

Symptoms and Findings Predictive for the Development of New Retinal Breaks

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Objective: To validate the conclusion of our previous prospective study of 250 patients with isolated posterior vitreous detachment: follow-up visits are only necessary if patients mention symptoms of flashes in combination with multiple floaters or a curtain or cloud at the initial examination, or an increase in number of floaters after the initial examination.

Methods: Prospective study of 270 consecutive patients with symptomatic isolated posterior vitreous detachment. All patients completed a questionnaire detailing their symptoms and had a full eye examination at the initial examination and at follow-up visits. Logistic regression with backward elimination was used for statistical analysis. We also performed pooled analysis of our previous and present study data.

Results: New retinal breaks developed in 10 patients (3.7%). Multiple floaters, a curtain or cloud, hemorrhages (retinal or vitreous) at the initial examination, and an increase in the number of floaters after the initial examination were found to be predictive factors for the development of new retinal breaks. These factors were also the only significant predictors after pooled analysis of both studies (520 patients, 23 breaks).

Conclusions: We assume we can formulate a safe policy for scheduling patients with isolated posterior vitreous detachment: only patients with multiple floaters, a curtain or cloud, or hemorrhages (retinal or vitreous) at the initial examination should be scheduled for reexamination. All other patients should return only if the number of floaters increases.

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MANY PATIENTS VISIT THE ophthalmic emergency department because of acute symptomatic posterior vitreous detachment (PVD). About one sixth of these patients may have a retinal break at the initial examination.¹⁻¹⁰ The remainder will be reexamined usually 6 to 8 weeks after the onset of symptoms, but a new retinal break will develop in only a few patients in this time frame.¹⁻⁵ These reexaminations claim considerable time and manpower of the ophthalmic casualty department, as each visit requires a detailed dilated fundus examination.

In a previous prospective study,¹ we used a standardized and detailed history-taking form to isolate specific symptoms at the initial examination that may predict the later development of retinal breaks to allow more efficient use of ophthalmic resources by safely discharging patients not at risk from further follow-up visits. In that study in which patients with retinal or vitreous hemorrhages were scheduled for a

reexamination after 2 weeks and patients without hemorrhages for a reexamination after 6 weeks, we concluded that only patients who mention symptoms of light flashes in combination with multiple floaters or a cloud or curtain at the initial examination should be reexamined within 6 weeks. A follow-up visit for all other patients with an isolated PVD should only be necessary if these specific symptoms were present or if symptoms of floaters worsen after the initial visit. The objective of this study was to validate the previously developed prediction rule on a new set of patients.

METHODS

We conducted a prospective study of consecutive patients seen in the casualty department of The Rotterdam Eye Hospital, Rotterdam, the Netherlands, with acute symptomatic PVD during a 9-month period. Patients who had symptoms for longer than 1 month, preexisting ocular diseases, or a history of blunt trauma or ocular surgery (except cataract surgery) were

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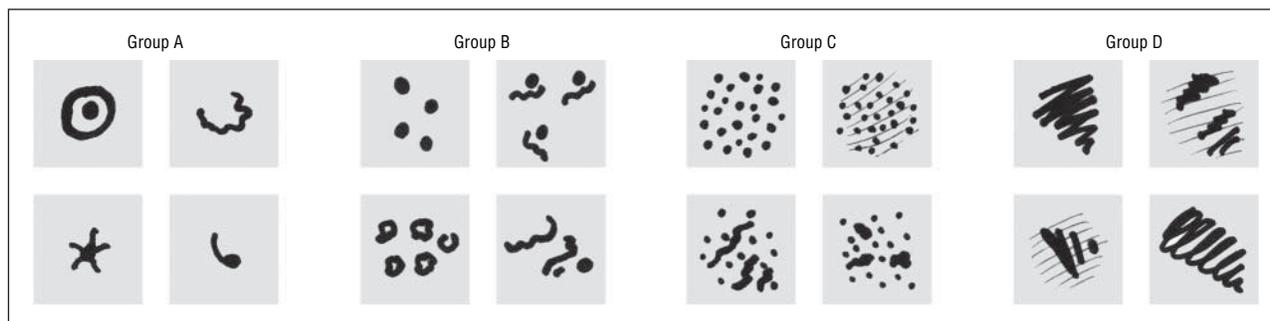


Figure 1. Four examples of each floater group (group A, 1-3 floaters; group B, 3-10 floaters; group C, >10 floaters; and group D, a curtain or cloud) drawn by patients with an isolated posterior vitreous detachment at their first visit during our previous study.¹

excluded from this study. Patients whose examination was inadequate at the initial examination because of vitreous hemorrhage were also excluded. Patients found to have retinal breaks or retinal detachments at the first examination were referred for treatment and were excluded from the study group. This study had been approved by the institutional review board and all patients gave informed consent.

