ATOPIC KERATOCONJUNCTIVITIS

BY *Michael J. Hogan,* M.D.*

THE ASSOCIATION of a number of dermatologic entities with lesions in the conjunctiva and cornea has been known for many years. The most important of these diseases are: acne rosacea, infectious eczematoid dermatitis, seborrheic dermatitis, erythema multiforme, pemphigus, psoriasis and congenital ichythyosis.

The skin lesions of acne rosacea are restricted to the face and are characterized by the development of erythema, indurated nodules, and eventual telangiectesia of the skin of the nose, cheeks, and eyelids. A blepharoconjunctivitis and keratitis are commonly associated. The early corneal changes consist of a gray superfiicial opacification and vascularization of the entire limbal area, especially the upper half. Catarrhal infiltrates may develop in the limbus at any stage as a result of secondary infection.

Infectious eczematoid dermatitis may be accompanied by a blepharoconjunctivitis of bacterial origin, usually staphylococcic. A keratitis, characterized by formation of catarrhal infiltrates and ulcers which are followed by secondary vascularization may develop during the course of this skin disease.

Seborrheic dermatitis affects the scalp (dandruff), forehead, brows, lid margins, chest, axillae, and groin. The lesions are chronic, reasonably circumscribed, elevated, scaly, and hyperemic. Secondary infection frequently occurs. A conjunctivitis is not uncommonly associated with the blepharitis, even in the absence of secondary infection. A type of primary peripheral epithelial keratitis may be associated with the blepharoconjunctivitis.

The conjunctival and corneal changes accompanying erythema

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multiforme are acute and self-limited and in all probability would not be confused with the condition about to be described. The same may be said of pemphigus, with the addition that the ocular lesions are frequently progressive and more destructive. Psoriasis affects mainly the extensor surfaces of the limbs, the scalp and the trunk and is characterized by placque-like hyperemic lesions which are covered by scales. The face and lids are rarely affected. A conjunctivitis and keratitis have been described in this condition, either with or without psoriatic lesions of the eyelids. Peripheral epithelial and stromal involvement may occur. Congenital ichythyosis may resemble atopic dermatitis but the cutaneous lesions are present at birth and are more widely distributed.

The term atopic eczema or dermatitis is well known to ophthalmologists, mainly because of the relationship between this condition and the development of cataracts. In view of this knowledge it is surprising that, as far as can be determined, the occurrence of a typical keratoconjunctivitis has never been described in this condition. During the past four years we have encountered five cases of atopic eczema which had an associated bilateral keratoconjunctivitis. The course of the disease and the character of the corneal and conjunctival changes are so typical that it is felt this entity deserves the specific title "atopic keratoconjunctivitis." A search of the literature has failed to reveal a previous report of this condition. Important articles on allergic conjunctivitis and keratitis have been examined to determine if the cases showed an associated typical dermatitis but none was encountered. Monographs on the association of eye diseases with various dermatoses fail to mention this condition (1, 2).

The cutaneous lesions in patients with atopic eczema are exceptionally persistent and symmetrically distributed areas of chronic inflammation characterized by thickening of the dermis, scaling, exaggeration of the minute folds and more or less pigmentation. The surface is generally dry, but may be considerably excoriated because of severe and characteristic pruritis. Secondary infection and dermatitis from medication are commonly observed. The sites of predilection are the antecubital and popliteal areas, the sides and the back of the neck, face, head, axillae, shoulders

and thorax. The lower trunk and extremities are usually free. The course of the disease is chronic, with intervals of months or years between severe exacerbations.

The term "atopy" was devised by Coca (3) to apply to cases of human hypersensitivity which show a hereditary influence. Many observers have urged the recognition of atopic dermatitis as the childhood and adult manifestations of infantile eczema; others would include cases of rhinitis, hay fever, asthma, and urticaria.

