

Multicenter Retrospective Study of Retinal Detachment Associated with Atopic Dermatitis

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Purpose: Epidemiological and clinical study of retinal detachment associated with atopic dermatitis.

Methods: A multicenter retrospective study.

Results: We analyzed the records of 417 eyes of 348 patients operated on during 5 years from 1989 to 1993 and followed up for more than 6 months by vitreo-retinal specialists in 33 hospitals throughout Japan. The number of eyes operated on increased yearly from 42 in 1989 to 132 in 1993. These cases associated with atopic dermatitis were 2.3% of the average number of eyes operated on for rhegmatogenous retinal detachment during the same period, but when restricted to the Kanto area or further to Tokyo only, the percentage was as high as 3.8% and 4.7%, respectively.

Conclusion: Clinical characteristics of retinal detachment previously reported, such as traumatic slapping or rubbing of the lids by patients as the most likely pathogenetic factor, and high incidence of cataract and proliferative vitreoretinopathy, were confirmed. The primary surgical procedure was scleral buckling in 78% of the cases and vitreous surgery in 22%, and initial and final reattachment rates were 75.3% and 92.6%, respectively. **Jpn J Ophthalmol 2000;44:407-418.** © 2000 Japanese Ophthalmological Society

Key Words: Atopic dermatitis, multicenter study, retinal detachment.

Introduction

The prevalence of retinal detachment associated with atopic dermatitis is increasing in Japan and continues to be of great interest to vitreo-retinal surgeons. This specific type of rhegmatogenous retinal detachment affects the younger population and significantly influences their lifestyle. The phenomenon, however, appears to be unique to Japan, and vitreo-retinal specialists in the United States, Europe, Hong Kong, Korea, and Taiwan rarely encounter these cases. While there are numerous reports

discussing the clinical characteristics of retinal detachment associated with atopic dermatitis,¹ the number of eyes in each of these studies has been limited and may have included nonspecific cases, such as those with partial dermatitis or only a previous history of atopic dermatitis. In this study, having gathered a large number of affected patients, we conducted a retrospective multicenter study to evaluate the incidence and the annual rate of retinal detachment associated with atopic dermatitis and confirmed its clinical characteristics.

Materials and Methods

Vitreo-retinal specialists from 45 institutions in Japan were asked to participate in the study by an-

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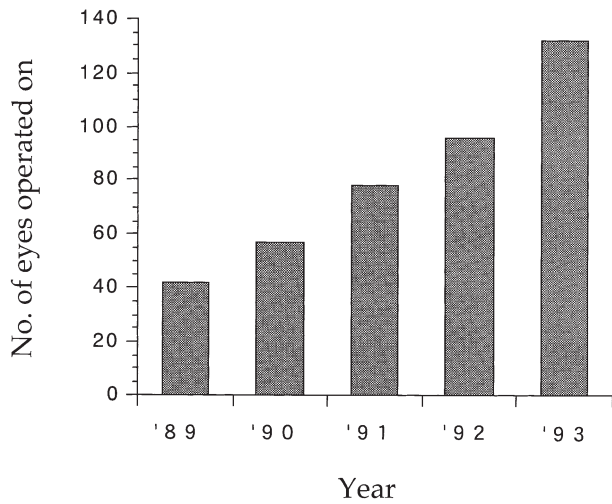


Figure 1. Number of eyes operated on for retinal detachment associated with atopic dermatitis in each year.

swering a questionnaire. Included in the study were eyes of patients with rhegmatogenous retinal detachment associated with atopic dermatitis that had undergone primary surgery and were followed up for more than 6 months after surgery at these institutions. All subjects had presented symptoms of atopic dermatitis on the face; those not demonstrating any facial symptoms or asymptomatic of atopic dermatitis at the time of onset of retinal detachment were excluded from the study. For those subjects affected bilaterally, each eye was recorded separately.

The following data were covered in the questionnaire: patient's age, sex, affected eye, age of onset of atopic dermatitis, severity of blepharitis, history of either habitual rubbing or slapping the eyelid, and presence or absence of the following in the affected eye: refractive error, cataract (aphakic or pseudophakic), conjunctivitis, keratitis, keratoconus, and cells in the anterior chamber. In eyes with a history of cataract