At the initial examination and follow-up visits all patients completed a questionnaire detailing their symptoms (flashes and floaters). On this questionnaire the symptom of floaters was divided into the following 4 groups: group A, 1 to 3 floaters; group B, 3 to 10 floaters; group C, more than 10 floaters; and group D, a curtain or cloud. Each group was presented with a representative drawing. These drawings were drawn by patients with isolated PVD during our previous study (Figure 1).¹ Patients who mentioned floaters were asked which description and drawing corresponded most to their floaters. An increase of symptoms was defined as a report of an increase in the number of floaters after the initial examination. Subjective vision reduction (SVR) was defined as a report of decreased vision at or after the first visit, not corresponding to a decrease in Snellen visual acuity.

All patients had a full ophthalmologic examination at the initial visit and follow-up visits that included indirect ophthalmoscopy and slitlamp biomicroscopy with a Goldmann 3-mirror contact lens after maximal pupil dilation to detect retinal breaks. Scleral indentation or examination of the anterior vitreous for pigment granules was not performed. Posterior vitreous detachment was only diagnosed when the site of hyaloid detachment to the optic disc (Weiss ring) could be identified within the vitreous cavity. Findings from the examinations were registered on a standardized study form.

All patients were scheduled for a reexamination 6 weeks after the onset of symptoms, but if retinal or vitreous hemorrhages were found at the initial visit, patients were also reexamined within 2 weeks after the initial visit. All patients were instructed to return earlier if symptoms increased after the first visit. Patients were discharged from follow-up visits if no retinal breaks were detected at the 6-week examination.

All data were entered into a Microsoft Access (Microsoft, Seattle, Wash) database. To relate specific symptoms and findings at the initial examination and follow-up visits to the later development of retinal breaks, logistic regression analysis was performed with SPSS (SPSS Inc, Chicago, Ill), using a backward-elimination method based on the likelihood ratio. We regarded $P < .05$ as statistically significant. The results were compared with the results of our previous study¹ to test our hypothesis, that is, new retinal breaks can be predicted using the factors previously identified (symptoms of flashes, >10 floaters and/or a cloud or curtain at the initial examination or an increase in the number of floaters after the initial examination).

Because of the few new retinal breaks found in both studies, we also performed a pooled analysis by combining the data of both study groups. Significant factors found in the pooled analysis by logistic regression with backward elimination were used in a test for the prediction of new retinal breaks. In this analysis the weight by which each factor contributes to a linear predictor score was based on the log (odds ratio) estimated from the pooled analysis. The predictive power of this score was expressed as an area under the receiver operating characteristic (ROC) curve.¹¹ The ROC curve represents the combination of values of sensitivity and specificity corresponding to all possible cutoff points of the test score to predict new retinal breaks.

RESULTS

We prospectively studied 270 consecutive patients with an isolated PVD during our study period. New retinal breaks developed in 10 patients after the initial examination (ie, 5 horseshoe tears and 5 operculated breaks). Findings of the 10 patients who were found to have a new retinal break at the follow-up visit are summarized in Table 1.

The mean (\pm SD) age of our patient group was 66.1 (\pm 8.8) years. No significant differences in the number of new retinal breaks among groups by decade of age were found. A new retinal break was detected in 1 (16.7%) of the patients in the fourth, 3 (7.1%) in the fifth, 2 (1.6%) in the sixth, 3 (4.6%) in the seventh, and 1 (9.1%) in the eighth decade-of-age groups. There was also no significant difference between the number of new retinal breaks in patients older than 63 years and patients aged 63 years and younger. However, all 5 patients with a retinal break at the 2-week follow-up visit were 63 years or younger, whereas all 5 patients with a retinal break at the 6-week follow-up visit were 63 years or older. The difference in the number of retinal breaks in patients older than 63 years and patients 63 years and younger was significant at both the 2-week ($P = .006$) and 6-week follow-up visit ($P = .005$).