The atopic individual is believed to become sensitized during infancy at which time he manifests an infantile eczema. His sensitivity later becomes multiple so that almost no environment is possible wherein an absence of sensitivity exists or may develop (4). Efforts to desensitize atopic individuals are usually not successful. There is usually an elevated eosinophil count in the blood and in various body exudates. Atopic patients show positive intracutaneous and scratch tests of the "immediate" type with a wheal and erythematous reaction. Patch tests are usually negative. There are positive circulating antibodies or "reagins" in the blood and these reagins are transferable (Prausnitz-Kustner reaction). Coca demonstrated that the antibodies in human allergic reactions have certain differences from those in animal anaphylaxis and these he termed reagins. The sensitizing substances he termed atopens. The offending atopens are pollens, plants, dander from animals and insects, spores, dusts and powders, clothing, cosmetics, serums and vaccines, parasites and drugs. There is often a very definite associated hay fever, asthma, rhinitis, or urticaria.

Brunsting (5), in a survey of 101 cases of atopic dermatitis, found that 71 had a history of infantile eczema, asthma, and hay fever. The ages in his cases varied between 15 and 35 years and there was no sex predilection. Ten of the cases were complicated by a cataract, but no mention was made of a keratoconjunctivitis.

CONJUNCTIVAL AND CORNEAL CHANGES

The conjunctival and corneal changes in our patients were so similar that a general description of the lesions may be given prior to presentation of the case reports.

At a variable interval after onset of the dermatitis, a bilateral

conjunctivitis makes its appearance. The symptoms at this time consist of burning and a moderate mucoid secretion. The conjunctival inflammation may undergo exacerbations and remissions, coincident with those in the skin. Secondary infection with bacteria, usually pathogenic staphylococci, may occur. The keratitis may appear with, or follow, repeated exacerbations of the conjunctivitis. Usually the superficial third of the peripheral cornea is first affected. The corneal stroma in the region of Bowman's membrane becomes hazy and the bulbar conjunctival vessels engorged. After a variable interval the opacity spreads farther into the cornea and vascularization occurs from the limbus. The epithelium over the area of keratitis is slightly edematous and shows minute points of staining with fluorescein. Over a period of years fresh areas of peripheral keratitis develop, followed by vascularization. In our most advanced case the entire cornea became hazy and vascularized, with resulting lowered acuity. If the attacks of keratitis are mild the disease remains localized to the periphery, but if the keratitis is severe and persistent, it becomes diffuse. There is no associated intraocular inflammation. If a secondary infection occurs catarrhal infiltrates may appear in the peripheral cornea and form shallow ulcers. These lesions, however, are distinct from the primary keratitis.

CASE REPORTS

CASE 1. A white drug manufacturer, aged 47.

Chief complaint: Chronically inflamed eyes with gradual visual loss for seven years.

Past history: At the age of 15 he developed a non-seasonal type of hay fever and occasional attacks of asthma.

Family history: His mother and one daughter had asthma. The asthmatic attacks of the daughter were precipitated by colds.

Present history: A dermatitis of the face, neck and arms developed in 1937. During 1942 the left eye became inflamed and caused burning, tearing, and itching. Various treatments were without effect. He was examined by an allergist in March, 1944, and found to be sensitive to ten ingestants, five environmentals, twenty-two pollens and to house dust. Desensitization over a period of two months afforded some relief from the ocular inflammation. In April, 1944, slight symptoms appeared in the right eye. In September, 1944, vision in each eye was 20/25 corrected. The skin of the lids was red and thickened and the

palpebral and bulbar conjunctivas were inflamed. Circumcorneal injection was present and a slight inflamed ridge was seen at the limbus of both eyes. On slit-lamp examination he showed numerous punctate epithelial staining areas. A fine diffuse opacification was noted at the level of Bowman's membrane, more on the left eye. Cultures showed pathogenic staphylococci, and smears showed rare eosinophils from the left conjunctiva. Treatment was again without effect.