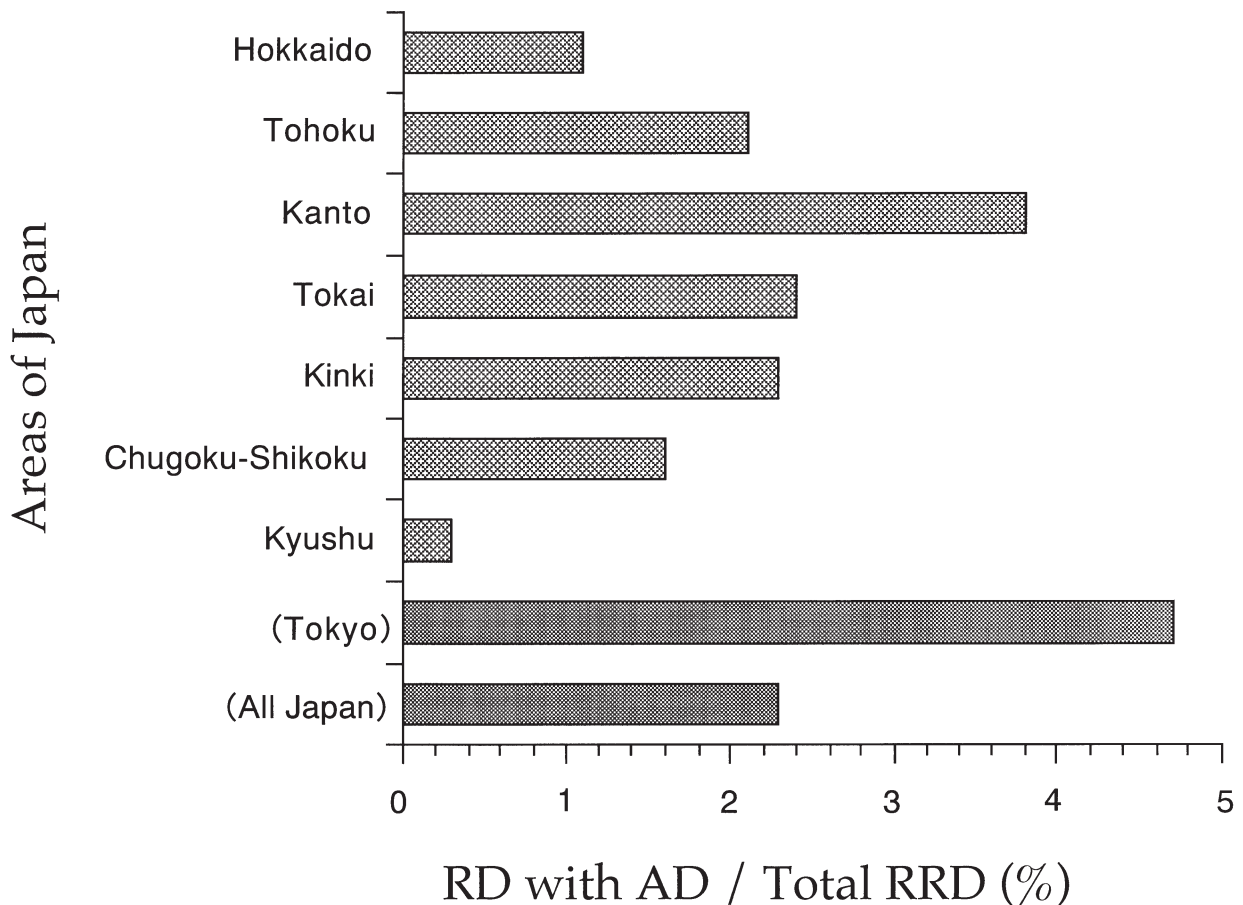


Figure 2. Rates of retinal detachment (RD) associated with atopic dermatitis (AD) in total rhegmatogenous retinal detachment (RRD) surgery in different areas of Japan.

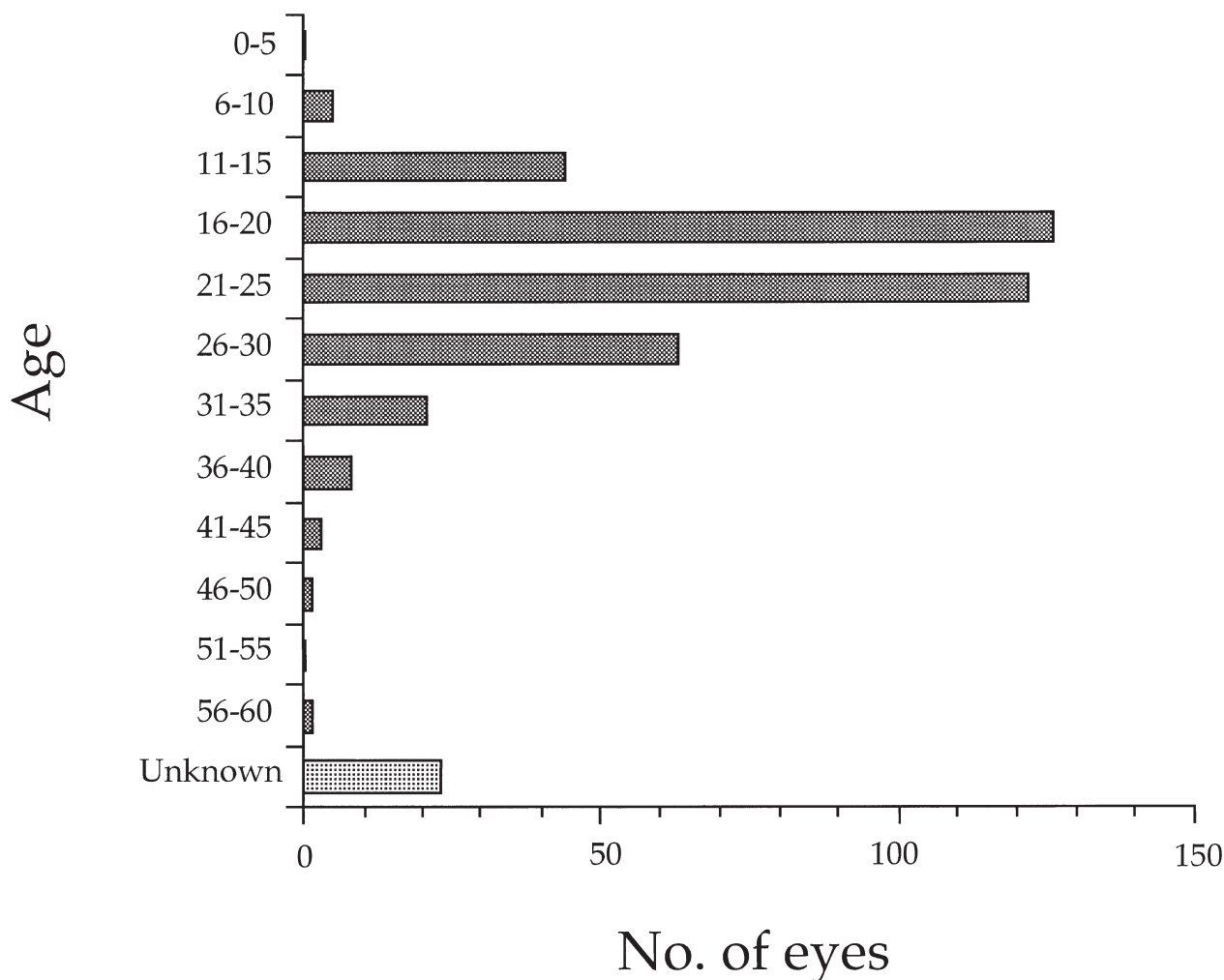


Figure 3. Age (years) of patients.

surgery, the surgical method and the time interval between cataract surgery and onset of retinal detachment had to be recorded. The retinal detachment in quadrants, location, and type of all retinal breaks detected, presence or absence of proliferative vitreoretinopathy (PVR) (those classified as Grade 3 or above according to the classic classification of the Retina Society²), method of retinal reattachment surgery (scleral buckling, with or without encircling or vitrectomy), method of cataract surgery if performed simultaneously, and if initially or finally reattached or not were also to be described. The questionnaire did not confirm the method in which fundus examination was performed. In order to determine the prevalence of rhegmatogenous retinal detachment associated with atopic dermatitis, the surgeons were also asked to report the total number

of eyes undergoing surgery for rhegmatogenous retinal detachment during the study period.

Results

Data from a total of 348 subjects (417 eyes) from 33 institutions (73.3% response rate) were obtained. Three of the institutions indicated that they did not have any retinal detachment cases associated with atopic dermatitis. Ninety-nine subjects (28.4%) were affected bilaterally and 249 subjects (71.6%) unilaterally. Those subjects with the fellow eye showing retinal breaks without detachment or retinal detachment already contraindicated for surgery were also considered as bilateral subjects, hence making the total number of eyes surveyed larger than the number of eyes actually having undergone surgery.

