

Pigmentation on Anterior Chamber Angle in Eyes of Patients With Atopic Dermatitis

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Purpose: To evaluate pigmentation on the anterior chamber angle in patients with atopic dermatitis.

Methods: This study includes 61 patients suffering from atopic dermatitis who visited our hospital between 1991 and 1995. Gonioscopy, cycloscopy, and fundus examinations with a scleral depressor were performed on every patient during the initial visit, and were repeated every 6 months. Pigmentation on the anterior chamber angle was classified according to Scheie.

Results: The pigmentation on the anterior chamber angle at the initial visit was evaluated as grade 0 (15 eyes), grade 1 (81 eyes), grade 2 (21 eyes), and grade 3 (5 eyes). Retinal detachment was found in 9 eyes of the 26 eyes with grade 2 or 3 pigmentation, but in only one of the 96 eyes with grade 0 or 1. The pigmentation on the anterior chamber angle correlated significantly with the incidence of retinal detachment ($P < .0001$). Causative breaks were found in the peripheral retina or ciliary epithelium in all eyes.

Conclusions: Moderate to dense pigmentation on the anterior chamber angle in patients with atopic dermatitis seems to be a sign of breaks in the retina or ciliary epithelium, and the fundus of these patients should be examined carefully for signs of retinal detachment. **Jpn J Ophthalmol 1999;43:535-538** © 1999 Japanese Ophthalmological Society

Key Words: Atopic dermatitis, pigment band, retinal detachment.

Introduction

Recently, the incidence of retinal detachment associated with atopic dermatitis (AD)¹ has been increasing dramatically in Japan.² Retinal detachment characteristically develops in young patients with severe facial eczema and frequently affects both eyes.³ According to several investigators, retinal breaks are characteristically present in the vitreous base, including the ora serrata, the pars plana, and sometimes in the pars plicata.⁴⁻¹⁴ Latent breaks can be found in the pars plana and pars plicata.

Previously, we discussed the distinct pigment band on the anterior chamber angle in 8 eyes with retinal detach-

ment.¹⁵ In that study, the pigmentation observed during the initial visit preceded retinal detachment in all eyes. In one case, the retina detached 81 months after the detection of pigment bands during the initial visit. By contrast, retinal detachment did not develop in eyes with no pigment band. This finding had not been reported previously. We concluded that pigmentation on the anterior chamber angle is an early sign of retinal detachment.

In this study, the pigmentation on the anterior chamber angle was studied in more patients with AD who did or did not show retinal detachment than in our earlier study.¹⁵

Materials and Methods

We examined 61 patients with AD who first visited the Department of Ophthalmology, Sapporo Medical University School of Medicine, between January 1991 and December 1995.

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Visual acuity, Goldmann applanation tonometry, slit-lamp biomicroscopy, gonioscopy, cycloscopy, indirect ophthalmoscopy, and peripheral fundus examination with a scleral depressor were performed on every patient whether or not they showed ocular symptoms. Eyes with dense cataract were examined using A- and B-mode ultrasound preoperatively; the peripheral fundus was examined using an indirect ophthalmoscope with a scleral depressor just after lens extraction to confirm the absence of retinal detachment or retinal breaks. Pigmentation on the anterior chamber angles was classified according to Scheie.¹⁶

These examinations were repeated every 6 months if the patients did not have retinal detachment. Sixteen patients did not return to our clinic after the first examination. The remaining 45 patients (26 men and 19 women) made follow-up visits for 20.2 months on average. The average age of the 61 patients was 22.2 years (range, 7-41 years). Ultrasound biomicroscopy was used to examine the pars plicata and pars plana in 42 of the 61 patients.

In eyes with retinal detachment with or without detected breaks, the peripheral fundus was examined during surgery using a scleral depressor.

We also retrospectively evaluated the pigmentation on the anterior chamber angle in 28 eyes of 14 patients with rhegmatogenous retinal detachment without AD, who visited our clinic between 1994 and 1998. Nine patients were men and five were women. The average age was 20.9 years (range, 12-32 years). The data gathered from these eyes were used as control.

For statistical analysis, we used Fisher's exact probability test.