The eye and skin conditions progressed with exacerbations and remissions until February 11, 1948, when vision in the right eye measured 15/200 and in the left eye 10/200. The skin of the lids was thickened, scaly, and hyperemic and the conjunctivas were inflamed and hypertrophic with considerable mucous discharge. Both corneas

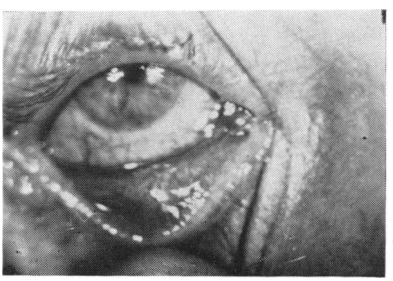

FIGURE 1. CASE 1, RIGHT EYE: CONJUNCTIVAL AND CORNEAL INFLAMMATION

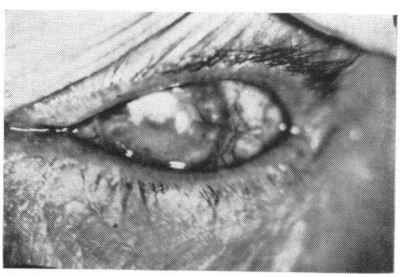

FIGURE 2. CASE 1, LEFT EYE: CORNEAL SCARRING AND INFLAMMATION

were partially opaque and vascularized (Figs. 1 and 2). General examination showed a scaly atopic eczema of the arms, neck, forehead, ears, groin, and popliteal areas. Cultures of the conjunctiva showed pathogenic staphylococci in large numbers. Scrapings showed many eosinophils. Antibiotic therapy and local treatment were without effect.

He was next seen on December 27, 1949. The ocular and cutaneous

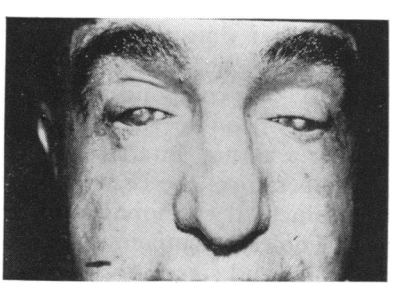

FIGURE 3. CASE 1, ACTIVE ATOPIC ECZEMA AND INCREASED CORNEAL SCARRING

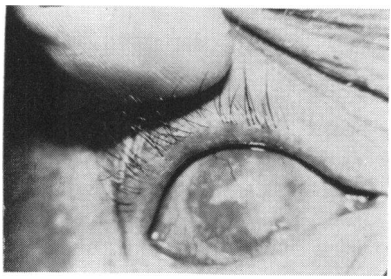

FIGURE 4. CASE 1, RIGHT EYE: CORNEAL SCARRING AND INFLAMMATION IN DECEMBER, 1950

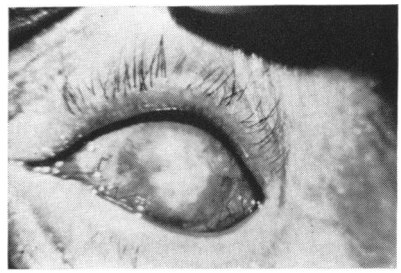

FIGURE 5. CASE 1, LEFT EYE: CORNEAL SCARRING AND INFLAMMATION IN DECEMBER, 1950

conditions had become progressively worse (Fig. 3). Vision in the right eye was counting fingers at one foot and in the left eye counting fingers at two feet. The corneas were more opaque because of yellow-white deep opacities which were vascularized (Figs. 4 and 5). The conjunctiva was hypertrophic and congested. The lenses were normal. Parenteral treatment with cortisone was started on January 3, 1950, and continued to March 10, 1950, with a very satisfactory response. The conjunctival scrapings showed no eosinophils after the twenty-third day of treatment. Vision in the right eye improved to 2/200 but vision in the left eye was unchanged. At the end of a month the dermatitis had almost entirely disappeared.

Discontinuance of cortisone was followed by a prompt relapse. ACTH was then given but caused very little improvement in the symptoms and signs because of a poor adrenal response. Oral cortisone was started after April 17, 1950, and continued for almost a year, following which it was gradually decreased and topical cortisone substituted. During this time no systemic disturbance appeared as a result of the cortisone therapy and the skin and ocular conditions remained entirely quiescent. Following cessation of parenteral cortisone treatment in April, 1951, there was no relapse of the conjunctivitis, keratitis, or dermatitis.

