CHRONIC CYCLITIS*

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WE PREVIOUSLY DESCRIBED[1] 100 cases of chronic anterior uveitis primarily affecting the ciliary body, anterior vitreous, and associated with optic disc changes and macular edema. After a period of time the peripheral choroid and retina were affected, and in severe or advanced cases the exudate accumulated in the inferior pars plana area. This entity, first described under the designation of cyclitis by Ernst Fuchs,[2] has received renewed attention in the past few years, having been described as peripheral uveitis,[3,4] pars planitis,[5] and cyclitis with peripheral chorioretinitis.[1] Apparently new ophthalmoscopic findings have caused some observers to believe they are dealing with a new entity, because indirect ophthalmoscopy with scleral depression shows exudation in the pars plana region in severe or advanced cases. A satisfactory name for this condition does not exist but inasmuch as the primary site of the inflammation seems to be in the ciliary body and *definite* evidence of peripheral chorioretinitis does not exist, the term cyclitis, as originally used, still seems quite appropriate.

CLINICAL PICTURE

Chronic cyclitis often affects young individuals. The onset is usually insidious, some patients having no complaints or symptoms. The initial complaint often is of blurred vision with or without floaters in the visual field. As the disease advances the symptom of visual blurring becomes more severe with many large and small floaters. A rare form has an acute onset, with all the features of acute iridocyclitis, which progresses into a chronic stage. The signs of inflammation are seen then mainly in the anterior vitreous. Synechias of the iris to the lens may occur during the acute phase.

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SIGNS OF CHRONIC CYCLITIS

Congestive signs in the anterior segment usually are absent. Aqueous flare is usually minimal with few circulating white cells. They rarely exceed 2+ flare and 2+ cells by our standard of classification.[6,7] K.P.'s are rare but when present they are usually small- or medium-sized and white. Gonioscopic examination may show larger precipitates in the angle, often of the mutton-fat type.

The iris rarely shows changes. This is in contrast to the rather constant stromal and pigment layer atrophy in Fuchs' syndrome of heterochromic cyclitis.

The lens eventually becomes cataractous if the inflammation persists, but in severe cases the lens change is more rapid. Initially a posterior subcapsular cataract occurs, but the anterior subapsular area eventually becomes opacified, the cortex becomes hazy with many polychromatic crystals.

The vitreous shows a varying number of cells. Early there are fine dust-like opacities in the anterior vitreous. Coarser opacities are observed in the later stages, when vitreous degeneration occurs. After six months to two years exudate accumulates in the vitreous and settles into the lower eye near the ora serrata and pars plana. In some cases numerous so-called "snowball" opacities are present in the lower and posterior vitreous, where they lie near the inner retina. These opacities lie close to the retina in the peripheral fundus and often

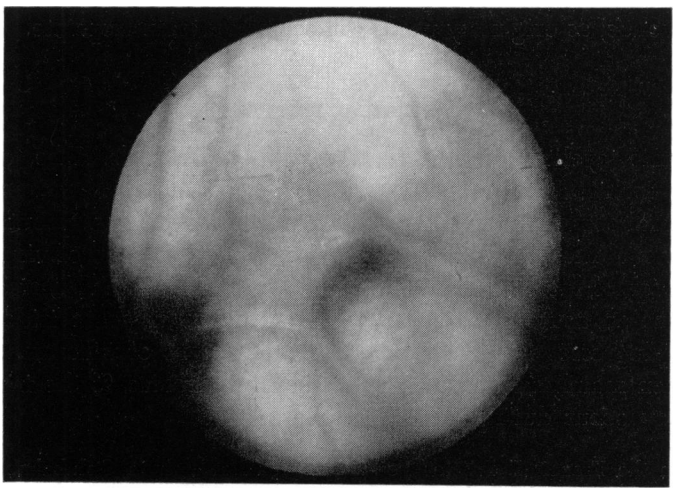

FIGURE 1. FUNDUS PHOTOGRAPH SHOWING INFLAMMATORY VITREOUS MEMBRANE IN CHRONIC CYCLITIS

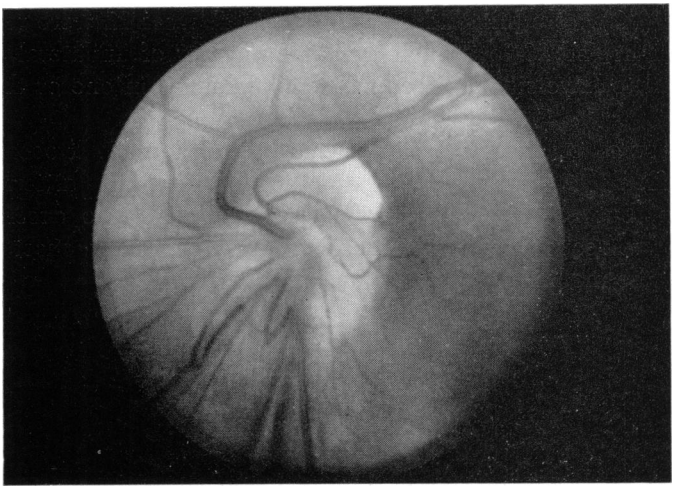

FIGURE 2. FUNDUS PHOTOGRAPH OF SAME EYE (FIGURE 1) SHOWING DISTORTION OF RETINA AT THE NERVE HEAD

are mistaken for an active area of chorioretinitis. Similar opacities have been described in sarcoidosis.[8] The peripheral fundus later may show perivascular sheathing of the vessels, and at times pigmentary changes resembling peripheral chorioretinitis are seen.