Results

Table 1 shows the classification of the pigmentation on the anterior chamber angle of the 122 eyes at the initial visit. Fifteen eyes (average patient age, 20.3 years, range, 12-25 years) showed no pigmentation (grade 0), 81 eyes (average patient age, 22.6 years, range, 7-39 years) showed minimal pigmentation (grade 1), 21 eyes (average patient age, 24.1 years, range 15-34 years) showed moderate pigmentation (grade 2), and 5 eyes (average patient age, 30.0 years, range, 25-39 years) showed dense pigmentation (grade 3) in the trabecular meshwork. The pigmentation was diffuse in the entire pigment band. The angle width of all eyes was wide-open, grade 4 in Shaffer's classification. No patient showed angle recession indicating history of blunt trauma.

Retinal detachment was found in 10 eyes of 10 patients (8.2%) during the initial visit. The pigmentation

Table 1. Grade of Pigmentation on Anterior Chamber Angle of 122 Eyes at Initial Visit and Pathological Conditions

Angle Pigmentation (grade)	No. of Eyes	Retinal Hole	Detachment		
			of Ciliary Epithelium	Retinal Detachment	Others
0	15	0	0	0	0
1	81	4 (4.9%)	3 (3.7%)	1 (1.2%)	0
2	21	0	0	7 (33.3%)	14
3	5	0	0	2 (40.0%)	3
4	0	0	0	0	0

"Others" represent pathological conditions other than the three listed here.

tion on the anterior chamber angle in these 10 eyes was classified at the initial visit as follows: grade 1 (1 eye), grade 2 (7 eyes), and grade 3 (2 eyes). None of the 15 eyes with grade 0 pigmentation had retinal detachment. Nine of the 26 eyes with grade 2 or 3 had retinal detachment but only 1 of the 96 eyes with grade 0 or 1 had retinal detachment. The pigmentation on the anterior chamber angle during the initial examination and the incidence of retinal detachment showed a significant correlation ($P < .0001$). We found retinal holes in 4 eyes and detachment of the ciliary epithelium with breaks in the pars plana or pars plicata in another 3 eyes. The pigmentation in these 7 eyes at the initial visit was minimal (grade 1).

Table 2 shows the clinical findings in 17 eyes that showed either retinal detachment, retinal holes, or detachment of the ciliary epithelium. The retinal detachments were flat and localized in the peripheral retina with one exception. We detected the causative breaks in the peripheral retina or more anteriorly in all 10 eyes with retinal detachment. These 10 eyes also showed detachment of the ciliary epithelium, and had breaks in the pars plicata or pars plana. Ten of the 17 eyes had multiple breaks. The number of breaks in the pars plana and pars plicata was almost equal to those in the ora serrata and peripheral retina. Pigment dispersions in the vitreous were observed in 13 eyes. These findings were observed during the initial visit in 15 eyes, and from 3 weeks to 2 months after the initial visit in the other 2 eyes. An increase in pigmentation on the anterior chamber angle was not detected during the follow-up period.

Other pathologic conditions, aphakia, iris cyst, iridodonesis, phacodonesis, suspected pigment dispersion syndrome, secondary glaucoma resulting from anterior uveitis, and eyes with a past history of retinal detachment surgery, were observed in another 17 eyes that showed moderate to dense pigmentation

Table 2. Clinical Findings in 17 Eyes Showing Retinal Detachment, Retinal Hole, or Detachment of Ciliary Epithelium

Case No.	Age/Gender/Eye	Ocular Symptoms	VA	Cat	Pig	Detachment of CE	RD	Break Location and Number				Pig in Vit
								P plica	P plan	Ora	Peri R	
1	15/M/R	Yes	0.7	PSC	1	Yes	No		1			Yes
	15/M/L	No	0.9	ASC	1	Yes	No		1			Yes
2	20/F/L	Yes	1.5	PSC	1	Yes*	No		1			Yes*
	15/F/R	No	1.0	No	1	No	No				3<	Yes
3	15/F/L	No	1.0	No	1	No	No				3<	Yes
	19/M/L	No	1.0	ASC	1	No	No				1	No
5	24/F/L	Yes	0.7	ASC	1	No	No				1 [†]	No
	24/F/R	Yes	0.3	ASC	1	Yes	Flat		1		1	Yes
6	24/M/L	No	1.0	No	2	Yes	Flat	1		1	1	No
7	15/M/L	Yes	0.2	ASC	2	Yes	Flat		1		1	Yes
				PSC								
8	20/F/R	No	1.5	PSC	2	Yes	Flat		1		1	Yes
9	19/M/R	No	1.0	No	2	Yes	Flat		1	1		No
10	19/M/R	Yes	0.1	PSC	2	Yes	Flat		1	1		Yes
11	29/F/L	Yes	0.1	ASC	2	Yes	Flat	1				Yes
				PSC								
12	27/M/L	Yes	LP	Mature	2	Yes	Flat	1				Yes
13	30/M/L	Yes	HM	ASC	3	Yes	Total		3<	1		Yes
				PSC								
14	25/F/L	Yes	0.6	ASC	3	Yes	Flat	1		1	2	Yes