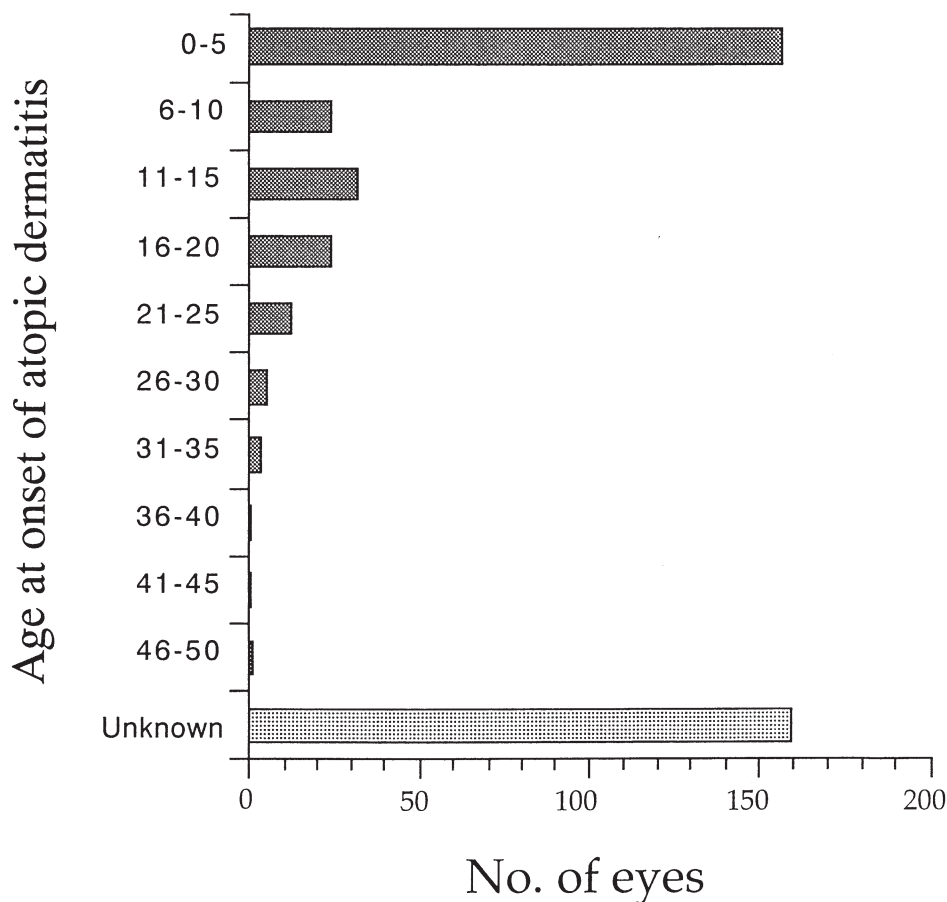


Figure 4. Age (years) at onset of atopic dermatitis.

The number of eyes operated on increased yearly from 42 eyes in 1989, to 57 in 1990, 78 in 1991, 96 in 1992, and finally 132 in 1993 (Figure 1).

Of the 33 institutions, 26 were able to provide the total number of retinal detachment cases during the study period, which amounted to 13,795 eyes all together; of these eyes, 316 (75.8% of the total of 417 eyes) were confirmed to be associated with atopic dermatitis. This indicates that 2.3% of the eyes with retinal detachment were associated with atopic dermatitis. When the findings were broken down into different areas (Figure 2), we found that the Hokkaido region had 1.1% (12/1,083 eyes with retinal detachment), Tohoku region 2.1% (11/527 eyes), Kanto region 3.8% (164/4,409 eyes), Tokai region 2.4% (64/2,657 eyes), Kinki region 2.3% (38/1,670 eyes), Chugoku-Shikoku region 1.6% (20/1,208 eyes) and Kyushu region 0.3% (7/2,241 eyes). Of the Kanto region, Tokyo alone showed an especially high incidence of 4.7% (108/2,318 eyes). The χ^2 test confirmed that Kyushu had a statistically signifi-

cantly lower incidence compared to all other regions ($P < .01$), Kanto to show a significantly higher incidence compared to all others except Tohoku ($P < .01$), and Tokyo to have significantly higher incidence compared to all others including other Kanto regions ($P < .05$ with Tohoku, $P < .001$ with all Japan).

Having broken down the age group into 5-year intervals, we found that the age of onset of retinal detachment was between 16 and 25 in 62.9% (248/392 eyes), and the incidence was significantly lower both before and after this age group (Figure 3). Retinal detachment was more common in men (222 subjects) than women (126 subjects) and showed a ratio of 2:1. There was no significant difference in the incidence between right eyes (208 eyes) and left eyes (209 eyes). In 60.9% (157/258 eyes), the time of onset of atopic dermatitis was between 0-5 years after birth (Figure 4).

As for the severity of blepharitis, 125 eyes were classified as severe (38.5% of those with dermatitis) and 200 eyes as mild (61.5%), while it was not indi-

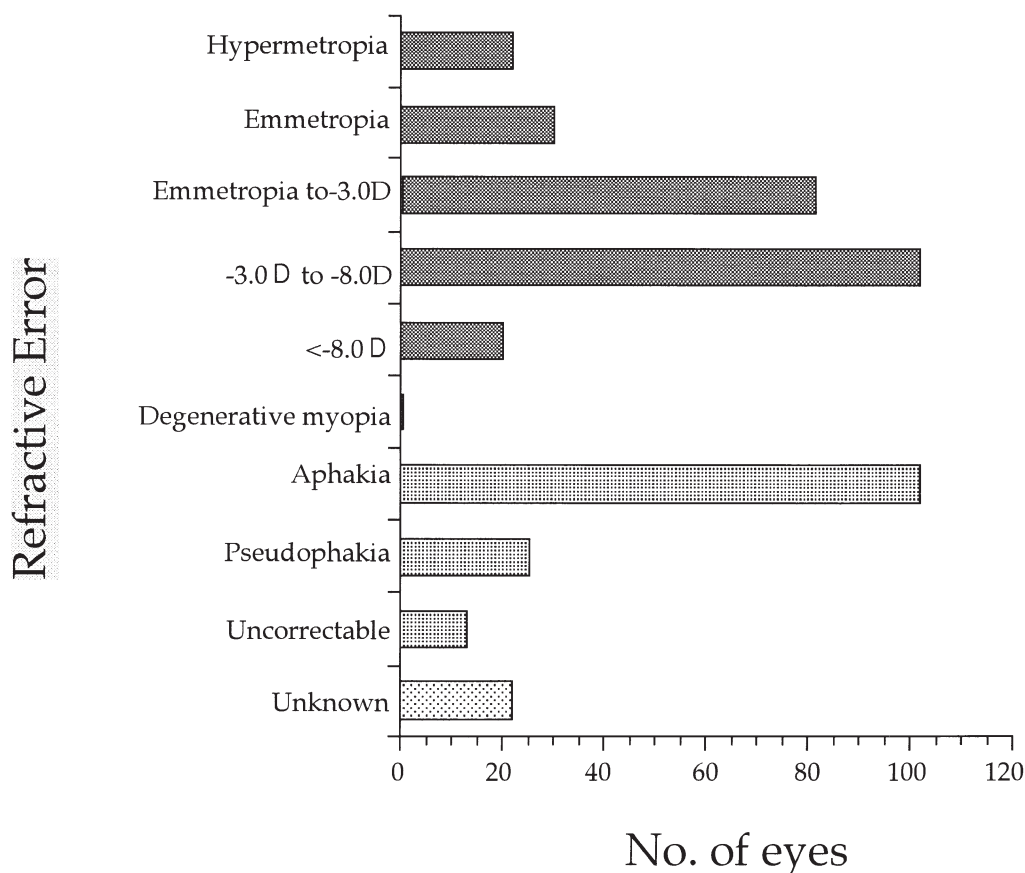


Figure 5. Refractive error in affected eye.