Pigment clumps frequently may be seen in the peripheral retina, surrounding depigmented zone. In our experience an active chorioretinitis in the peripheral fundus is a rare finding in these cases. Welch and Maumenee[5] mentioned their existence, but did not describe the lesions in their discussion of the clinical findings.

Edema may occur in the posterior fundus and be quite severe, especially in children. The macula is particularly affected and in more severe cases there is a flat serous separation of the posterior retina. The edema and inflammation also may affect the optic disc. Cystoid degeneration invariably occurs after prolonged macular edema.

Vitreous strands and inflammatory membranes may form along the vitreo-retinal juncture (Figure 1), leading to folding and shrinkage of the retina, and to distortion of the retinal vessels and nerve fiber layer (Figure 2). Retinal detachment may result from secondary hole formation and from cicatrizing cyclitic and other membranes.

ANALYSIS OF 136 CASES

We have restudied 100 previously reported cases, and added 36 new ones. Seventy-one occurred in males and 65 in females. Seventy-one

percent (98) were bilateral. Of the unilateral cases 12 were restricted to the right and 26 to the left eye. The number of unilateral cases is too small to have significance as to predominance in one or the other eye.

THE AGE OF ONSET of all cases is charted in Figure 3. It occasionally was difficult to determine the exact time of onset, particularly in children, but in most cases the patients were able to describe the onset of vitreous opacities. Figure 3 shows the early onset of this disease, the median age being 27 years.

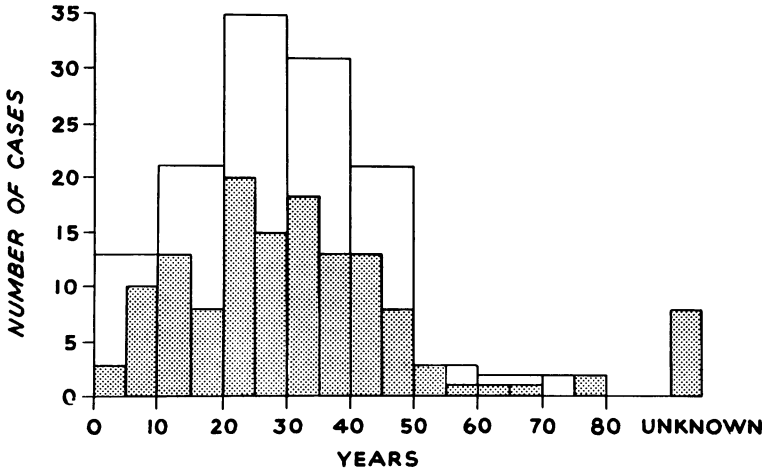

FIGURE 3. DISTRIBUTION OF THE 136 CASES OF CHRONIC CYCLITIS ACCORDING TO THE AGE OF ONSET

THE DURATION OF THE DISEASE from the time the patient was first seen is shown in Figure 4. The findings suggest we probably have seen the cases soon after onset, and for this reason the follow-up period is short. Even though of short duration the observations shed some light on the problem of these inflammations.

After repeated study the severity of the disease was arbitrarily classified as mild, moderate, and severe, based on the following findings:

Mild:
- No keratic precipitates
- Faint or no flare
- Occasional or no cells
- 1–2+ anterior vitreous floaters
- Slight edema of posterior retina
- No exudate over the pars plana

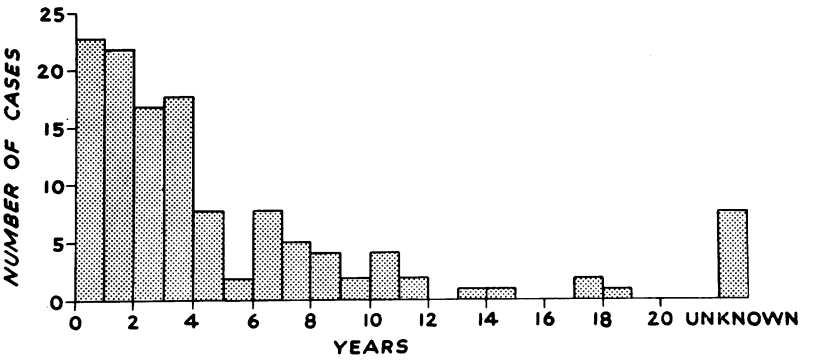

FIGURE 4. DISTRIBUTION OF THE 136 CASES OF CHRONIC CYCLITIS ACCORDING TO THE DURATION OF THE INFLAMMATION

Moderate: Usually no keratic precipitates
Faint to 1+ aqueous flare
Occasional to 1+ aqueous cells
2–3+ anterior vitreous floaters
Moderate edema of the posterior fundus
Exudate usually found over inferior pars plana

Severe: Small- to medium-sized white keratic precipitates in small numbers
Very few, large, mutton-fat type keratic precipitates often seen in the angle on slit-lamp or gonioscopic examination
1–2+ aqueous flare
2+ aqueous cells
Occasional posterior synechias to lens (mainly in children)
3–4+ anterior vitreous cells
Marked edema of posterior fundus
Exudate over inferior pars plana (grossly visible)
Snowball exudates in vitreous
Peripheral vascular sheathing
Pigmentary changes in the peripheral retina

Of the 136 cases, 59 were mild, 62 showed moderate disease, and 15 were severe. It was not always easy to classify some cases. Emphasis was placed on the amount of vitreous exudation and "spill over" into the anterior chamber for this analysis. The visual acuity was not found to be a good criterion of activity because even mild cases showed severe reduction of vision after a long duration, because of cystic degeneration of the macula, or cataract.