Since that time the patient has been carried for almost a year on topical cortisone. A corneal transplantation was done on each eye while he was taking cortisone orally. This surgery resulted in a visual acuity of 20/80 vision in the left eye and 20/30 in the right eye. Wound healing was not interfered with while he was taking cortisone. In November, 1951, he became somewhat refractory to topical cortisone, a conjunctival eosinophilia recurred and cultures again became positive. Topical Compound F produced an immediate subsidence of symptoms and since this time he has shown no tendency to relapse.

CASE 2. A white male bakery salesman, aged 38 years.

Chief Complaint: Blurring and inflammation of both eyes for one month.

Past History: He had an infantile eczema as a child involving the face, neck, hands, antecubital areas, and back. The skin condition persisted through childhood into adult life, with exacerbations and remissions. Redness, scaling, itching, and occasional weeping were present on the face, neck, hands, and arms. He had been studied repeatedly as a child without determining the specific causative factor. The family history was negative for evidence of allergy.

The eyes first became inflamed at the age of 33 years while he was in the army. Blurring, redness, photophobia, and itching were present. At this time the ophthalmologist commented to the patient that he had some peculiar corneal lesions. Since discharge from the army in 1945 he had periodic exacerbations in the skin and occasional slight attacks of conjunctivitis.

Present illness: In December, 1950, the skin condition relapsed, both eyes became inflamed, and the vision was markedly reduced. Constant burning, tearing, and mucopurulent discharge were present. On examination vision in the right eye was 18/200 and in the left 20/80, with correction. Physical examination showed an atopic eczema of the face, neck, and shoulders with crusting, hyperemia, and discharge (Fig. 6). The remainder of the skin was normal. Examination of the eyes showed a diffuse fairly marked haziness of the corneas, due to an inflammation of the superficial stroma. Peripheral vascularization