cated in 92 eyes. Either habitual rubbing or slapping of the eyelid was confirmed in 93.0% (159/171 patients answering this question), which was significantly high. It was not indicated in the records for 246 eyes. The most common refractive error was less than 8 diopters of myopia (Figure 5).

Conjunctivitis was reported in 113 eyes (35.4%) of which 93 eyes (29.2%) had allergic conjunctivitis and 9 eyes (2.8%) had spring catarrh; 206 eyes (64.6%) did not have conjunctivitis. There was no answer for 98 eyes.

Twenty-one eyes (5.8% of the eyes reported in answer to this question) were confirmed to have keratitis, 338 eyes (94.2%) no keratitis, and no answer for 58 eyes. Five eyes (1.3%) had keratoconus, 372 eyes (98.7%) no keratoconus, and no answer for 40 eyes.

The amount of cells in the anterior chamber was 2+ in 56 eyes (14.5% of the eyes reported in answer to this question), 1+ in 120 eyes (31.1%), ± in 6 eyes (1.6%), – in 204 eyes (52.8%) and no answer for 31 eyes.

At the time of onset of retinal detachment, 290 eyes (69.5%) were phakic, 102 eyes (24.5%) were aphakic,

and 25 eyes (6.0%) were pseudophakic. Of the phakic eyes, 198 eyes (83.2% of the eyes reported in answer to the question) had cataract with 49.5% (98 of 198 eyes) showing anterior subcapsular cataract and 70.7% (140 eyes) with posterior subcapsular cataract. Forty eyes had no cataract, and there was no answer for 52 eyes. Excluding the last group of 52 eyes or 12.5%, the incidence of cataract was found to be 89.0%.

In eyes with previous cataract surgery, 46 eyes (38.3% of the eyes reported in answer to the question) had undergone extracapsular cataract extraction, 7 eyes (5.8%) pars plana lensectomy, 39 eyes (32.5%) phacoemulsification, 25 eyes (20.8%) aspiration, 3 eyes (2.5%) intracapsular cataract extraction, and it was not indicated in 7 eyes (Figure 6). In 48 eyes (38.1%), the time interval between cataract surgery and the diagnosis of retinal detachment was within 3 months; the remaining eyes showed different trends with retinal detachment in most pseudophakic eyes occurring within 2 years and in many aphakic eyes after several years following cataract surgery (Figure 7). Six eyes (5.0%) had undergone cataract surgery simulta-

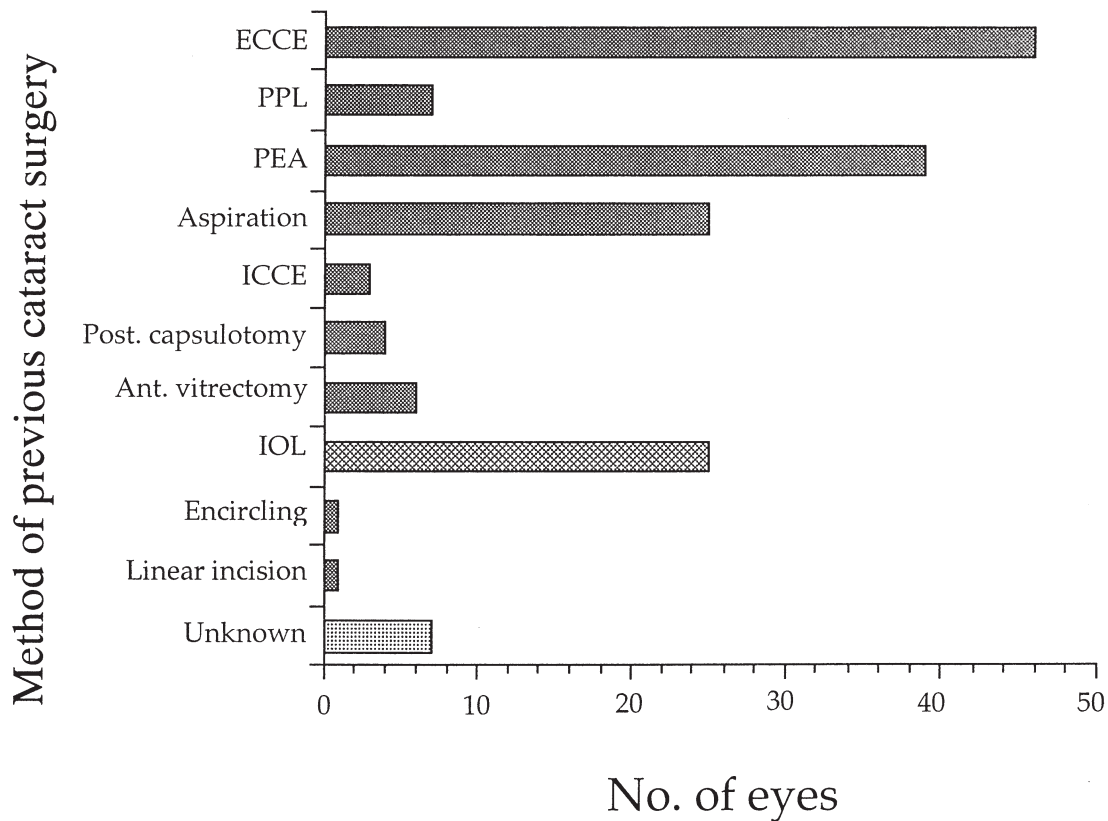


Figure 6. Method of previous cataract surgery. ECCE: extracapsular cataract extraction, PPL: pars plana lensectomy, PEA: phacoemulsification and aspiration, ICCE: intracapsular cataract extraction, Post. capsulotomy: posterior capsulotomy done at time of cataract surgery, Ant. vitrectomy: anterior vitrectomy done at time of cataract surgery, IOL: intraocular lens implanted, Encircling: prophylactic encircling done at time of cataract surgery.

neously with anterior vitrectomy; encircling had been performed in one of these eyes.

