Comparison of the Prevalence of Posterior Vitreous Detachment in Whites and Japanese

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ABSTRACT
The vitreous condition of healthy white (n = 551) and Japanese (n = 528) eyes were reviewed and compared with respect to the prevalence of posterior vitreous detachment (PVD) in the two groups. No white or Japanese patient 39 years of age or younger had PVD; the prevalence among those older than 39 increased with age in the fifth through the ninth decades, i.e., respectively, to 4%, 24%, 37%, 59%, and 87% in the whites, and to 5%, 21%, 43%, 72%, and 82% in the Japanese. In none of these decades was there any significant difference between the prevalence of complete or partial PVD in the whites and the Japanese. This finding is significant because the vitreoretinal relationship influences the development and prognoses of the various vitreoretinal disorders.

Posterior vitreous detachment (PVD) plays an important role in the development and prognosis of various vitreoretinal disorders. It is the most important event predisposing to the development of rhegmatogenous retinal detachment, because the separation of the posterior vitreous from the retina often causes retinal tears and subsequent retinal detachment. The main cause of idiopathic macular holes is tangential vitreous traction on the fovea; idiopathic macular hole formation is much less common in eyes with PVD. Among eyes with nonproliferative diabetic retinopathy or retinal vein occlusion, retinal or optic disc neovascularization occurs much less frequently in eyes with PVD. Thus, even if diabetic retinopathy or retinal vein occlusion occurs in eyes with complete PVD, the risk of fibrovascular proliferation progressing to vitreous hemorrhage or tractional retinal detachment is much lower.

Researchers have found that certain races or ethnic groups have a relatively high or low incidence of vitreoretinal disorders, without any obvious hereditary component other than the factor of race or ethnicity itself. For example, the incidence of rhegmatogenous retinal detachment ranges from 8.1 to 10.8 eyes per 100 000 population annually in patients of Jewish extraction; in Swiss patients, it is 10.0 eyes per 100 000. However, in black Africans, the prevalence ranges from 0.2 to 1.0 eyes per 100 000; the rarity of the disorder among these individuals has been attributed to a lower prevalence of vitreous changes, such as liquefaction and PVD, as compared with whites. In Japanese
patients, the incidence of rhegmatogenous retinal detachment is approximately 5 eyes per 100 000.32

Because the vitreoretinal relationship influences the development and prognosis of vitreoretinal disorders, knowledge of this relationship, particularly PVD, in each race or ethnic group is essential for comparing the incidences, prognosis, or treatment effects in these disorders in these different groups. To the best of our knowledge, the vitreoretinal relationship between the Japanese and other races or ethnic groups has not previously been compared.

In the present study, we reviewed the vitreous conditions of healthy white (n = 551) and Japanese (n = 528) eyes and compared the prevalence of PVD in the two groups.

SUBJECTS AND METHODS

Five hundred fifty-one healthy eyes of 551 white patients (254 men, 46%; 297 women, 54%; median age, 61 years; range, 8 to 89 years) (Fig 1) seen at the Retina Associates in Boston from 1984 to 1992 were retrospectively studied. Two hundred eighty-three were right eyes; 268, left. Five hundred twenty-eight healthy eyes of 528 Japanese patients (245 men, 46%; 283 women, 54%; median age, 59 years; range, 5 to 88 years) (Fig 2) seen at the Department of Ophthalmology, Asahikawa Medical College, from 1986 through 1992 also were retrospectively studied. Two hundred seventy-one were right eyes; 257, left. Only one eye per patient was randomly chosen and studied. Eyes with a history of ocular surgery, blunt trauma, myopia greater than 3.00 diopters, ocular inflammation, retinal disease, or systemic disease of a type predisposing to PVD, such as diabetes, were excluded from both groups. Furthermore, to avoid overestimating the prevalence of PVD, eyes with a history of floaters and/or flashes were excluded.