No retinal break was found in the 18 patients with a positive family history of retinal detachment (Table 2). One of the 42 patients having myopia of more than 2 diopters (patient 10, Table 1) and none of the 27 patients with pseudophakia developed a new retinal break after the initial examination. Two retinal breaks were detected in the 9 patients with lattice degeneration (patient 2 and 9, Table 1).

Table 1. Symptoms and Signs of the 10 Patients With Isolated Posterior Vitreous Detachment and a New Retinal Break at the Follow-up Visits

Symptom and Sign	Patients With Retinal Break at the 2- or 6-wk Follow-up Visit										Total No. of Patients	P Value*
	1	2	3	4	5	6	7	8	9	10		
At the initial examination												
Hemorrhage	+	+	-	+	+	+	-	+	+	+	43	<.001
SVR	+	+	+	+	+	-	-	+	-	-	85	.08
Flashes	-	+	+	+	+	+	+	+	+	-	222	.70
Group C or D floaters†	+	-	+	-	+	-	+	+	-	-	58	.04
At follow-up visit												
More floaters	+	+	-	+	-	-	+	-	+	-	21	<.001
SVR	+	+	-	+	+	-	-	-	-	-	10	<.001
New retinal break												
At 2 wk	+	+	-	+	-	-	-	-	+	+	5	NA
At 6 wk	-	-	+	-	+	+	+	+	-	-	5	NA

Abbreviations: NA, not applicable; SVR, subjective visual reduction; -, absent; +, present.

*Fisher exact test from cross-table analysis.

†Group C indicates more than 10 floaters; group D, a curtain or cloud.

Table 2. Relevant History and Clinical Findings at the Initial Examination and the Number of New Retinal Breaks at the Follow-up Visits

Variable	No. (%) of Patients (N = 270)	No. (%) of Incidences of Retinal Breaks	P Value*
Sex			
Male	79 (29.3)	4 (5.1)	NA
Female	182 (67.4)	6 (3.3)	NA
Missing data	9 (3.3)	0	NA
Family history of RD	18 (6.7)	0	.99
Myopia >2 D	42 (15.6)	1 (2.4)	.99
Pseudophakia	27 (10.0)	0	.60
Aphakia	0	0	NA
Lattice degeneration	9 (3.3)	2 (22.2)	.04
Hemorrhage			
Retinal	43 (15.9)†	8 (18.6)	<.001
Vitreous	38 (14.1)	6 (15.8)	.001
	9 (3.3)	3 (33.3)	.003

Abbreviations: D, diopters; NA, not applicable; RD, retinal detachment.

*Fisher exact test from cross-table analysis.

†Four patients had both retinal and vitreous hemorrhage.

Of the 43 patients who were found to have retinal or vitreous hemorrhages at the initial visit, new retinal breaks developed in 8 patients (Table 2). Five of these 8 retinal breaks were detected at the 2-week follow-up visit and 3 breaks were found at the 6-week follow-up visit. Of the 227 patients without hemorrhages at the initial examination, only 2 patients were found to have a retinal break after 6 weeks. No retinal breaks were found in the 7 patients who returned before their scheduled follow-up appointment because of increased symptoms. Erroneously, 6 patients with hemorrhages at the initial examination were not reexamined at the 2-week follow-up visit but only at the 6-week follow-up visit and 6 patients without a retinal break at the 2-week follow-up visit were not reexamined 6 weeks after the initial examination. None of these patients was treated in our hospital or elsewhere after the last follow-up visit because of a new retinal break or retinal detachment (telephone interview).

Table 3. Symptoms at the Initial Examination of 270 Patients With Isolated Posterior Vitreous Detachment and the Number of New Retinal Breaks at the Follow-up Visits

Symptoms	No. (%) of Patients	No. (%) of Incidences of Retinal Breaks	P Value*
Flashes only	13 (4.8)	0	.99
Floaters only	38 (14.1)	1 (2.6)	.99
SVR only	0	0	NA
Flashes and SVR	2 (0.7)	0	.99
Floaters and SVR	10 (3.7)	1 (10.0)	.32
Floaters and flashes	134 (49.6)	3 (2.2)	.34
Floaters, flashes, and SVR	73 (27.0)	5 (6.8)	.14
Total	270 (100.0)	10 (3.7)	NA

Abbreviations: NA, not applicable; SVR, subjective vision reduction.

*Fisher exact test from cross-table analysis.

