

Patient ignorance is the main reason for treatment delay in primary rhegmatogenous retinal detachment in The Netherlands

F Goezinne¹, EC La Heij¹, TTJM Berendschot¹, NG Tahzib¹, LS Koetsier¹, JGMM Hovenaars¹, ATA Liem¹, A Kijlstra^{1,2}, CAB Webers¹ and F Hendrikse¹

Abstract

Aims Treatment delay of progressive vision-threatening conditions should be minimal. In this study, the treatment delay of patients with a rhegmatogenous retinal detachment (RRD) undergoing retinal detachment surgery was quantified, and causes for this delay were evaluated.

Materials and methods Consecutive patients ($n=205$) presenting with a primary RRD between June 2006 and June 2007 at the tertiary referral center (TRC) were interviewed. Five categories of delay were discerned in the following: 'patient delay,' 'general practitioner's delay,' 'referring ophthalmologist's delay,' 'delay at the TRC' and 'delay before surgery at the TRC'. In addition, overall delay was calculated.

Results In total, 186 eyes were included in the analysis. Median overall delay between the patients' first symptoms and RRD surgery was 10 days. Almost 60% of this overall delay time was due to patient delay and the delay of the general practitioner. More than 50% of patients had a delay owing to unawareness of the symptoms. The median patient delay was significantly lower in patients with a vitreous hemorrhage and in patients with a history of a RRD in the fellow eye.

Conclusions The major reason for patient delay with a RRD was the patients' unawareness and unfamiliarity with the symptoms of a retinal detachment.

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Introduction

A rhegmatogenous retinal detachment (RRD) is caused by a retinal break with subsequent shift of intraocular fluid and liquefied vitreous into the subretinal space. This causes a separation of the neuroretina from the retinal pigment epithelium.¹ If untreated, most RRD will progress to a complete detachment and subsequently result in vision loss of the affected eye.¹ The annual incidence of RRD is about 10 per 100 000 persons.^{2,3} The following predictors were found to be risk factors for functional and anatomic success after primary RRD repair: more than 6 days of visual loss,⁴ macular involvement and the size of detachment area.^{3–9} As all these factors are dependent on the time interval between the first symptoms noted by the patient and the timing of surgery, we decided to investigate the reasons for treatment delay.

Patients and methods

In this prospective study, we included all consecutive cases with a primary RRD who visited the Department of Ophthalmology of the Academic Hospital Maastricht between June 2006 and June 2007. This department functions as a tertiary referral center (TRC), especially for retinal detachment cases. Excluded were all patients with a secondary retinal detachment. The study was performed with the agreement of the institutional ethics committee. Patients were informed about the study procedure and provided informed consent.

The study was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki Principles.

¹The Department of Ophthalmology, University Hospital Maastricht, Maastricht, Limburg, The Netherlands

²The Animal Sciences Group, Wageningen University and Research Center, Lelystad, The Netherlands

Correspondence: F Goezinne, Department of Ophthalmology, University Hospital Maastricht, P.O. Box 5800, P. Debyelaan 25, 6202 AZ, Maastricht, The Netherlands
Tel: +31 43 3875346;
Fax: +31 43 3875343.
E-mail: fgo@soog.azm.nl

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The following preoperative clinical characteristics of the study patients were collected: age, sex, preoperative visual acuity, myopia (defined as spherical equivalent of -6 diopters or more), prior intraocular surgery (ie, cataract and retinal detachment of the fellow eye), the number of detached quadrants of the retina, whether or not the central area of the macula (foveal region) was involved in the detachment, which was measured by an optical computer tomography and the number of days this region was involved. We defined this as the subjective duration of the sudden drop in visual acuity and/or decreased visual field. We further noted the presence of proliferative vitreoretinopathy, graded according to the classification of RRD,¹⁰ the type and localization of the retinal tear, the number of breaks, the presence of a vitreous hemorrhage and the type of surgery (scleral buckling or vitrectomy).