All of the patients underwent comprehensive ocular examinations, including measurement of best-corrected visual acuity, slit-lamp microscopy, and indirect ophthalmoscopy. The vitreous condition was studied biomicroscopically with the use of preset lenses (a +58.6-dioptr El Bayadi-Kajiura lens and/or a +90-dioptr lens).33-36 The entire vitreous cavity was observed before and after swift vertical and horizontal ocular movements. When a PVD was present, ocular movements momentarily displaced the detached vitreous cortex from the retinal surface. As a result, the posterior limits of the detached vitreous gel, delineated by the detached posterior hyaloid membrane, were briefly visible. This method allowed observation of the dynamics of the vitreoretinal relationship.33-36 The same Japanese clinicians (T.H., H.H., M.K., J.A., A.K., and A.Y.), all of whom had resided in the United States at one time or another, examined the vitreous conditions in the two groups.

The study eyes were classified into one of three groups based on the position of the posterior vitreous cortex relative to the retina: complete, partial, or no PVD. Complete PVD was defined as the total detachment of the posterior vitreous cortex from the retina; partial PVD, as the detachment of only a portion of the posterior vitreous cortex from the retina.

The chi-squared test with Yates' correction or Fisher's exact test was used for statistical analysis. A finding was considered statistically significant when the probability that it could have occurred by chance was less than 5% (P < .05).
RESULTS

PVD was present in 198 (36%) of the 551 white eyes: 183 eyes and 15 eyes had complete and partial PVD, respectively. No patients 39 years of age or younger had PVD. Among those older than 39, the prevalence of complete PVD increased with age. Specifically, it was 4%, 24%, 37%, 59%, and 87% in the fifth through ninth decades, respectively. The prevalence of partial PVD ranged from 3% to 4% in the sixth through the ninth decades (Fig 3).

Of the 528 Japanese eyes, 165 (31%) had PVD: 155 and 10 eyes had complete and partial PVD, respectively. No patients 39 years old or younger had PVD. Among those older than 39, the prevalence of complete PVD increased with age. Specifically, it was 5%, 21%, 43%, 72%, and 82% in the fifth through the ninth decades, respectively. The prevalence of partial PVD ranged from 3% to 4% in the sixth through the ninth decades (Fig 3).

In none of these decades was there any significant difference between the prevalence of complete or partial PVD in the whites and the Japanese.

Similarly, in none of these decades was there any significant difference between the prevalence of PVD in the males and females, or in the right and left eyes. However, the prevalence of PVD was slightly higher in the females than in the males in all of the age groups (Fig 4). In none of the decades was there any significant difference between the prevalence of PVD in the males and females, or in the right and left eyes, in the whites and Japanese (Fig 5).

DISCUSSION

To the best of our knowledge, this is the first study to compare the prevalence of PVD in whites and Japanese. The study patients might not have had perfectly normal eyes, because they were patients visiting the hospital. However, in reviewing the vitreoretinal relationship in the eyes of each group, we used a uniform definition and criteria for patient selection. Thus, there was no apparent difference between the groups in terms of the characteristics influencing the development of PVD in these patients, who were nearly equal to normal subjects in this respect. Furthermore, because the same physicians examined the vitreous conditions in the two groups, we could eliminate any potential variability of diagnosing PVD attributable to a difference in examiners. Although there is some risk that a biomicroscopic vitreous examination could have yielded a misdiagnosis of vitreous delamination as complete PVD, the dynamic vitreous examination decreased that risk. In short, the degree of risk of misdiagnosis was the same in both groups, because all of the eyes had similar characteristics, and because both underwent the same examination, by the same examiners.

We found no significant difference between the whites and Japanese in terms of the development of PVD as a normal vitreous aging process. Because PVD is preceded by vitreous liquefaction, the results also suggest that there was no significant difference between the two groups in terms of the development of normal age-related vitreous liquefaction. In addition, it seems reasonable to assume that the strength of the
vitreoretinal adhesion in the normal eye did not differ significantly in the two groups. Because the vitreoretinal relationship influences the development and prognosis of vitreoretinal disorders, comparing the incidence or evaluating the natural course or the treatment effect of the vitreoretinal disorders in whites and Japanese, our findings are important. For instance, we can conclude from it, that, even if the incidence of rheumatogenous retinal detachment is different in whites and Japanese, that difference does not result from any difference in the incidence of PVD. Rather, the incidence of other conditions predisposing to retinal detachment, such as lattice degeneration or vitreous traction on the anterior vitreous base should be considered.

REFERENCES

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