VISUAL ACUITY. The visual acuities observed in this series are of

TABLE 1. CHRONIC CYCLITIS (136 CASES), DURATION OF DISEASE AND VISUAL ACUITY

Duration of disease in years	*V.A. 20/30 or better in worse eye*	*20/50 or better in worse eye*	*20/200 or better in worse eye*	*20/200 or* worse *in worse eye*
0–1	17 (51%)	5	6	5
1–2	12 (41%)	5	9	3
2–3	7 (36.8%)	1	7	4
3–4	5 (41.6%)	3	4	–
4–5	0	2	3	–
5–6	3 (25%)	3	6	–
6–7	0	–	–	3
7–8	1 (20%)	1	3	–
8–9	0	–	1	1
9–10	2 (100%)	–	–	–
10–11	1 (20%)	2	1	1
11–12	0	–	–	2
12+	0	–	–	–

some interest. Table 1 graphs the visual acuity according to the duration of the disease. It shows the visual acuity to be worse in patients with prolonged disease. Fifty-one percent of patients with disease of less than 1 year's duration had a visual acuity of 20/30 or better in the worse eye. The percentage with this vision drops in cases with a longer duration. The number of cases, however, is too small to draw definite conclusions.

TABLE 2. CHRONIC CYCLITIS (136 CASES), SEVERITY OF DISEASE AND VISUAL ACUITY

Severity	*20/30 or better in worse eye*	*20/50 or better in worse eye*	*20/200 or better in worse eye*	*20/200 or* worse *in worse eye*
Mild (59 cases)	35 (59%)	10 (17%)	11 (17.6%)	3 (5%)
Moderate (62 cases)	13 (21%)	18 (29%)	28 (45%)	3 (5%)
Severe (15 cases)			5 (33.3%)	10 (66.6%)

Table 2 shows the visual acuity according to severity. The more severe the disease, the worse the visual prognosis. The lowered visual acuities were due to vitreous opacities, macular edema and early lens opacities. Sixty of the 136 cases had less than 20/200 vision in an affected eye.

EXUDATE in the anterior vitreous is an important finding. In early mild cases, fine dust-like opacities may be difficult to see unless the anterior vitreous is examined thoroughly by direct ophthalmoscopy and the slit-lamp. With the slit-lamp microscope a marked vitreous flare and cells are seen. This is an important method of examination of these cases. The exudate, which is seen in the ora serrata–pars plana

region inferiorly in some cases, is not seen early even with indirect ophthalmoscopy and scleral depression. Twenty-five of the 136 cases demonstrated varying amounts of this exudate. Eleven of the 25 cases also demonstrated the "snowball" type of inferior and posterior vitreous opacities. Invariably all of such cases were moderately severe to severe cases, and of long duration. In six severe cases the exudate was grossly visible and involved the equatorial portion of the lens inferiorly.

PERIPHERAL CHORIORETINITIS has been quoted as being an associated part of the disease. Its presence is mentioned by several observers.[3,5] Careful examination of the peripheral fundus with the indirect ophthalmoscope and scleral depression failed to reveal areas of active peripheral chorioretinitis in our cases. The exudate in the peripheral fundus often resembled a chorioretinal lesion, however, and the peripheral choroid often showed pigment degeneration and proliferation.

PERIPHERAL RETINAL VASCULITIS often is found when there is exudate over the pars plana area. The vessel sheathing extends posteriorly after the disease has existed for some time. Severe cases show changes which suggest periphlebitis and vessel occlusion. Several of our cases showed occlusion of a branch retinal vein. These vessel changes, however, more likely are secondary to the inflammatory process, rather than a primary part of the disease process.

MACULAR EDEMA was present in 62 of the 136 cases when they were first examined. Twenty-six of the 62 cases showed cystoid macular changes. All of these eyes had active disease for several years or longer.

EDEMA OF THE OPTIC DISC was present in 25 cases and in all instances it was seen in patients with macular edema. The incidence of macular and papillary edema probably is higher than our figures would indicate, because low-grade edema is difficult to detect.

DILATATION OF THE RETINAL VEINS, especially the inferior ones, commonly is associated with edema of the posterior fundus. The degree of dilatation is often quite marked, especially in children with moderate to severe forms of chronic cyclitis. This venous dilatation resembles that seen in cases with dysproteinemia. For this reason the blood serum proteins were studied by ultracentrifugation. Since venous changes always were more prominent in children most of the serum specimens which were analyzed were from this age group. Twenty-five separate sera were examined. Most of the S19 values (gram per 100 ml. of serum) were higher than the stated 5 percent of total gamma globulin necessary to support the diagnosis of macroglobulinemia. Since normal values for children were not available a control series

had to be run. It was found that the elevated values found in our cases with cyclitis were within the normal values for children of a given age group. It is now felt that the dilatation of the retinal veins is due to the hypoxia as a result of the retinal edema.

CATARACTS were noted to be present in 36 of the 136 cases when they were first seen in the Uveitis Clinic. All of the cases showed early posterior subcapsular changes and were in patients that had active disease for over two years.

CHRONIC CYCLITIS IN SIBLINGS. Two cases of chronic cyclitis were in a brother and sister, age 14 and 9 years respectively when first examined. The boy was discovered to have lowered vision in both eyes at the age of 10, during a hospitalization for nephritis. At that time visual acuity was 20/40 in the right, and counting fingers in the left eye. At age 12 years the corrected vision was 20/25 right, and 20/25 left. At age 14 it was 20/60 right and 20/25 left, corrected. Examination at this time showed 1+ flare and cells in the anterior chambers. The lenses showed early posterior subcapsular changes. The vitreous of the right eye showed 3+ and the left 2+ opacities. Macular edema was worse in the right eye than the left.