There were 13.7% of eyes (57/417 eyes) confirmed to have PVR at the time of initial surgery for retinal detachment; 10.0% (29/290 eyes) of phakic eyes, 20.6% (21/102 eyes) of aphakic eyes, and 28% (7/25 eyes) of pseudophakic eyes demonstrated PVR. Proliferative vitreoretinopathy was more common in eyes with previous cataract surgery.

Retinal detachment was found in one quadrant in 167 eyes (40.0% of the eyes reported in answer to the question), two quadrants in 153 eyes (36.6%), three quadrants in 45 eyes (10.8%), and four quadrants in 48 eyes (11.5%). In 4 eyes (1.0%), this was not identifiable preoperatively due to the presence of cataract (Figure 8). Hence in 77.5% (320/417 eyes), it had existed in one or two quadrants, indicating that most retinal detachments were localized. The average retinal detachment in phakic, aphakic and pseudophakic eyes were in 2.1, 2.2, and 2.4

quadrants, respectively, presenting no significant difference among the three groups.

Breaks were observed anterior to the ora serrata in 19.7% (82 of 417 eyes), between the ora serrata and the equator in 63.8% (266 eyes), at the equator in 6.2% (26 eyes), and posterior to the equator in 2.6% (11 eyes), indicating a trend for them to appear near the ora serrata (Figure 9). As for their type, oral dialysis was seen in 39.1% (163/417 eyes), pars plana breaks in 17.0% (71 eyes), pars plicata breaks in 4.8% (20 eyes), giant breaks in 9.6% (40 eyes), hole(s) in lattice degeneration in 6.0% (25 eyes), tear(s) associated with lattice degeneration in 1.0% (4 eyes), tear(s) and holes unassociated with lattice degeneration each of in 13.2% (55 eyes), radially oriented tear(s) in 2.9% (12 eyes), macular hole in 0.7% (3 eyes), and not identified in 10.3% (43 eyes) (Figure 10). Eyes with severer blepharitis showed a higher incidence of giant breaks (Figure 11) while eyes with a history of cataract surgery showed a high incidence

of giant breaks, pars plana breaks, or unidentifiable breaks (Figure 12).

Primary surgery for retinal detachment included scleral buckling in 78.2% (326/417 eyes); of these, 57.3% (239 eyes) involved encircling. In 21.8% (91 eyes), vitrectomy (including additional scleral buckling) was selected. In 71 eyes (24.5% of phakic eyes), simultaneous cataract surgery was conducted by par plana lensectomy in 40 eyes (56.3%), extracapsular cataract extraction in 4 eyes (5.6%), phacoemulsification in 18 eyes (25.4%), and aspiration in 9 eyes (12.7%); in 7 eyes (9.9%) intraocular lens implantation was performed.

The initial reattachment rate was 75.3% (314/417 eyes). Additional retinal photocoagulation, addi-

tional gas tamponade and silicone oil removal were not considered as secondary surgery. In 31 eyes, reattachment was not eventually achieved (including 18 eyes in which silicone oil was not removed) and the final reattachment rate was 92.6% (386/417 eyes). In 103 eyes that did not achieve initial reattachment, for 49 eyes (47.6%) it was due to PVR and for 54 eyes (52.4%) to new retinal breaks or re-opening of original retinal breaks.

Discussion

Ever since Katsura et al reported on retinal detachment associated with atopic dermatitis in 1982,³ the disorder continues to be of great interest in Ja-

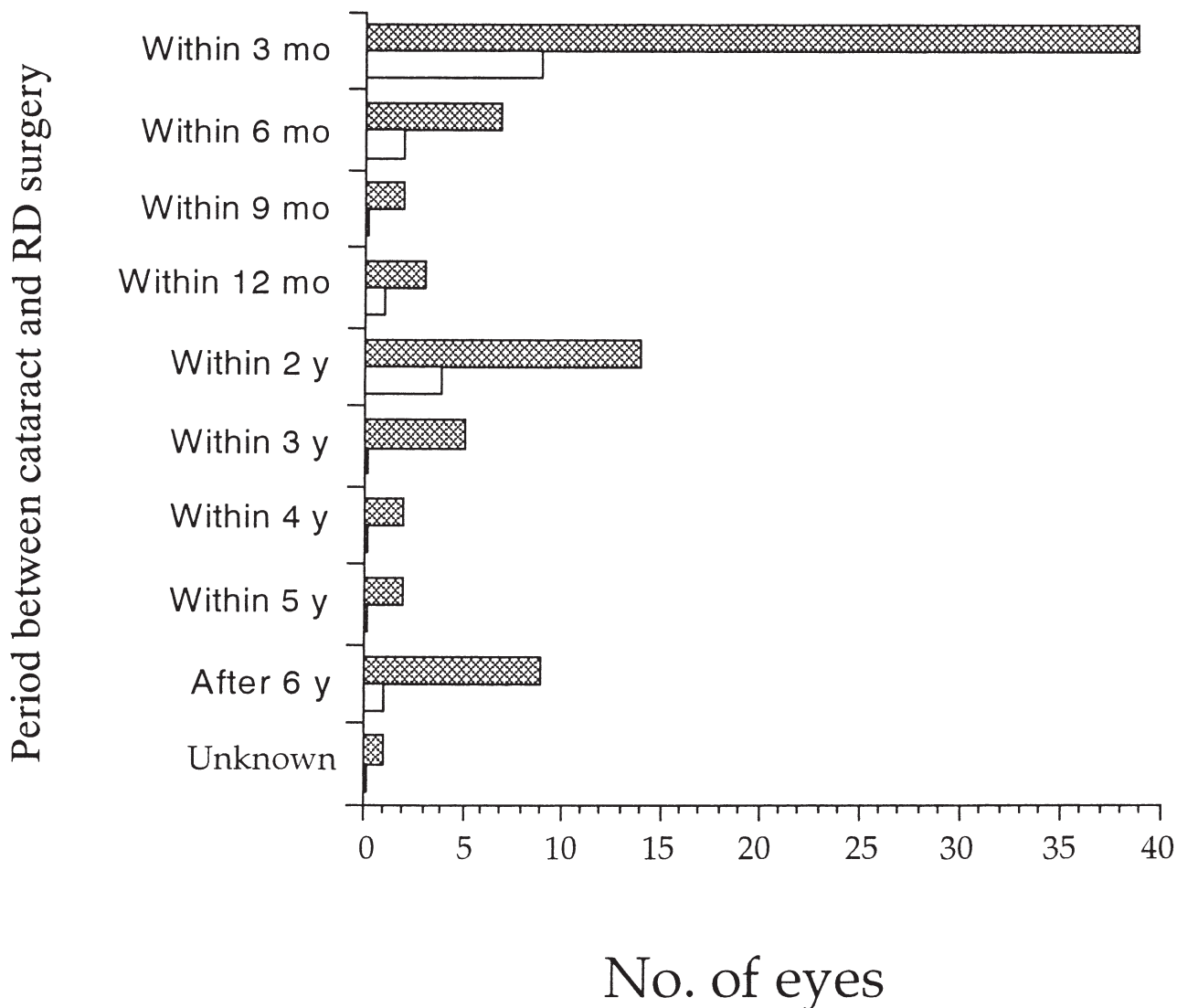


Figure 7. Period between cataract surgery and diagnosis of retinal detachment (RD).