Preoperatively, the patients were interviewed by one of the three co-authors (FG, JH and LSK) using a questionnaire (see Table 1), and when necessary, questions were clarified. Patients were requested to carefully estimate the time interval in days for the delay they had experienced. We helped the patient to relate this to a happening that they could refer to, such as a birthday. This method assisted in defining the delay time more precisely, at least up to a few days, even if the event occurred more than 2 months before. When the answers yielded no clear answers, or patients were uncertain, these cases were excluded. Five different categories of delay were discerned: 'patient delay,' 'general practitioner's (GP) delay,' 'referring ophthalmologist's (RO) delay,' 'delay at the TRC' and 'delay before surgery at the TRC'. In addition, the overall (meaning cumulative) delay was calculated per patient (see Table 2). Information on three of the five categories was obtained by questioning the patient (patient delay, GP delay and RO delay). 'The delay at the TRC' was determined using admission papers. The exact date of the surgery was noted from the surgery report. An example for one patient is shown in Figure 1. By interviewing the patients, we noted that they had no knowledge or experience with the symptoms of posterior vitreous detachment (PVD) and/or retinal detachment. For instance, they explained the interviewer that they did not think that the symptoms of flashes, floaters or visual field reduction were serious, so they did not haste to visit a physician.

Statistical analysis was performed after the consultation of a statistician, and using the SPSS software 13.0. The days of delay were converted to a logarithmic scale to create an equal distribution. After this conversion, statistical analysis was performed using an independent sample *t*-test (significance was defined as $P < 0.05$).

Results

A total of 206 eyes from 205 patients with an RRD (134 males and 71 females, respectively, 65.5 and 34.5%) were included in this study. No reliable answers were obtained in 7 out of 205 patients. In two out of these seven patients, the RRD was coincidentally found, and these patients were therefore not able to report on the start of their symptoms. In five other patients, the results of the interviews were unreliable owing to dementia or confusion. Another 12 patients were excluded who had a primary symptomatic PVD without retinal defects and/or patients with a retinal break who underwent photocoagulation, without an RRD at the initial visit and who later developed an RRD. These 19 patients were excluded, making a total of 186 eyes that were included in the analysis. The male *vs* female pseudophakic ratio was 51 : 18 (3 : 1). The mean patient age was 59 years (range: 18–87). Ninety-nine eyes were right eyes (53.2%) and 87 eyes were left eyes (46.8%). Clinical characteristics of all 186 patients are summarized in Table 3. Fifteen fellow eyes (8.1%) had a previous RRD, 33 eyes (17.9%) were myopic. Scleral buckling surgery was performed in 138 eyes (74.2%), whereas a primary pars plana vitrectomy was performed in 48 eyes (25.8%) (see Table 3).

The first symptoms experienced by the patients were flashes ($n = 70$; 37.6%), floaters ($n = 112$; 60.2%), visual field defects ($n = 145$; 78.8%) and visual loss ($n = 131$; 70.4%). The median patient delay of patients complaining of flashes, floaters, visual field defects and sudden visual loss was 6 (SD \pm 27), 15 (SD \pm 41), 5 (SD \pm 15) and 5 days (SD \pm 16), respectively.

The median overall delay for all 186 eyes was 10 days (SD \pm 35). The calculation of the mean overall delay time in percentages was 51% (SD \pm 32); it was 9% for GP delay (SD \pm 21) and 9% for the RO delay (SD \pm 20). The delay at the TRC was 5% (SD \pm 15) and before surgery it was 26% (SD \pm 25). Almost 60% of this overall delay time was due to patient delay and GP delay. The median patient delay was 4 days (SD \pm 24.5; $n = 186$) and the median GP delay was 0 days (SD \pm 20.0; $n = 119$). The median RO delay was 0 days (SD \pm 20.2; $n = 127$) and the median delay at the TRC was 0 days (SD \pm 4.2; $n = 186$). The median delay before surgery was 1 day (SD \pm 4.2; $n = 186$) (Table 4). In 104 patients (55.9%), we found that patient delay was due to unawareness and/or unfamiliarity with the RRD symptoms. In this subgroup of 104 patients, the median patient delay was 6 days (SD \pm 31). Other reasons for the delay involving the GP, RO and TRC are presented in Table 4.