The sister was found to have reduced vision by the school nurse at the age of 9 years. Her corrected acuity was 20/25 right, and 20/50 left. The conjunctiva was slightly injected. The aqueous humor showed 2+ flare and 1+ cells in each eye. There were no keratic precipitates. The lenses showed very early subcapsular changes. The vitreous showed 1+ opacities in the right and 2+ in the left eye. Both maculas showed edema, and the lower retinal veins were dilated.

A detailed history failed to reveal a personal or family trait which would indicate the possible cause.

This is the only case we have seen where chronic cyclitis affected more than one member of a family. Unfortunately this family has been lost for follow-up studies.

FOLLOW-UP STUDIES (38 CASES)

Thirty-eight of the one-hundred thirty-six cases have been followed for periods of one to nine years. Table 3 shows that the disease had become worse in slightly over 50 percent of the cases. A case was considered worse if:

1. There was an increase in the vitreous opacities.
2. A posterior subcapsular cataract had developed.

TABLE 3. CHRONIC CYCLITIS (38 CASES), CORRELATION OF OUTCOME WITH THE AGE OF ONSET

Age of onset	*Worse*	*Improved*	*Unchanged*	*Inactive*
0–10	5	–	2	–
11–20	3	1	2	–
21–30	4	–	2	1
31–40	7	–	4	1
41–50	1	2	–	–
51–60	–	–	1	–
61–70	1	–	1	–
71–80	–	1	–	–
TOTAL	21	4	11	2

3. Macular degeneration had occurred.
4. The fellow eye showed involvement in a unilateral case.
5. A retinal detachment had occurred.
6. Glaucoma had developed.

Our clinical impression always had been that this disease ran a more protracted course in children but the findings, although insufficient, do not bear this out. Table 4 shows the correlation of outcome with duration of the disease. The results are the same as when outcome was analyzed according to age of onset of the disease (Table 3).

TABLE 4. CHRONIC CYCLITIS (38 CASES), CORRELATION OF OUTCOME WITH DURATION OF THE DISEASE

Years duration	*Worse*	*Improved*	*Unchanged*	*Inactive*
0–5	11	2	4	1
5–10	7	2	5	1
11–15	1	–	2	–
16–20	2	–	–	–
TOTAL	21	4	11	2

Table 5 correlates outcome and severity of the disease when the patients were first seen. There is an equal number of mild, moderate, and severe cases. Forty-six percent of the mild cases were worse. Sixty percent of the moderately severe and severe cases were worse.

TABLE 5. CHRONIC CYCLITIS (38 CASES)

Severity 1st visit	*Worse*	*Improved*	*Unchanged*	*Inactive*
Mild (13)	6	2	4	1
Moderate (13)	4	2	5	1
Severe (13)	11	–	2	–

Table 6 charts the complications seen on follow-up studies according to the severity of the disease when first seen. These findings show that complications occur earlier in the more severe cases. The infrequency of lens changes in mild cases is expected. The prime complication seen in all three categories of severity is cystoid degeneration of the macula. Glaucoma was found in only two cases, a quite different observation from that seen in heterochromic cyclitis. A longer follow-up period is necessary, however, before comments about glaucoma can be made.

TABLE 6. CHRONIC CYCLITIS (38 CASES), COMPLICATIONS AND SEVERITY

Complications	*Mild*	*Moderate*	*Severe*	*Total*
Cataract	–	8	10	18
Macular degeneration	3	4	7	14
Retinal detachment	–	–	2	2
Glaucoma	–	1	1	2
Phthisis bulbi	–	–	1	1

INVOLVEMENT OF THE FELLOW EYE

Eight of 38 cases with follow-up examinations were unilateral at the first examination. After one to eight years only one case showed early signs of involvement of the second eye. This was a 13-year-old girl, first seen at the age of 10 years, with disease limited to the right eye. Three years later, the aqueous humor of the left eye showed a faint flare, occasional cells, and a few vitreous cells. This case may have become bilateral. Further follow-up is required in all cases because the disease in one eye often precedes that in the fellow eye by several years.

An additional case showed involvement of the fellow eye nine years after that in the first eye. By the time we first examined her she had bilateral disease.

A housewife, age 51. Floaters appeared in the visual field, right eye, ten years before the eye came to enucleation. The onset was sudden and fairly severe, but soon became chronic. The left eye developed similar symptoms nine years later. When examined by us the right eye had only light perception because of a dense cataract and a retinal detachment, which had occurred two years earlier. The left eye showed a faint aqueous flare, with occasional cells. The anterior vitreous, however, showed 3+ vitreous floaters which were of the small and large "snowball" type. The peripheral vessels showed sheathing. Edema of the retina was difficult to evaluate because of the vitreous haze. No active chorioretinal lesions were seen. The blind right eye was enucleated a year after she was seen for uveitis

survey studies. We are indebted to Dr. Landis S. Stewart of Adrian, Michigan, for sending the eye for culture, microscopic study, and for permission to publish this case.

GROSS EXAMINATION. The specimen was a right eye of normal dimensions. The anterior chamber was of medium depth and the pupil was irregular due to a few posterior synechias. The lens was opaque. A horizontal calotte was made. On making the section brownish fluid ran out of the eye. The retina was totally detached. There was no evidence of a choroiditis. The ciliary body in the corona and pars plana was considerably thickened as a result of infiltration of a dense gray-yellow scar. This was especially marked between 4 and 8 o'clock. Internal to the ciliary body the base of the vitreous showed a loose fine organizing exudate (Figure 5). Contraction of the ciliary body and vitreous exudate had produced retinal folding in its periphery, with hole formation in the same area.

FIGURE 5. EYE WITH CAP REMOVED SHOWING THE EXUDATE OVER THE PARS PLANA AREA INFERIORLY

MICROSCOPIC EXAMINATION. The iris showed a slight diffuse atrophy.