VA: corrected visual acuity, Cat: cataract, Pig: angle pigmentation, CE: ciliary epithelium, RD: retinal detachment, P plica: pars plicata, P plan: pars plana, Ora: ora serrata, Peri R: peripheral retina, Pig in Vit, dispersed pigments in vitreous, M: male, F: female, R: right, L: left, PSC: posterior subcapsular cataract, ASC: anterior subcapsular cataract.

*Findings 3 weeks after the initial examination.

†Findings 2 months after the initial examination.

on the anterior chamber angle (Table 1, Others). Table 3 shows the ocular findings in these 17 eyes.

The classification of the pigmentation on the anterior chamber angle in 28 eyes of the 14 patients without AD was grade 0 or 1. No eyes showed grade 2 or higher. Rhegmatogenous retinal detachment was found in 17 eyes of 14 patients. The pigmentation on the anterior chamber angle of these 14 patients without AD was distributed as grade 0 (9 eyes) and grade 1 (8 eyes). Eleven patients had retinal detachment in 1 eye, but they showed no differences between eyes in pigmentation on the anterior chamber angle.

Discussion

Visible cells and pigment in the anterior chamber appear in eyes with long-standing retinal detachment. Floating pigments and cells in the anterior chamber also have been observed in many eyes having retinal detachment with AD.¹⁷ However, as far as we know, no one has referred to the pigmentation on the anterior chamber angle in AD patients.

In general, young people have little or no pigmentation on the anterior chamber angle. Therefore, if

we find a distinct pigment band in young people, we must consider pathologic conditions, such as uveitis, pigmentary glaucoma, pseudo-exfoliation syndrome, iridodonesis, phacodonesis, iridoschisis, malignant melanoma, iridociliary cyst, trauma, or previous intraocular surgery.

Distinct pigment bands (grade 2 or higher) were observed in 26 eyes in this investigation (Table 1). Three eyes had a past history of retinal detachment surgery, and 14 eyes had other pathologic conditions (Table 3) that were thought to be a cause of the distinct pigment band. However, in the other 9 eyes, we

Table 3. Pathological Conditions of 17 Eyes Showing Moderate to Dense Pigmentation on Anterior Chamber Angle

Pathological Conditions	Number (Eyes)
Postoperative aphakia	1
Iris cyst	2
Iridodonesis	2
Phacodonesis	2
Pigment dispersion syndrome suspected	2
Secondary glaucoma due to anterior uveitis	5
Post surgery of retinal detachment	3

found no adequate cause except rhegmatogenous retinal detachment.

These 9 eyes had a break or multiple breaks in the ciliary epithelium, ora serrata, and peripheral retina, and 7 of them showed dispersed pigments in the vitreous. Similar findings were observed in 8 eyes showing minimal pigmentation on the anterior chamber angle. In other words, all the eyes showing some pigmentation on the anterior chamber angle had a break or breaks in their peripheral retina and/or ciliary epithelium. Six of them also had dispersed pigment in the vitreous.

In patients with AD, 9 of 10 eyes with retinal detachment showed a moderate to dense pigment band, but none of the 17 eyes with retinal detachment in patients without AD showed a moderate to dense pigment band. Even though we cannot make a statistical analysis between these two groups, because we did not match them for age and gender, the moderate to dense pigment band might be characteristic of retinal detachment in patients with AD.

These results suggest that moderate to dense pigmentation on the anterior chamber angle in patients with AD is a sign of breaks in the retina and/or ciliary epithelium unless the following conditions exist: uveitis, pigmentary glaucoma, pseudo-exfoliation syndrome, iridodonesis, phacodonesis, iridoschisis, malignant melanoma, iridociliary cyst, trauma, or previous intraocular surgery. That is why we need to examine the fundus of AD patients very carefully. Our results suggest that dispersed pigment in the vitreous also is a sign of break(s) in the peripheral retina and/or ciliary epithelium.

In this study, eyes that developed retinal detachment and showed pigmentation on the anterior chamber angle at the first visit did not show an increase in pigmentation during the follow-up period. To confirm that dense pigmentation on the anterior chamber angle is an early sign of retinal detachment in AD patients, further examinations and longer follow-ups are required.

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