The median patient delay was longer in patients with a detached macula than in patients without macular detachment; 4 days (SD \pm 30) *vs* 4 days (SD \pm 14),

Table 1 Questionnaire

Did you experience any flashes? Yes/No	For how long?.....days
Did you experience any floaters? Yes/No	For how long?.....days
Did you experience any visual field loss? Yes/No	For how long?.....days
Did you experience an acute visual loss? Yes/No	For how long?.....days
<hr/>	
When did you first contact the general practitioner/ophthalmologist? days ago Reason for delay:	Patient related delay.....days
<hr/>	
When did the general practitioner/ophthalmologist refer you (at what time did he or she contact the physician)? days ago Reason for delay:	General practitioners delay.....days
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When did the ophthalmologist refer you to our hospital (at what time did he or she contact the Academic Hospital Maastricht (AHM))? days ago Reason for delay:	Referring ophthalmologist delay.....days
<hr/>	
When did the retinal surgeon at the Academic Hospital Maastricht (AHM) decide to operate (ask retinal surgeon) ? days ago Reason for delay:	Our out patient clinic delay.....days
<hr/>	
At what date did the surgery take place? (this information was collected from the admission papers) days ago Reason for delay:	Delay before surgery.....days
<hr/>	
Total delay.....days	
<hr/>	
<i>To fill in after ophthalmologic examination by ophthalmologist or retinal surgeon</i>	
Visual acuity.....	
Funduscopy examination: PVR A/PVR B/PVR C	
Foveal involvement Yes/No? (how long).....days	
Amount of breaks...../horse shoe/hole/oral dialysis/giant retinal tear	
Ophthalmologic history:...	
Pseudophakia? Yes/No	
Fellow eye retinal detachment Yes/No	
Myopia? Yes/No dioptries: SE.....	
Note: all questions were asked by the same three residents (FG, JH, LK).	

although this finding was not statistically significant ($P=0.67$). Patients with a history of a retinal detachment in the fellow eye ($n=15$) presented significantly earlier. The median patient delay here was 1.0 days ($SD \pm 8.0$), whereas in patients without a history of retinal detachment ($n=171$) patient delay was 4 days ($SD \pm 25$), ($P=0.015$). Moreover, the median patient delay in patients with a vitreous hemorrhage ($n=7$) was significantly lower than in patients without a vitreous hemorrhage ($P=0.032$); 1 day ($SD \pm 1$) vs 4 days ($SD \pm 25$). This difference was only found for the category

patient delay, but not for the other four delay categories (see Table 5). For myopia, affected eye (right or left), age and symptoms, no statistically significant differences in delay were found.

Nine patients suffered a delay owing to an incorrect diagnosis at the RO, where the RRD had been overlooked. In one case, our center decided to initially undertake alternative interventions (see Table 4), which was defined as an ultrasonography. In one patient, delay was probably due to a misunderstanding between the patient and a desk employee.

Table 2 Definitions used in this study to specify the different categories of delay

Categories of delay	Defined as number of days...from...until...
Patient delay	From the first symptoms (flashes/floaters/visual acuity loss and/or visual field loss) noted by the patient until the moment the patient made his or her first appointment for this complaint with either the GP, the RO or the TRC
GP delay	From the first moment the patient contacted ^a the GP until the moment the GP contacted ^a either the RO or the TRC
RO delay	From the first moment the patient or the GP contacted ^a the RO until the moment the RO referred the patient
Delay at the TRC	From the first moment the patient, GP or RO contacted ^a the department until the patient was scheduled for surgery
Delay before surgery at TRC	From the patient was scheduled for surgery until the actual intervention
Overall delay	From the first symptoms noted by the patient until the actual intervention

GP = general practitioner; RO = referring ophthalmologist; TRC = tertiary referral center.
^aContacted indicates call or visit.