Fifteen patients were initially seen with symptoms of flashes alone or flashes in combination with SVR (Table 3). None of them were found to have a new retinal break at follow-up. A new retinal break developed in 1 of the 38 patients who mentioned floaters only after the initial examination (patient 10, Table 1). This patient classified the floaters as being of group B. Ten patients described floaters in combination with SVR, a new retinal break developed in 1 patient (patient 1, Table 1). No patients mentioned SVR without flashes or floaters. A combination of flashes and floaters without SVR was mentioned by 134 patients. A new retinal break developed in 3 of these patients after the initial examination (patients 5, 7, and 9; Table 1). Seventy-three patients mentioned SVR in combination with floaters and flashes, a new retinal break developed in 5 of these patients (patients 2 through 5 and 8, Table 1).

At the initial examination 121 patients classified their floaters in group A (1-3 floaters), 77 patients mentioned group B floaters (3-10 floaters), 24 patients noticed more than 10 floaters (group C), and 33 patients mentioned a

Table 4. Floaters of 270 Patients With Isolated Posterior Vitreous Detachment and the Number of New Retinal Breaks Found at Follow-up Visits

Floaters Group*	No. (%) of Patients	No. (%) of Incidences of Retinal Breaks	P Value†
Floaters at the initial examination			
No floaters	14 (5.2)	0	.99
Group A	124 (45.9)	3 (2.4)	.35
Group B	74 (27.4)	2 (2.7)	.73
Group C	25 (9.3)	1 (4.0)	.99
Group D	33 (12.2)	4 (12.1)	.02
Total	270 (100.0)	10 (3.7)	NA
Floaters at the 2-wk follow-up visits			
Missing data	1 (2.3)	0	
No floaters	1 (2.3)	0	.99
Group A	17 (38.6)	0	.48
Group B	12 (27.3)	2 (16.7)	.07
Group C	9 (20.5)	2 (22.2)	.04
Group D	4 (9.0)	1 (25.0)	<.001
Total	44 (100.0)	5 (11.4)	NA
Floaters at the 6-wk follow-up visits			
No floaters	17 (6.6)	0 (4.8)	.99
Group A	160 (61.8)	2 (1.3)	.02
Group B	50 (19.3)	0	.22
Group C	19 (7.3)	1 (5.3)	.52
Group D	13 (5.0)	2 (15.4)	.08
Total	259 (100.0)	5 (1.9)	NA

Abbreviation: NA, not applicable.

*Group A indicates 1 to 3 floaters; group B, 3 to 10 floaters; group C, more than 10 floaters; and group D, a curtain or cloud.

†Fisher exact test from cross-table analysis.

Table 5. Change of Symptoms After the Initial Examination of 270 Patients With Isolated Posterior Vitreous Detachment and the Number of New Retinal Breaks at 2- and 6-Week Follow-up Visits

Change of Symptoms	No. (%) of Patients	No. (%) of Incidences of Retinal Breaks	P Value*
At the 2-wk follow-up visit			
More floaters	8 (18.2)	4 (50.0)	0.003
More flashes	1 (2.3)	0	.99
SVR	6 (13.6)	4 (66.7)	.02
Total	44 (100.0)	NA	NA
At the 6-wk follow-up visits			
More floaters	13 (5.0)	1 (7.7)	.23
More flashes	0	0	NA
SVR	4 (1.5)	0	.99
Total	259 (100.0)	NA	NA

Abbreviations: NA, not applicable; SVR, subjective vision reduction.

*Fisher exact test from cross-table analysis.

curtain or cloud (group D, **Table 4**). A retinal break was found in 3, 2, 1, and 4 patients, respectively. Two weeks after the initial visit a new retinal break was found in none of the 17 patients who mentioned group A floaters, 2 of the 12 patients who noticed group B floaters, 2 of the 9 patients with group C floaters, and 1 of the 4 patients

Table 6. Symptoms and Signs at the Initial and Follow-up Examinations of 270 Patients With Isolated Posterior Vitreous Detachment and the Number of New Retinal Breaks at Follow-up Visits

Findings	No. (%) of Patients	No. (%) of Incidences of Retinal Breaks	P Value*
CD only	41 (15.2)	1 (2.4)	.99
MF only	13 (4.8)	0	.99
HE only	25 (9.3)	2 (8.0)	.23
CD and MF	3 (1.1)	1 (33.3)	.11
CD and HE	13 (4.8)	2 (15.4)	.08
MF and HE	4 (1.5)	3 (75.0)	<.001
CD, MF, and HE	1 (0.4)	1 (100.0)	.04
No CD, MF, or HE	170 (63.0)	0	<.001
Total	270 (100.0)	10 (3.7)	NA

Abbreviations: CD, floaters from group C or D (group C, >10 floaters; and group D, a curtain or cloud); HE, retinal or vitreous hemorrhage; MF, more floaters; NA, not applicable.