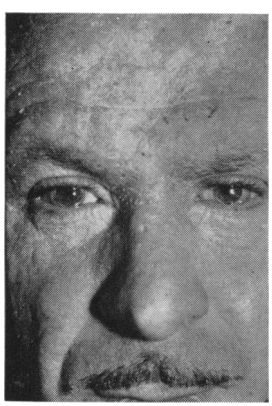

FIGURE 6. CASE 2, ATOPIC ECZEMA OF THE FACE AND NECK WITH KERATOCONJUNCTIVITIS

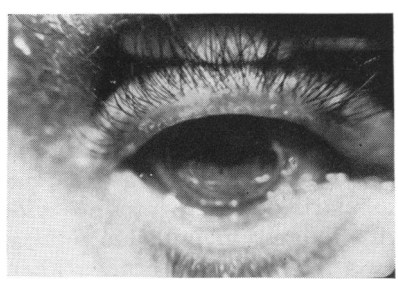

FIGURE 7. CASE 2, GERONTOXONLINE LESION AND KERATITIS

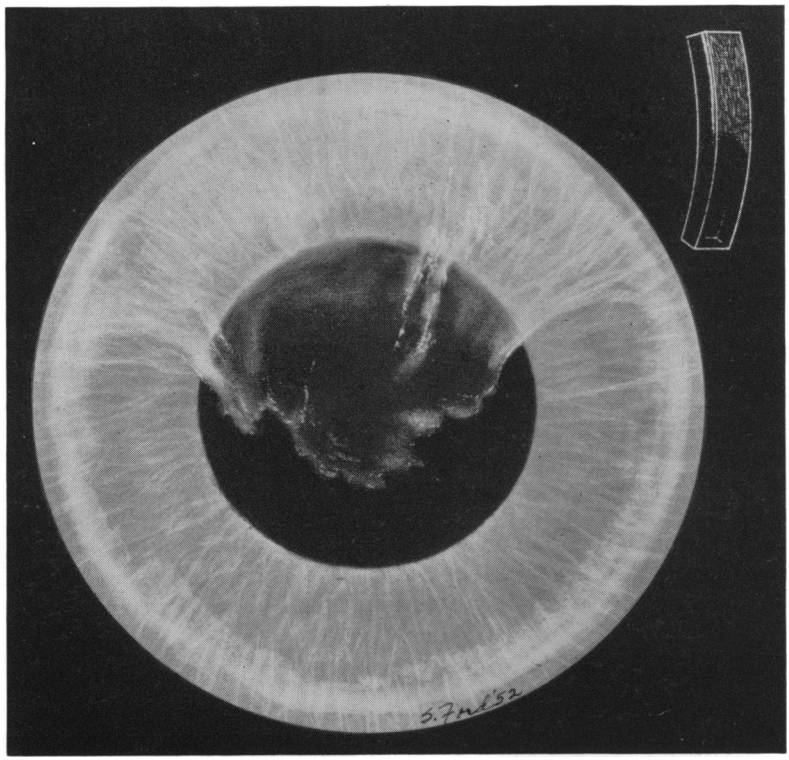

FIGURE 8. CASE 2, GERONTOXON-LIKE LESION INSIDE LIMBUS AND CORNEAL INFILTRATION

was present. Within the limbus approximately one to two mm. was a gerontoxon-like lesion (Figs. 7 and 8). The central corneas were not vascularized. There was no evidence of ulceration, and on staining with fluorescein multiple punctate epithelial areas were seen in the lower halves of the corneas. There were no changes in the lenses.

Allergy tests showed a variety of positive reactions, but it was not deemed advisable to attempt desensitization in this case. The patient was treated with intramuscular cortisone from January 30, 1951, until February 10, 1951, starting with 300 mgm. the first day, 200 mgm. the second day, and 100 mgm. thereafter. An almost immediate improvement occurred in the skin, corneal, and conjunctival lesions. Within four days most of the itching and weeping had disappeared. By February 4, vision in the right eye was 20/80 and in the left it remained at 20/80. There was no corneal staining, although the corneal haziness seemed to persist.

On February 10, vision in each eye was 20/70 and the conjunctiva was clear. On February 13, vision in each eye was 20/30. The patient was placed on drops of cortisone acetate suspension in a dilution of 1:4, at hourly intervals. He was followed as an out-patient for several months during which period there was no relapse of the dermatitis. Topical cortisone drops were gradually reduced to four times a day and there was no evidence of recurrence of the keratitis or conjunctivitis. He has been seen at three to six month intervals since this time. The vision is unchanged and there has been no relapse.

CASE 3. A white male salesman, aged 36.

Chief complaint: Redness, watering, and discharge from both eyes for two months.

Past history: The patient had a long history of severe allergies commencing during childhood. A skin rash involving the face, neck, arms, and chest appeared in infancy and continued through childhood into adult life. He had also probably suffered from hay fever during childhood. The skin condition had undergone many exacerbations and remissions. Extensive studies were made by pediatricians and internists in an effort to determine the cause of this condition. He had been treated with filtered X-ray and a number of anti-histaminic drugs, without improvement.

The first ocular symptoms appeared in 1940 when he was 26 years of age. At that time a bilateral inflammation of the conjunctiva and cornea occurred, accompanied by ulceration. After a considerable period the lesions subsided, leaving a residual impairment of vision. Constant relapses of the skin, conjunctival, and corneal inflammation occurred between 1940 and 1950, when he was first observed.

Present illness: He was first examined on April 20, 1950, when he complained of photophobia, discomfort, and slight discharge for the previous two months. Local astringent medications had not afforded relief.

