicone oil injection (references 4, 7 through 14, and 25, and Heinemann MH, Williams RG, Wise-Campbell S, unpublished data, “CMV-associated retinal detachment in patients with AIDS,” presented at the IX International Conference on AIDS, Berlin, June 6–11, 1993). Loss of vision associated with retinal detachment repair may be caused by advancement of the retinitis, delay in repair, surgery technique, difficulty obtaining a stable refraction through silicone oil, or cataract.

Strengths of this study include the multicentered prospective nature of the study and the high quality of the data collection. However, it must be remembered that patients in this study were selected to be good study candidates and so, for example, had higher Karnofsky scores than the cytomegalovirus retinitis population in general has. The requirements for this study probably resulted in the exclusion of patients who were likely to be noncompliant or poorly compliant with drug treatment regimens and study procedures. Extremely ill patients also were excluded. This study used only systemically administered anticytomegalovirus drugs, given intravenously. It did not include patients treated with local intravitreal therapy or with oral anticytomegalovirus agents. Despite these limitations, this study helps to determine the risk factors for the development of rheumatogenous retinal detachment in eyes with cytomegalovirus retinitis. These results should assist patient counseling, possibly help in designing risk-reduction strategies, and help to define the nationwide scope of the problem in the United States. Measures that slow the progressive increase in the area of retina involved by retinitis or that improve immune status, or that do both, may reduce the risk of retinal detachment.

THE FOSCARNET-GANCICLOVIR CYTOMEGALOVIRUS RETINITIS TRIAL PARTICIPATING CLINICAL CENTERS
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