*Fisher exact test from cross-table analysis.

with group D floaters. At the 6-week examination, a new retinal break developed in 2 of the 160 patients with group A floaters, 1 of the 19 patients with group C floaters, and 2 of the 13 patients with group D floaters. No retinal breaks were found in the 50 patients with group B floaters at the 6-week examination.

An increase in the number of floaters was mentioned by 8 patients at the 2-week and 13 patients at the 6-week follow-up appointment (**Table 5**). A retinal break was detected in 4 and 1 patients, respectively. Only 1 patient noticed more flashes after the initial examination. A new retinal break did not develop in this patient. Three of 6 patients, who mentioned SVR at the 2-week appointment, were found to have a new retinal break. No retinal breaks were detected in the 4 patients with SVR 6 weeks after the initial examination.

The following factors were statistically significantly related by cross-table analysis to the development of a new retinal break: floaters in group C or D ($P = .041$), hemorrhage (retinal or vitreous, $P < .001$) and lattice degeneration ($P = .035$) at the initial examination, and an increase in the number of floaters ($P < .001$) and SVR ($P < .001$) at follow-up visits (Tables 2-5). Logistic regression analysis with backward elimination of these factors revealed that only the following findings were significantly predictive for the development of a new retinal break after the initial visit: group C or D floaters at the initial examination, hemorrhages (retinal or vitreous) at the initial examination, and an increase in the number of floaters after the initial examination, with predictive weights based on the log (odds ratio) of 1.7, 3.6, and 3.6, respectively. A combination of these 3 findings was found in only 1 patient, in whom a new retinal break did develop after the initial examination (**Table 6**). No retinal breaks were found in the 170 patients who did not have any of these 3 findings.

A new retinal break developed in 1 of the 41 patients with only group C or D floaters (without an increase in the number of floaters or hemorrhage), 0 of the 13 pa-

tients with only an increase in the number of floaters, and 2 of 25 patients with only hemorrhage. A combination of group C or D floaters and an increase in the number of floaters were mentioned by 3 patients. A retinal break developed in 1 of them. Hemorrhage in combination with group C or D floaters was found in 13 patients of which 2 were found to have a retinal break at follow-up. A new retinal break developed in 3 of 4 patients who had an increase in the number of floaters and hemorrhage. Thus, all new retinal breaks were found in patients who had 1 or more of these 3 findings.

By combining the data of our previous study and the present one, a study group of 520 patients, of which 23 patients had a new retinal break, can be used for a pooled analysis. Applying logistic analysis with backward elimination on this study group, the same 3 factors as in the present study alone (group C or D floaters at the initial examination, hemorrhage [retinal or vitreous] at the initial examination, and an increase in the number of floaters after the initial examination) appeared to be significantly predictive for the development of a new retinal break. These 3 factors can be summarized in a weighted sum score as a test to predict a new retinal break after the initial examination, with respective weights of 2.6, 2.0, and 4.0 based on the log (odds ratio). **Figure 2** shows the ROC curve for this test model, with an area under the curve of 0.94 (SE=0.02; $P<.001$). This test model predicts a new retinal break with a sensitivity and specificity of 91.3 (95% confidence interval [CI], 72.0-98.9) and 83.1 (95% CI, 79.8-86.4), respectively. The predictive value of a negative test was 99.5% (95% CI, 98.9-100). The decision rule for a positive test is as follows: at least 2 of 3 factors present or only group C or D floaters at the initial examination or only an increase in the number of floaters after the initial examination.

COMMENT

In our previous study, 250 patients with isolated PVD were included during a 10-month period of which 13 patients (5.2%) were found to have a retinal break at follow-up.¹ In this study, statistical analysis revealed that symptoms of flashes in combination with floaters of group C or D and an increase in the number of floaters were significantly predictive for the development of a new retinal break. The current study was performed to validate these results. The study group of both studies appeared to be similar in size and nature and once again, floaters of group C or D (with or without flashes) and an increase in the number of floaters were found to be statistically significant predictive factors.