pan, and the affected cases have increased significantly during the past 15 years. The special session on atopic dermatitis held during the 32nd Meeting of the Japanese Vitreo-Retina Society in 1993⁴ was highlighted by an outstanding number of papers and reported cases, convincing the organizing committee members of the necessity for conducting a national survey, which led to the present study.

To date, a statistical analysis involving six institutions conducted by Azuma et al⁵ has been the most thorough survey, although this study may have included more severely affected eyes due to the characteristics of institutions chosen for the study. In the present study, we have attempted to involve institutions from all over Japan to gather more general cases. In order to apply uniform inclusion and diagnostic criteria, however, the chosen institutions were limited to those having vitreo-retinal specialists. Only those patients showing symptoms of dermatitis on the face were included in the study; because of a tremendously large population of subjects with partial atopic dermatitis or with a history of atopic dermatitis, attention was paid to eliminate the possibility of entering subjects with nonspecific retinal detachment.

While some answers in the questionnaire were left unanswered because of the retrospective nature of the study, we were able to compile records for 417 eyes with retinal detachment associated with atopic dermatitis and confirmed that affected eyes are increasing each year.

It should be noted that the institutions participating in this study are still likely to gather patients with

complicated retinal detachment, including those associated with atopic dermatitis, hence the actual incidence could be lower than 2.3% (on the average), but nevertheless should not be significantly less. When limited to younger patients, the prevalence of retinal detachment associated with atopic dermatitis is probably twice as common, constituting a large percentage of the rhegmatogenous retinal detachment cases in Japan.

The difference in the incidence of retinal detachment according to regions is also of great interest. The Kanto region and especially Tokyo alone showed higher prevalence. This is partly because many of the institutions in Tokyo have vitreo-retinal specialists to receive referrals from other parts of Japan. Nevertheless, it should be noted that Tokyo shows twice the prevalence of retinal detachment compared to Kyushu and Hokkaido. According to a census done in 1990, persons between 15 and 24 years of age compose 15.2% of the population; 18.1% in Tokyo, 14.3% in Hokkaido, and 12.2% in Kyushu excluding Okinawa.⁶ Although there is a slight difference in the population of this age group among the regions, this does not sufficiently explain our findings. Generally, atopic dermatitis is said to be more common in larger cities,⁷ and perhaps this is the reason for the higher prevalence in Tokyo.

As for clinical characteristics, our findings have confirmed those previously reported. While we attempted to analyze anterior segment complications, this portion of the questionnaire was often left unanswered because of the retrospective nature of the study. The incidence of corneal and conjunctival complications was lower than we had expected, but

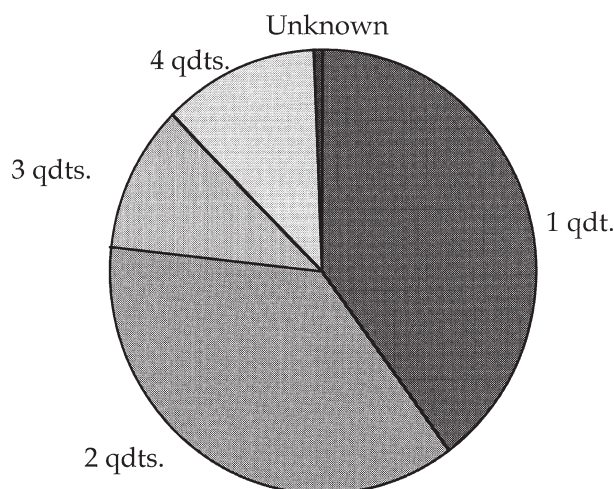


Figure 8. Area of retinal detachment in number of quadrants.

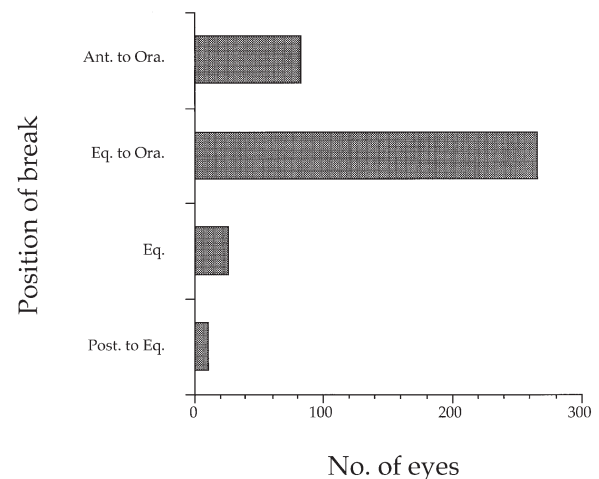


Figure 9. Position of break. Eq: equator.