Ciliary body: There was generalized thickening, fibrosis, and hyalinization of the stroma of the corona and pars plana (Figure 6). A chronic low-grade inflammation was seen in these areas, the infiltrate consisting of lymphocytes and a few plasma cells. The stromal vessels showed thickened walls, congestion, and perivascular lymphocytic infiltration. The epithelial layers showed cystic degeneration and some atrophy (Figure 7). The inner surface of the ciliary body, and the vitreous base contained a fibrous exudate (cyclitic membrane, Figure 8).

Choroid: The posterior choroid showed a mild diffuse lymphocytic infiltration.

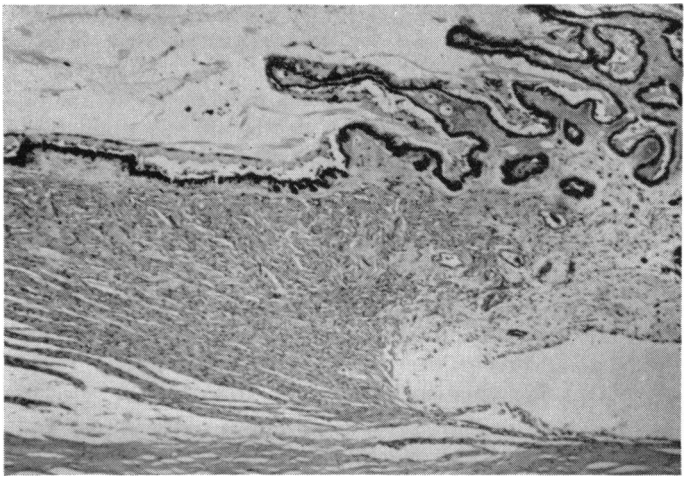

FIGURE 6. PHOTOMICROGRAPH OF CILIARY BODY SHOWING FIBROSIS AND HYALINIZATION OF THE CILIARY MUSCLES

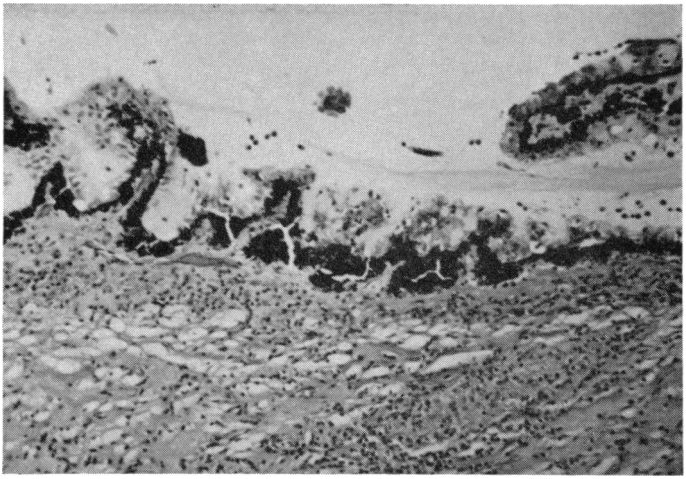

FIGURE 7. PHOTOMICROGRAPH OF CILIARY BODY
The epithelial layer shows atrophy and the vascular layer is infiltrated with inflammatory cells.

Retina: There were some late fixation changes in the retina. The peripheral and equatorial portions of the retina showed some interesting vascular changes. The vessel walls were thickened and hyalinized, with a corresponding reduction in the calibre of the lumen. Their walls and the perivascular spaces showed lymphocytic infiltration (Figure 9). The macula

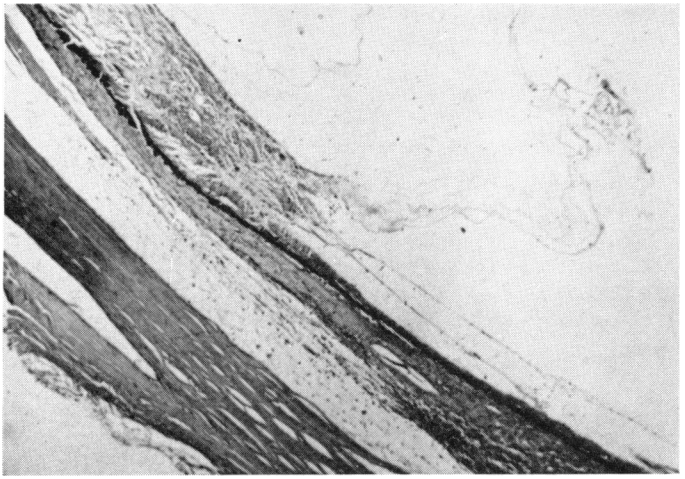

FIGURE 8. PHOTOMICROGRAPH SHOWING THIN CYCLITIC MEMBRANE

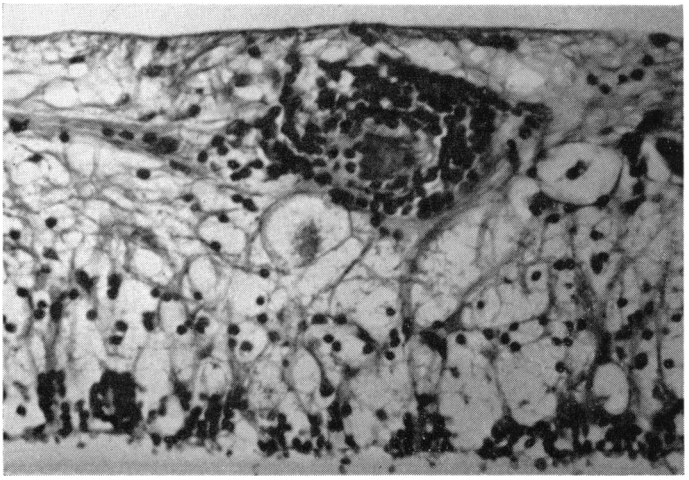

FIGURE 9. PHOTOMICROGRAPH OF THE RETINA SHOWING PERIVASCULAR INFILTRATION OF CELLS

showed cystoid degeneration, which did not appear to be an artifact (Figure 10).