However, in contrast with our previous study, hemorrhages (retinal or vitreous) were found to be a third significant predictive factor. Therefore, the hypothesis we tested (new retinal breaks can be predicted using the factors previously identified: symptoms of flashes, >10 floaters, and/or a cloud or curtain at the initial examination or an increase of floaters after the initial examination) was not fully validated.

Why may the results of these similar studies not match? In our current study 8 of 10 patients with a retinal break

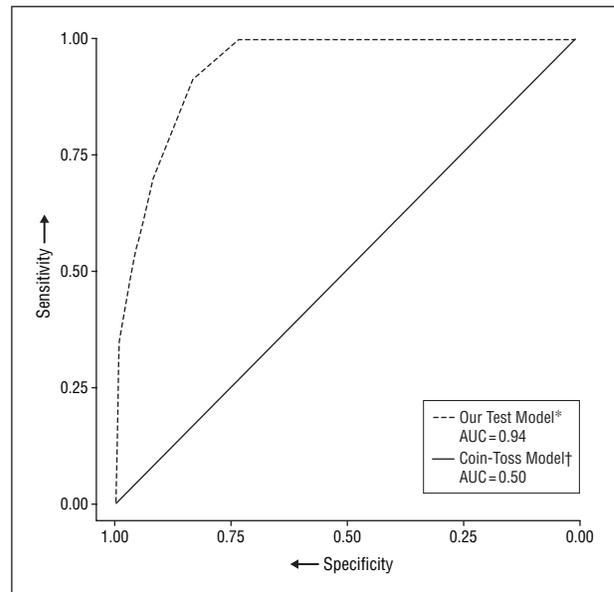


Figure 2. The receiver operating characteristic curve for prediction of the development of new retinal breaks in patients with an isolated posterior vitreous detachment after combining the results of the present study and our previous study.¹ An asterisk indicates our test model includes the following predictive factors: retinal or vitreous hemorrhages at the initial examination, group C or D floaters at the initial examination, and an increase in the number of floaters after the initial examination. AUC indicates the area under the curve. A predictor that performs with perfect accuracy has an AUC value of 1. The dagger indicates that the diagonal line indicates a receiver operating characteristic curve for a predictor no better than tossing a biased coin.

that developed later had hemorrhages at the initial visit, whereas in the previous study only 5 of 13 patients had hemorrhages at the initial visit, with a similar overall number of hemorrhages (40 and 43 patients) found in each study. We assume that the small sample sizes may explain this variation because in other studies, hemorrhages were also associated with retinal breaks.⁵⁻⁹ The small sample size may also explain why flashes are a significant factor in our previous study and not in the present study.

Another difference in findings between the 2 studies was the predictive weight of each significant factor, which was based on the log (odds ratio). In the previous study, all significant factors were found to have the same predictive weight, but in the present study the symptom of floaters of group C or D appeared to be half as predictive as hemorrhages or an increase in the number of floaters. This could be explained by the way we grouped the symptom of floaters in each study. In the previous study we asked the patients to draw their floaters, which were then divided in groups by a researcher masked to the later outcome. In the present study we sought to validate this finding in a more practicable and standardized manner, that is, by having the patients choose between stylized drawings derived from our first study (Figure 1). We assume that our instructions to the patients for choosing between the different drawings were not sufficiently clear, thereby allowing an erroneous choice, such as recognizing one of their few floaters in the drawing of group C or D and choosing this category rather than paying attention to the (more important) number of floaters,

thereby favoring the choice of group C or D over group A floaters. As van Heuven¹⁰ also reported on the number of floaters as an important predictor, we assume that by this flaw the present study may underrate the significance of multiple floaters as a predictor.

To overcome statistical shortcomings of the small sample sizes, we combined the results of our previous and present study for meta-analysis. The results of the meta-analysis were comparable with our present study: hemorrhages (retinal or vitreous) at the initial examination, group C or D floaters at the initial examination, and an increase in the number of floaters after the initial examination are significantly predictive for the development of a new retinal break. When we combine these 3 factors in a test model, the results of which were expressed in a ROC curve, and use the following decision rule for a positive test: (1) at least 2 of 3 factors present, or (2) only group C or D floaters at the initial examination, or (3) only an increase in the number of floaters after the initial examination, new retinal breaks can be predicted with a sensitivity and specificity of 91.3 (95% CI, 72.0-98.9) and 83.1 (95% CI, 79.8-86.4), respectively. But more important, the predictive value of a negative test would be 99.5% (95% CI, 98.9-100).