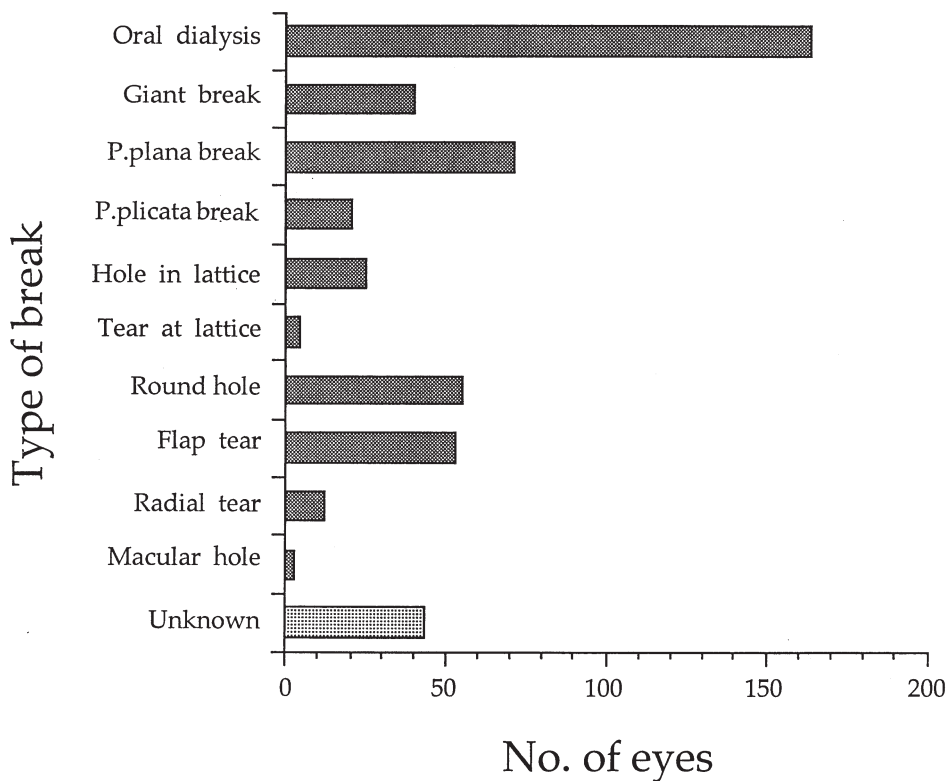


Figure 10. Type of break.

less severe cases may have been overlooked. The number of eyes showing keratoconus was small but larger than the incidence in the normal population.

Cataract was identified in 89.0% of the eyes, which could have delayed the detection of retinal detachment both subjectively and by the physician. It has long been suggested that retinal detachment is often induced following surgery for atopic cataract.⁸ Severe reactions in the residual cortex and the lens capsule can worsen the retinal condition, further making retinal surgery more difficult. There may be a common causative factor of retinal detachment and cataract, which needs to be confirmed.

In most eyes having undergone previous cataract surgery, the time interval between surgery and the onset of retinal detachment was 3 months or less. However, statistical re-evaluation is necessary because in some of these eyes, retinal detachment was already detected or diagnosed prior to cataract surgery.

Only about one fifth (19.7%) of the eyes undergoing cataract surgery received an intraocular lens (IOL) and only 9.9% underwent simultaneous procedures, such as cataract extraction, IOL implantation, and retinal detachment surgery. Recently, some reports claim that IOL implantation can prevent the

occurrence of retinal detachment.⁹ They claim that the IOL, more specifically the loops, by extending the capsule and stretching the zonule, prevent formation of the pars plicata breaks. Pars plicata breaks, however, are found in phakic eyes as well. Therefore, we think that the breaks are formed first, and stretching of the zonule is only a secondary change. Hence, we do not agree with their rationale.

Most retinal detachments found in this study were shallow and localized. On the other hand, there were some showing bullous and total detachment, as well as a high incidence of PVR at the time of initial surgery and thereafter. Retinal tears were located mostly around the ora serrata and oral dialysis was common; the incidence of both pars plana breaks and giant breaks was also high. All these findings confirm those previously reported.^{2,3} Paras plicata breaks were present in 4.8% and radically oriented breaks in 2.9%. When compared to the report by Azuma et al,³ the incidence of giant breaks and oral dialysis in our study was lower and may reflect a more general rate of incidence. Of the eyes with hole(s) in lattice degeneration, 6 had other causative breaks, but 19 disclosed retinal detachment caused by these holes. These eyes of young patients may be

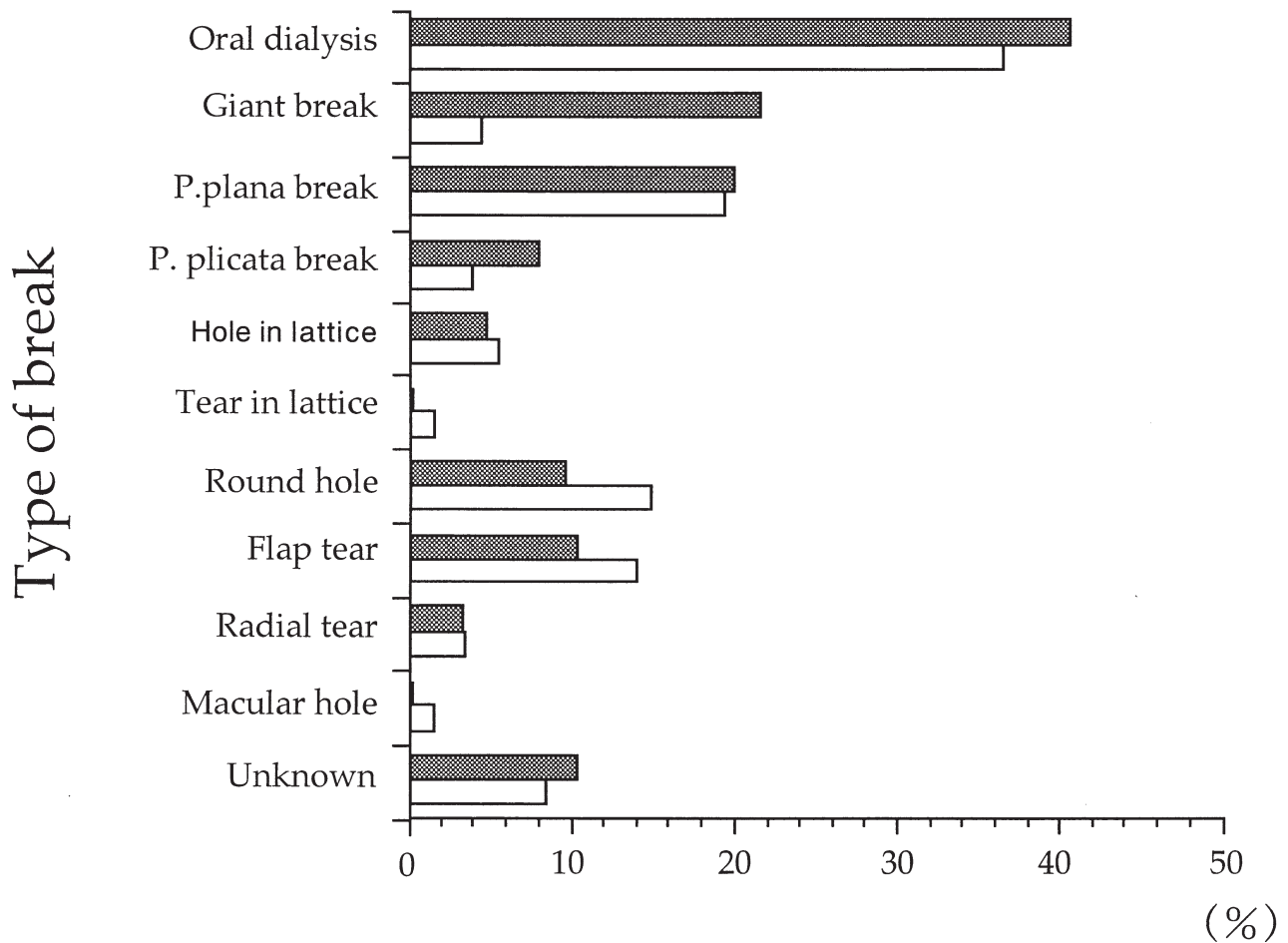


Figure 11. Severity of lid dermatitis and type of break. ■: Severe, □: mild.

considered to have nonspecific retinal detachment due to atrophic holes.