The optic disc showed a mild edema with separation of the nerve fibers from each other, and the vessels showed perivascular infiltration of inflammatory cells (Figure 11).

The lens was totally cataractous.

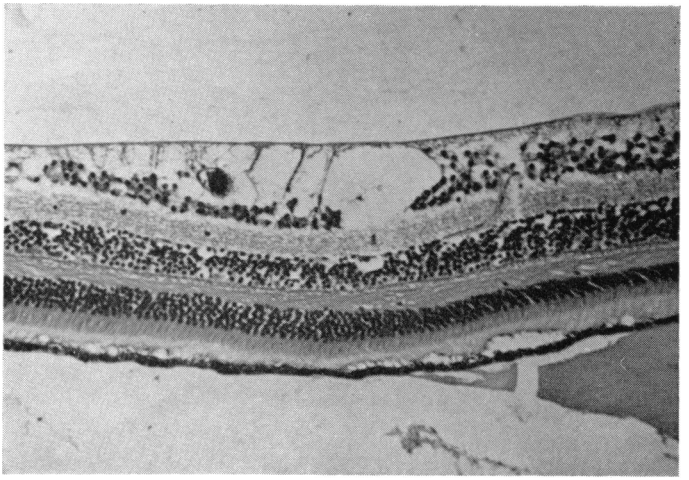

FIGURE 10. PHOTOMICROGRAPH OF THE RETINA SHOWING CYSTIC DEGENERATION OF THE MACULA

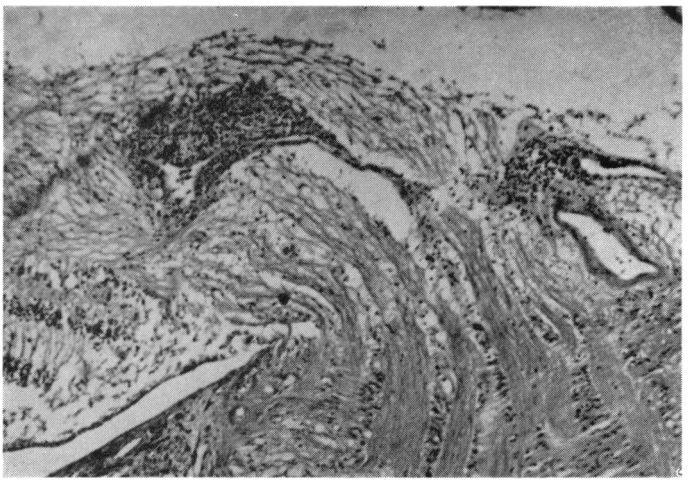

FIGURE 11. PHOTOMICROGRAPH OF THE OPTIC DISC SHOWING EDEMA, CELLULAR INFILTRATION, AND VASCULITIS

DISCUSSION

The cause of chronic cyclitis remains obscure. It is a disease of healthy young children and adults, and our studies have not revealed a clue to the etiology. Observations suggest it is a disease primarily affecting the ciliary body, because the most characteristic finding is

the anterior vitreous exudation. In more advanced stages the vitreous develops degenerative changes characterized by an increase in cells and coarse opacities. At this time the exudate accumulates over the lower ora serrata and pars plana. Although this is a rather dramatic finding in chronic cyclitis it is not exclusive for this disease. We have observed exudate to accumulate in the inferior vitreous peripherally in patients with posterior chorioretinal inflammations.

Experimental studies indicate a possible hypersensitivity factor in the genesis of this condition. Zimmerman and Silverstein[9] produced experimental uveitis with "snowball" types of vitreous opacities in rabbits by injecting crystalline egg albumin into the vitreous. Many of the features seen in human cases of chronic cyclitis were produced. The most interesting of these were: exudative detachment of the retina, inflammatory membranes along the inner surface of the retina, and retinal folds produced by contraction of the inflammatory membrane. This analogy is so striking that the hypersensitivity aspect of chronic cyclitis must be fully evaluated.

Studies to demonstrate skin hypersensitivity or circulating antibodies to uveal antigens have not been done in this group of patients, but detection of an antibody to a uveal component might not be of significance because it could be secondary rather than primary.

In severe cases "snowball" type of vitreous opacities develop. The nature of "snowball" opacities is obscure. They either are clumps of cells and fibrin, or are purely cellular. They are not specific for cyclitis, however, for we have seen them in other diseases and in sarcoidosis.

The vitreous exudation probably leads to the retinal, retinal vascular, and retinal pigmentary changes.

Macular and disc edema form a prominent part of the disease. With edema and its resulting hypoxia, the retinal veins become congested and tortuous. The macula undergoes cystoid degeneration with lowering of central vision. Posterior subcapsular cataracts are secondary to cyclitis and develop invariably in all severe or prolonged cases.

TREATMENT

To our knowledge there is no effective form of therapy for chronic cyclitis. Corticosteroids are used in an attempt to decrease the edema of the posterior fundus. We have started a series in children utilizing sub-Tenon's injections of methylprednisolone acetate (Depo-Medrol,® Upjohn Co.). One-half milliliter is injected every five to six weeks. Some of our patients have been on this regimen for over two years and there appears to be no deleterious effect on the eye. The injection

site remains unscarred in one case that has had injections regularly for over two years. The results so far are hard to evaluate, but this method seems to be as effective as any for treating children because it avoids the necessity of frequent drops and of oral therapy. Mydriatics and cycloplegics are usually unnecessary because synechias form only in those with an acute onset.