Patient age was not found to be a significant predictive factor for the development of new retinal breaks. However, we found that patients with new retinal breaks at the 2-week follow-up visit were significantly younger than patients with new retinal breaks at the 6-week follow-up visit. This finding suggests that new retinal breaks tend to develop sooner after the initial examination in younger patients, which could be attributed to the strength of the vitreoretinal interface, which appears to decrease with age.

Previous studies found vitreous pigment granules to be predictive for the presence of a retinal break in patients with an acute PVD.^{5,7} However, they did not examine the predictive value of vitreous pigment for the later development of retinal breaks. The strong positive correlation between vitreous pigment and a retinal tear may only apply to those patients with acute PVD of recent onset. Because pigment appears almost immediately after retinal break formation, we assume that vitreous pigment is only predictive for the presence and not for the later development of a retinal break. We do not believe that examination of the vitreous for pigment granules during our study would change our findings since all patients underwent a thorough retinal examination.

In the United Kingdom and United States the standard for the detection of retinal breaks may be indirect ophthalmoscopy with scleral indentation with the patient in a supine position (a method only reliable for skilled vitreoretinal surgeons), whereas we (and most other vitreoretinal surgeons in continental Europe) relied on indirect ophthalmoscopy without indentation, followed by contact lens biomicroscopy (a method that is likely to be more accurate for more ophthalmologists). If the former

method were superior to the latter, it could be argued that some of the retinal breaks that developed later might in reality be missed breaks at the initial examination and/or that some retinal breaks that developed later may have been missed. Therefore, our conclusions may only be valid when using our examination method. However, barring studies that show discordance between the examination methods, our findings might be of use in the United Kingdom and United States as well.

Taking these results and considerations into account, we assume we can formulate a safe policy for scheduling reexaminations: only patients who are found to have a retinal or vitreous hemorrhage at the initial examination, or patients who mention multiple floaters or describe a cloud or curtain at the initial visit should be considered for reexamination. All other patients should be well instructed to return for reexamination if symptoms increase after the initial visit. Using this protocol, it should be possible to reduce the number of follow-up visits by about 70%, whereas the probability to miss a patient who will develop a new retinal break or retinal detachment after the initial examination would be nil.

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REFERENCES

1. van Overdam KA, Bettink-Remeijer MW, Mulder PG, van Meurs JC. Symptoms predictive for the later development of retinal breaks. *Arch Ophthalmol.* 2001; 119:1483-1486.
2. Richardson PS, Benson MT, Kirby GR. The posterior vitreous detachment clinic: do new retinal breaks develop in the six weeks following an isolated symptomatic posterior vitreous detachment? *Eye.* 1999;13:237-240.
3. Dayan MR, Jayamanne DG, Andrews RM, et al. Flashes and floaters as predictors of vitreoretinal pathology: is follow-up necessary for posterior vitreous detachment? *Eye.* 1996;10:456-458.
4. Novak MA, Welch RB. Complications of acute symptomatic posterior vitreous detachment. *Am J Ophthalmol.* 1984;97:308-314.
5. Sharma S, Walker R, Brown GC, et al. The importance of qualitative vitreous examination in patients with acute posterior vitreous detachment. *Arch Ophthalmol.* 1999;117:343-346.
6. Byer NE. The natural history of asymptomatic retinal breaks. *Ophthalmology.* 1982; 89:1033-1039.
7. Brod RD, Lightman DA, Packer AJ, et al. Correlation between vitreous pigment granules and retinal breaks in eyes with acute posterior vitreous detachment. *Ophthalmology.* 1991;98:1366-1369.
8. Hikichi T, Trempe CL. Relationship between floaters, light flashes, or both, and complications of posterior vitreous detachment. *Am J Ophthalmol.* 1994;117: 593-598.
9. Murakami K, Jalkh AE, Avila MP, et al. Vitreous floaters. *Ophthalmology.* 1983; 90:1271-1276.
10. van Heuven WA. Retinal holes and tears. *Decision Making in Ophthalmology.* 2nd ed. St Louis, Mo: Mosby-Year Book Inc; 2000:336-337.
11. Hanley JA, McNeil BJ. The meaning and use of the area under a receiver operating characteristic (ROC) curve. *Radiology.* 1982;143:29-36.