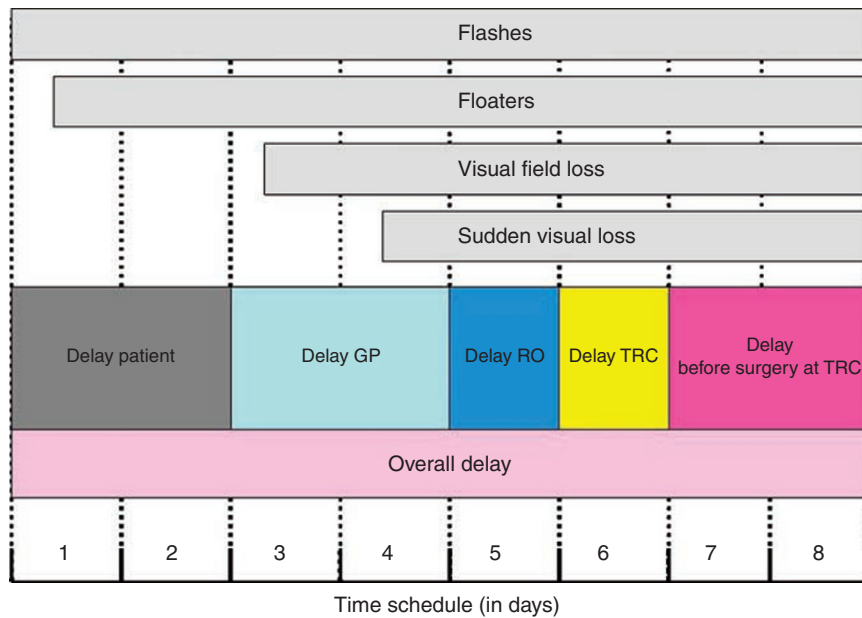


Figure 1 An example of how the different categories of delay for one patient were calculated. The first symptoms this patient had were flashes, followed a few days later by floaters, visual field loss and sudden visual loss. In this case, ‘patient’s delay’ was 2 days, the ‘general practitioner’s (GP)’ was also 2 days, the ‘referring ophthalmologist’s (RO)’ delay’ was 1 day and the ‘delay at the tertiary referral center’ (TRC) was also 1 day. The ‘delay before surgery at the TRC’ was 2 days. Thus, the cumulative or overall delay here was 8 days.

Discussion

The median overall delay between the first subjective symptoms and the time of surgery was 9 days. Almost 60% of this overall delay time was due to patient delay and GP delay. In addition, more than 50% of patients had a delay owing to the unawareness and/or unfamiliarity of the symptoms of PVD and/or RRD. For instance, patients explained that they did not consider the symptoms of flashes, floaters or visual field reduction as serious, so they did not haste to visit a physician. The

mean patient delay was significantly lower in patients with a vitreous hemorrhage and in patients with a history of an RRD in the fellow eye. The acute loss in visual function (acuity and field) in patients with a vitreous hemorrhage is probably the reason that these patients seek immediate help. Patients who have been treated for an RRD of the fellow eye more easily recognize symptoms of an impending retinal detachment and thus seek contact at an earlier time point.

Our data were collected by interviewing the patients and using a questionnaire. To our experience, this

Table 3 Patients (eye) characteristics

Clinical variable	Count (n = 186 eyes)	Percentage (%)
<i>Gender</i>		
Male	121	65.1
Female	65	34.9
<i>Eye</i>		
Right	99	53.2
Left	87	46.8
<i>Quadrants involved</i>		
1	57	30.5
2	93	50.0
3	22	11.8
4	14	7.5
<i>PVR</i>		
None	69	37.1
PVR A	45	22.6
PVR B	48	25.8
PVR C	24	12.9
<i>Macular involvement</i>		
Yes	103	44.1
No	82	55.4
Not known	1	0.5
<i>Retinal tear</i>		
Horse shoe	96	51.6
Hole	47	25.3
Ora dialysis	4	2.2
Tear	10	5.4
Missing	29	15.6
<i>Cumulative size of the retinal tear in disc diameters</i>		
1	106	57.0
2	33	17.7
3	10	5.4
<3	5	2.7
Missing	29	15.6
<i>Pseudophakic eye</i>		
Yes	69	37.1
No	117	62.9
<i>Fellow eye RD</i>		
Yes	15	8.1
No	171	91.9
<i>Myopia of >6 diopters</i>		
Yes	33	17.7
No	151	81.2
Unknown	2	1.1
<i>Type of surgery</i>		
Scleral buckle	138	74.2
Pars plana vitrectomy	48	25.8