SUMMARY

One-hundred and thirty-six cases of chronic cyclitis were analyzed. This disease involved young individuals and both sexes were involved equally. Seventy-one percent of the cases were bilateral. One instance of the disease occurring in siblings was noted.

Diagnosis of cyclitis is made from clinical examination alone. The presence of cells and opacities in the anterior vitreous with minimal involvement of the anterior segment is the commonest clinical finding. Posterior segment edema is usually present in long-standing cases. Exudate over the ora serrata and pars plana is present in long-standing cases or in severe cases and is best seen by scleral depression. It is not necessary to demonstrate this exudate to make a diagnosis of chronic cyclitis.

Follow-up studies of 38 cases indicated that one-half of the cases had become worse, as a result of cataracts, macular degeneration, retinal detachment, and secondary glaucoma. Patients with severe disease were more likely to develop these complications. Glaucoma was found to be not a frequent complication. The prognosis probably is not as bad as it was once believed.

ACKNOWLEDGMENT

We are grateful to many of our colleagues who have allowed us to see their patients, and also to the Uveitis Survey group at the University of California Medical Center for their invaluable help in studying the patients.

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DISCUSSION

DR. IRVING H. LEOPOLD. Careful analysis of thousands of patients and patients' records has permitted Drs. Kimura and Hogan to accumulate detailed information on the multinamed syndrome of peripheral posterior segment inflammation, posterior pole edema, vitreous opacities, and trabecular and corneal deposits.

Within the last few years Brockhurst, Schepens, and Okumura have presented data on over one hundred such cases. Welch, Maumenee, and Whalen added 22 more, Slezak three, and Nano and Perez one. During the past year 26 such patients have been seen at Wills Eye Hospital and will be reported in detail elsewhere by Sarin and Ghosh. The incidence was approximately 8.0 percent of all uveitis patients seen during the year.

All observers are in agreement that the most striking finding lies in the fundus anterior to the equator, an area difficult to see with the ordinary ophthalmoscope. Although the Goldmann 3-way mirror and slit-lamp are useful, scleral depression with an indirect ophthalmoscope offers the best visual approach clinically to this region. The gonioscope must also be used to screen all patients for trabecular deposits.

There are several other points of agreement. Usually the patient has a white eye and complains only of slight visual haze, floaters, or spots; rarely of a red, photophobic, or painful eye. Only 4 of our 26 patients complained of redness and/or photophobia.

The etiology remains obscure. Diagnostic surveys by Brockhurst, *et al.*, Kimura, Hogan, and coworkers, Welch, *et al.*, and our own group failed to produce a predominant or therapeutically responsive factor. Brockhurst, *et al.*, called attention to the similarity of the white globular, gelatinous exudates seen in the ora serrata, pars plana ciliaris, and trabecular regions and those produced by Zimmerman and Silverstein with intravitreal injections of egg albumin in experimentally induced hypersensitivity uveitis in rabbits. Kimura and Hogan also have been impressed by this similarity as well as the other associated induced changes.

Welch, Maumenee, and Whalen found 13 of their 22 patients to be markedly sensitive to streptococcal antigens. Only 6 of our 26 cases demonstrated this. None of these were helped by desensitization. In only 11 of Brockhurst, Schepens, and Okumura's one hundred patients could the streptococci be suspected.

All investigators to date are agreed that this is usually a disease of children and young adults. The age of onset in our series ranged from 8 to 53 years. The oldest patient in the Kimura and Hogan series was in the seventh decade at onset. This disorder demonstrates one place where males seem to dominate over females—14 to 12 in our group, 15 to 7 in the Hopkins' series, 71 to 65 in the series of Kimura and Hogan.

Seventy-one percent of the Kimura and Hogan series, 74 percent of the Wills' cases, and 81 percent of the Wilmer patients presented with bilateral involvement although the complaints were occasionally unilateral.

The vast experience of Kimura and Hogan permits them to suggest a classification of this disease. This assumes that all of the findings are related to one initially involved tissue, i.e., the ciliary body. Not all would agree with this premise. However, the classification suffers in our small series from the overlapping of signs. The mild group is easier to classify in retrospect than in everyday practice. They have delegated corneal deposits into the severe group but keratic precipitates in our series have been present in eyes which fell otherwise into their mild to moderate groups. The essential and guiding finding may very well be the intensity of anterior vitreous involvement. What makes the changes of inflammation of the ciliary body demonstrable earlier in the anterior vitreous than the posterior chamber or to a greater intensity in the anterior vitreous than the posterior chamber is not apparent.

Therapy of this condition is unsatisfactory. Kimura and Hogan feel that steroids may be of some value as did Brockhurst in occasional eyes. They have employed massive doses subconjunctivally. Glaucoma has been a rare complication. In our series only one case of glaucoma was encountered. This one occurred after three months of local steroid therapy. Welch, Maumenee, and Whalen do not mention glaucoma in their series and Brockhurst, Schepens, and Okumura describe one case studied pathologically that had an acute rise in pressure five years after onset of the disease. They did not discuss the frequency of glaucoma in their series. Many cases had been treated with steroids locally. Could steroid administration have been related to the glaucoma in the series of Drs. Kimura and Hogan? Glaucoma has been suggested as a complication of local steroid therapy by François in 1960, Goldmann (1962), Valerio, *et al.* (1962), and Becker (1963).

A notable contribution of this detailed arduous study of Drs. Kimura and Hogan is the prognosis. In a disease picture for which we have no specific therapy it is comforting to know that the prognosis is not always grave. For this we are indebted and grateful.