The present questionnaire did not confirm the method in which fundus examination was performed. The ideal method would have been binocular indirect ophthalmoscopy using scleral depressor and slit-lamp examination with the three-mirror contact lens. However, this method is still not very commonly used among the vitreo-retinal surgeons in Japan. These tests often can be difficult to perform in patients with severe skin condition of the eyelid, and in the presence of cataract, sufficient fundus examination is not always possible. Having considered these reasons, this criteria was not included in the questionnaire. With vitreo-retinal specialists participating in this study, 10.3% undetected breaks seems high. This may be due to a nonuniform method of examination and/or technique. The undetected group may include eyes with the breaks on the extreme periphery, such as pars plicata breaks.

Vitreotomy was performed as initial surgery in 21.8%. When considering that these eyes were treated by vitreo-retinal specialists, the initial reattachment rate of 75.3% is much lower than that generally achieved in other groups of rhegmatogenous retinal detachment patients, and the final reattachment rate of 92.6% is also low. Some eyes in this study, however, were complicated cases with PVR, giant tears, multiple tears, and radially oriented breaks. The goal is to continue improving the reattachment rate as we gain further understanding of this complicated disorder.

As for the causative factors for retinal detachment associated with atopic dermatitis, Ideta¹⁰ and Oka et al¹¹ have continued to emphasize trauma. Most vitreo-retinal surgeons now seem to agree that actions such as repeated slapping and/or rubbing of the eyelid play a significant role. While this section was often left unanswered, surgeons that did answer indicated that 93% of the patients have induced this

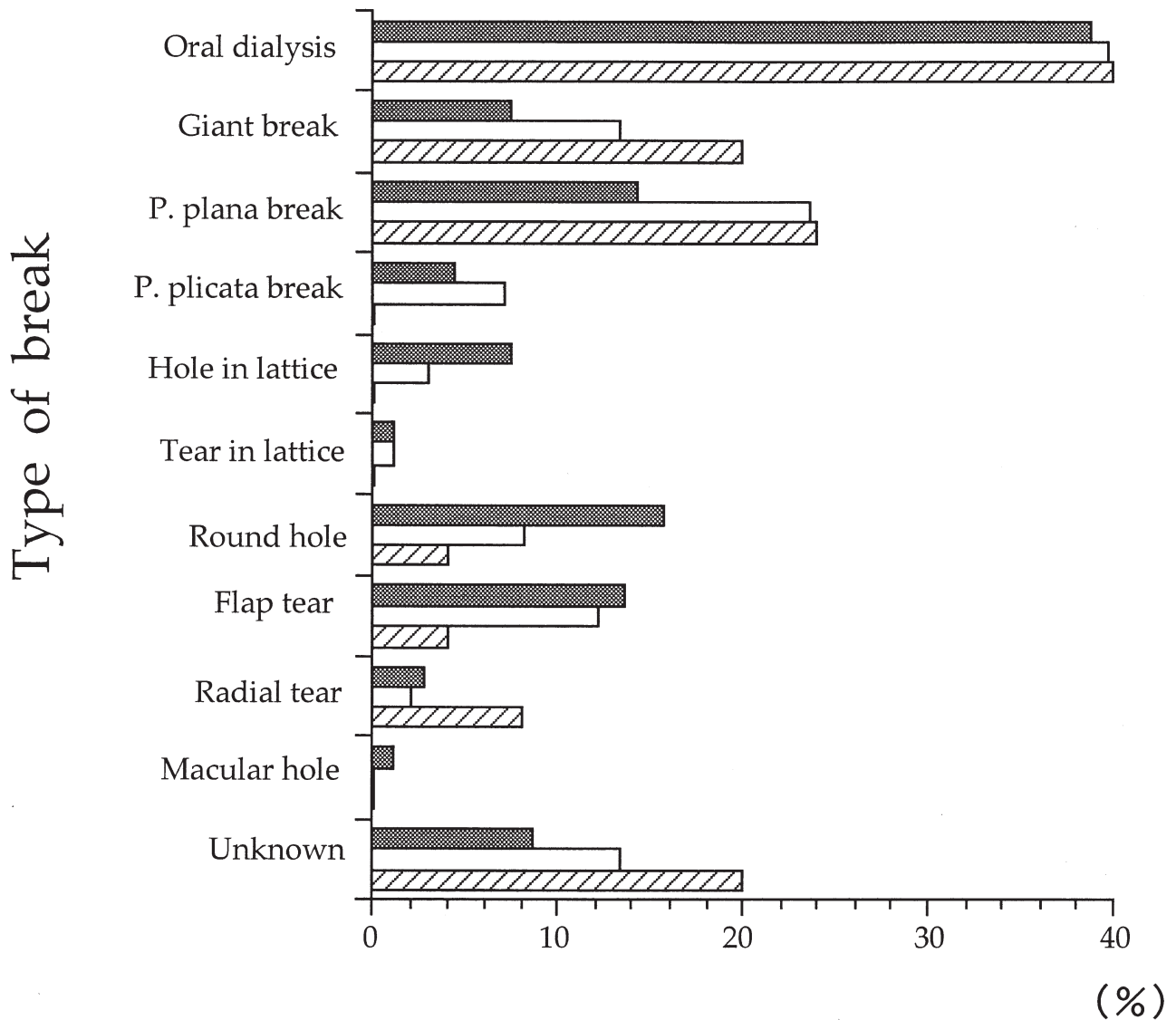


Figure 12. Status of lens and type of breaks. ■: Phakia, □: aphakia, ▨: pseudophakia.

kind of trauma upon themselves. Additionally, cases with more severe dermatitis showing higher incidence of giant breaks also support the thesis that detachment is induced by trauma. The way in which some patients slap their eyelids is abusive, which explains the presence of retinal breaks similar to those seen in abused or self-abusing children.

A small number of studies conducted to date report the incidence of retinal detachment in atopic dermatitis patients to be 1.3–8%,^{12–14} but further studies are necessary to disclose the types of patients at risk. Reports and personal communication do indicate that this disorder is perhaps unique to Japan, which is of interest. While the causative factor may

most likely be trauma, other factors unique to atopic dermatitis should also be evaluated. Dermatologists are also beginning to realize the seriousness and the high incidence of retinal detachment associated with atopic dermatitis. Future studies will hopefully identify the causative factors and help us advise our patients.

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