PVR = proliferative vitreoretinopathy; RD = retinal detachment.

method results in more accurate information than when a questionnaire is used without interviewing the patient. In the study of Quinn *et al* (United Kingdom),¹¹ the referral route of patients with an RRD from primary-care providers to a tertiary care ophthalmic unit was also evaluated by means of interviews. They reported that more than 50% of patients had a significant delay owing to ignorance, a percentage that is comparable with our findings. They found that the majority of referred patients with RRD were from optometrists and GPs, accounting for nearly one-third of the referrals each.¹¹ In contrast, in The Netherlands, 86% of patients first visit a GP. In our study, in 10% of cases ($n = 20$), the GP's made an incorrect diagnosis (see Table 4), resulting in a median GP delay of 0 ± 20 days.

Although the median patient-related delay was 4 days, the median GP and RO delay was 0 days. We excluded patients without abnormalities at first presentation to the retinal surgeon in a patient presenting with only a symptomatic PVD. In this case, a routine re-examination was scheduled within 6 weeks. The reason for exclusion was that their symptoms should be classified as symptoms of PVD or retinal breaks, and not of RRD. The patient may have developed an RRD prior to this scheduled visit, and found no reasons to consult the RO earlier. van Overdam *et al*^{12,13} found that 5% of patients developed a new retinal tear after the initial examination. In this study, 3% ($n = 6$) of patients (two from the RO and four from our center) developed an RRD after the initial examination when only a PVD, without a retinal tear, was diagnosed. A total of six patients (four from the RO and two from our center) were also excluded who first received photocoagulation and later developed an RRD for the same reason.

Inclusion of these patients would have resulted in a relatively high RO delay time, a finding that would have biased the delay of the RO. Other forms of symptomatic PVDs that were also excluded are cases who present with a vitreous hemorrhage, in which successive ultrasonographies were performed by the RO or at the TRC, and who developed an RRD after a few days of follow-up.

PVD is a common age-related degeneration^{14,15} in which patients experience light flashes and/or floaters.¹⁶ These symptoms are specific for a PVD, although not all patients experience them. A study by Hikichi and Trempe¹⁶ showed a sensitivity of 89% and a specificity of 25% for floaters and flashes. This confirms the statement by Sebag¹⁷ that 'posterior vitreous detachment is perhaps the least accurate diagnosis entertained by ophthalmologists on a daily basis.' In addition, these findings confirm our results that there was no significant difference in delay between patients with or without flashes either in patients with or without floaters. Nevertheless, PVD is associated with an

Table 4 Reasons for delay

Categories of delay	Cause related to	Number n (%)	Median ± SD days	Mean delay	Minimum– maximum
Patient delay (n = 186)	No delay	24 (13)	0	0	0
	'Thought nothing serious'	104 (56)	6 ± 31	17	1–230
	Wait until next working day	34 (18)	1 ± 4	3	1–20
	Symptoms started on holidays	6 (3)	7 ± 1	6	5–8
	Wait for appointment	6 (3)	6 ± 4	6	1–11
	Other	11 (6)	7 ± 17	15	2–50
	Total	186 (100)	4 ± 25	12	0–230
GP delay (n = 119)	No delay	78 (66)	0	0	0
	Appointment first available place	18 (15)	1 ± 2	1	1–7
	Incorrect diagnosis	20 (17)	14 ± 42	30	1–173
	Other	3 (3)	1 ± 1	1	1–2
	Total	119 (100)	0 ± 20	5	0–173
RO delay (n = 127)	No delay	73 (57)	0	0	0
	Next day	16 (13)	1	1	1
	GP referred without urgency	17 (13)	4 ± 12	9	2–45
	First other treatment or additional diagnostic procedure ^a	9 (7)	21 ± 56	52	8–180
	History with ophthalmologist, makes own appointment	6 (5)	15 ± 12	18	7–35
	Patient was not able to come earlier	7 (6)	4 ± 11	9	1–30
	Total	127 (100)	0 ± 20	6	0–180
Delay at our TRC (n = 186)	No delay	145 (78)	0	0	0
	Appointment next day	18 (10)	1	1	1
	Not referred as urgent	12 (6)	1 ± 15	7	1–53
	First other treatment or additional diagnostic procedure ^a	1 (1)	2	2	2
	Other	10 (5)	3 ± 3	4	1–10
	Total	186 (100)	0 ± 4	1	0–53
Delay before surgery at TRC (n = 198)	No delay	5 (3)	0	0	0
	Next scheduled day	83 (45)	1 ± 0	1	1
	Over weekend	26 (14)	2 ± 1	2	1–4
	Scheduled within... ..days	36 (20)	7 ± 6	8	1–33
	Emergency surgery not possible at that day ^b	25 (13)	2 ± 1	2	1–3
	Other	11 (6)	2 ± 7	7	2–20
	Total	186 (101)	1 ± 4	3	0–33