DR. A. EDWARD MAUMENEE. Drs. Kimura and Hogan have again contributed

to our knowledge of uveitis, and maybe what I will have to say is really not as important as I would like to think.

In uveitis there are the lumpers and the splitters. In the past Dr. Kimura's group stated that uveitis could best be described by dividing it into anterior or posterior and acute or chronic uveitis. Thus, they might be classified as lumpers. This has the advantage of simplicity so that anyone can follow the classification.

There are recurring entities in uveitis: for some of these the cause is known, e.g., toxoplasmosis and nematodes; in others the cause is suspected, e.g., histoplasmosis; and in others the cause is not known, e.g., Harada's syndrome, heterochromic iridocyclitis, and Behcet's syndrome. I believe it is important in the search for etiological agents in uveitis to classify these entities separately and not lump them into anterior or posterior and acute or chronic uveitis.

The point I would like to make at this time is that I think it is a mistake to lump all of the cases described by Kimura and Hogan into one group under cyclitis. The majority of the cases described today are patients with massive white exudates in or on the peripheral retina in the inferior portion of the eye. This differs from inflammation of the ciliary processes, peripheral circumscribed chorioretinitis, and peripheral periphlebitis, although some of the latter lesions do occur as late sequelas to the so-called "pars planitis."

In regards to the white exudates or transudates in the area of the ora serrata, these exudates begin in the inferior part of the eye and do not settle there by gravity. In early cases small nodules can be seen either in or on the surface of the retina in the vitreous. At times they are located in the peripheral retina, in others at the ora serrata, and still others in the pars plana. In late cases the exudates may extend 360° around the periphery of the eye. When the lesion is massive it can be seen with a hand light and a little pressure on the peripheral globe. Early lesions can be seen only with scleral depression and a Schepens' ophthalmoscope.

The marked reaction in the vitreous makes one wonder if the offending agent either is located in the vitreous or is possibly the vitreous itself.

I repeat that I think so-called "pars planitis" or peripheral exudative "retinitis" or "uveitis," no matter by what name it is called, is an entity and should not be confused with many of the lesions classified as cyclitis in the paper just presented.

DR. BRITTAIN PAYNE. I suppose outside of Dr. Theobald and perhaps Dr. Reese, I have had the opportunity of examining more pathological specimens, or as many pathological specimens as anybody in the house, unless Dr. Zimmerman is here. I was particularly impressed with the specimen that Dr. Kimura presented. I think that the optic neuritis or the papilloedema, whichever you call it, could be explained on the basis that the eye is atrophic.

Going back a little further, I wonder if the tension is ever taken by most

of us, and I must say that I am as much to blame as anybody else in these younger individuals. Therefore, we do not know how many of them have secondary glaucoma.

It is also my feeling that no glaucoma is primary except the congenital types. It is all secondary to something, and perhaps this explains the deposits of pigment and cells that we often see in the angle of the iris and in Schlemm's canal. I just wonder if we do not really have more cases of secondary glaucoma in these patients than is recorded.

I would like to compliment Dr. Kimura on this excellent presentation, and I want to thank Dr. Hogan also for helping me in many situations of this sort.

DR. ARTHUR LINKSZ. I do not want to discuss uveitis. I do not know enough about it to discuss it, but with the essayist's permission I would like to show you his first slide once more. This slide is a beautiful example of color stereopsis—if you look into the pupillary area of this eye, it looks as if a red lens would be bulging forward out of it. This is, of course, an optical illusion only, and not everybody can see it. But it is worth looking for it.

DR. WENDELL L. HUGHES. Dr. Leopold gave a very erudite discussion and made one comment that we have no therapy for this condition. I will agree there is no positive therapy, but I do think there are some cases that do illustrate the influence of foreign protein.

I am thinking of one case which I have followed for eighteen years, who has had three exacerbations, and the first two were treated with typhoid antigen H vaccine intravenously and responded quite well each of the first two times. The third exacerbation was in the time of steroid therapy, so we tried the steroid and did not get the result, and then we finally went back to the old fashioned methods of intravenous typhoid antigen H, and with rather dramatic clearing of the posterior corneal deposits, the activity of the posterior corneal deposits within a few days of the injection of the typhoid antigen H.

This woman had had chronic uveitis, and developed cataracts. Cataracts had been removed. She had secondary glaucoma in one eye, and the uveitis responded immediately to intravenous typhoid antigen H vaccine.

DR. KIMURA. In answer to Dr. Leopold's question regarding why we found few glaucoma in these cases, I cannot answer that. We do take applanation tensions routinely in our follow-up clinic on all uveitis cases, so it is not a case of not taking tensions.

In regard to Dr. Maumenee's point of two diseases, a few weeks ago we had a very severe retinal chorioditis which we thought was due to toxoplasmosis, and on indenting the sclera inferiorally, here was this beautiful exudate over the pars plana and this patient had a large, active lesion in the posterior fundus. So exudate over the pars plana is seen in conditions other

than chronic cyclitis. We have had other cases like this, and this is why we make the statement that we feel that this is a settling of the exudate and it is invariably in the lower quadrant. We have not seen it at 12 o'clock. In many of the severe cases, we have eleven cases documented where there are snowball opacities. These are large opacities in the vitreous that you have all seen. They are mainly seen below, and in the posterior fundus, and pre-retinal, and many times when we see these lesions out in the periphery, our original impression was this was an active area of corneal retinitis.

In our series, we have not been able to demonstrate peripheral chorio-retinitis.

In closing, this is a preliminary report. We are interested in the natural history of this disease, and we are not drawing any conclusions from our thirty-eight cases.

I thank all of the discussers for their contributions.