GP = general practitioner; RO = referring ophthalmologist; TRC = tertiary referral center.

For explanation and definitions of categories of delay see Table 1.

^aEyes with a PVD only on the first visit, which developed an RRD before their follow-up examination, and eyes with retinal tears that were first photocoagulated, but later developed an RD.

^bOperation room was not available or patients were unsuitable for surgery under local and/or general anesthesia.

increased risk for the development of retinal tears.¹² Retinal tears have been reported in 7.3–14% of patients with a PVD.⁶ Although an RRD may be present or may develop after a PVD, subjective flashes and/or floaters can be absent. Considering that in The Netherlands, many RRD patients initially present at their GP's office, it is important that GP's are familiar with the complexity and variations of symptoms associated with an RRD and have adequate knowledge concerning the implications of these symptoms.

In this study, we found an extraordinary male-to-female ratio of 134 males to 71 females. The

pseudophakic male-to-female ratio was 51:18 (3:1), which was also shown in a study by Sheu *et al*¹⁸ who found a cumulative 6-year pseudophakic RRD rates of 1.90% in the male subgroup and 0.56% in the female subgroup at the end of the follow-up period.¹⁸

Conclusion

In summary, the median overall delay between the first subjective symptoms and the time of surgery was 10 days. Almost 60% of this overall delay time was due to patient delay and GP delay. More than 50% of patients

Table 5 Delay in days of RD patients with or without a concomitant vitreous hemorrhage

Categories of delay	With vitreous hemorrhage (n = 7) Median ± SD (range) days	Without vitreous hemorrhage (n = 179) Median ± SD (range) days
Patient delay ^a	1 ± 1.1 (0–3)	4.0 ± 24.9 (0–230)
GP delay	0.0 ± 0.4 (0–1)	0 ± 20.6 (0–173)
RO delay	0.5 ± 1.9 (0–4)	0.0 ± 20.5 (0–180)
Delay at TRC	0.0 ± 0.4 (0–1)	0.0 ± 4.3 (0–53)
Delay before surgery at TRC	2.0 ± 7.8 (1–20)	1.0 ± 4.0 (0–33)
Overall delay	3 ± 8.9 (3–22)	10 ± 34.9 (1–231)

GP = general practitioner; RO = referring ophthalmologist; TRC = tertiary referral center.

For explanation and definitions of categories of delay see Table 2.

^aP < 0.05 for patients' delay between RD patients with (n = 7) and without (n = 179) a concomitant vitreous hemorrhage.

had a delay owing to unawareness and/or unfamiliarity with the symptoms of an RRD. Patient and GP education may therefore be a primary goal to improve functional outcome after RRD surgery. A complete fundoscopic examination, including three-mirror contact lens examination, should be performed by the ophthalmologist in every symptomatic patient, and re-examinations within 6 weeks should be scheduled for these patients. Patients should also be well instructed to return earlier when symptoms worsen. Patients should be made more aware of the meaning of symptoms, such as flashes, floaters and visual field loss, and advised to contact an ophthalmologist more promptly. Education could be imparted to patients who are at risk for RRD (eg, in cases of myopia) when they visit the ophthalmologist for any other reason, and by using brochures. Also, the GP should be aware of the different symptoms that can cause a PVD and/or RRD. For instance, the GP could be educated by an article in a national or GP magazine.

Disclosure

The authors state no conflict of interest.

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