Examination showed a slight pseudoptosis. Corrected visual acuity in the right eye measured 20/100 and in the left eye 20/50. The skin of the lids and face was thickened, fissured, and showed small weeping areas, especially at the external canthi (Fig. 9). A fair amount of lichenification was present. The palpebral and bulbar conjunctivas were hypertrophic and congested. The corneas showed a bilateral superficial inflammation with scarring and vascularization, especially in the right eye (Fig. 10). The principal lesions lay in the superficial third of the cornea. In the right eye the opacification extended into the pupillary region. There was no intraocular inflammation and the tension was normal. The lenses showed no cataractous changes. Cultures showed a moderate number of pathogenic staphylococci, and

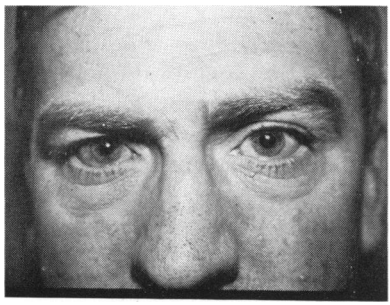

FIGURE 9. CASE 3, ATOPIC ECZEMA WITH KERATOCONJUNCTIVITIS

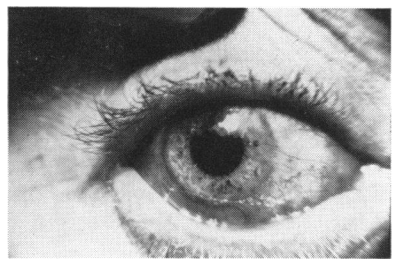

FIGURE 10. CASE 3, RIGHT EYE: CORNEAL SCARRING AND VASCULARIZATION IN ATOPIC KERATOCONJUNCTIVITIS

scrapings showed one to two eosinophils per high power field. There was faint staining of the corneas of both eyes with fluorescein, especially in the lower third. The eyes were treated with various antibiotics and astringents and the condition gradually subsided over a period of one month.

A relapse occurred again on August 3, 1951, at which time examination showed the condition to be much as has been described before. His eyes were treated with cortisone acetate suspension, diluted 50 percent with 1/8 per cent methylcellulose solution, one drop every hour. Within four days all itching was gone and the secretion had markedly diminished. Both eyes appeared very much less inflamed. By August 10 the itching was completely gone and both eyes showed only slight hyperemia. There was no staining of the corneas. Cultures still showed a few pathogenic staphylococci. On August 15 he was asymptomatic and visual acuity in the right eye was 20/70 and in the left eye 20/40. He was again seen on September 4, at which time there was a complete remission of all symptoms and an absence of any sign of inflammation. Since this time he has continued the use of cortisone drops four times a day and has shown no tendency to relapse.

CASE 4. White male, army officer, age 29. The patient was first seen at Letterman Army Hospital on April 1, 1952 and I am indebted to Lt. Col. Ozment for permission to publish the findings in this case.

Chief complaint: Watering, burning, and itching of both eyes since May, 1951. Dermatitis of the upper body since April, 1951.

Past history: As an infant he had a sensitive skin but he did not know of a definite eczema. His mother had a seasonal type of hay fever. He developed a mild dermatitis of the anterior portion of the neck between the ages of 16 and 20 which he attributed to close shaving.

Present illness: In May, 1951, while he was in Korea, there developed

an erythematous weeping eczematoid eruption of the eyelids which progressed to involve the face, neck, and antecubital areas. Since that time the dermatitis had relapsed several times, especially when he was nervous. During his service in Korea he noticed an asthmatic type of wheezing which seemed to be worse during the evening periods.

During May to June, 1951, he noted that the eyes appeared to be irritated by dust. Examination at that time showed a pannus-like lesion which was present at the upper limbus in both eyes, more marked on the left. In September, 1951, he was again examined at which time the condition had progressed. Both eyes were red, inflamed, and itching, especially the left eye. Examination showed a pannus-like lesion superiorly in both eyes composed of vessels and a gray infiltrate in the superficial corneal stroma. Several tiny staining ulcers were present in the limbal area. A dermatitis with thickening of the lids was present. At this time a dermatologist had made a diagnosis of an atopic dermatitis.

The patient was received at Letterman Army Hospital on April 1, 1952. Examination showed that he had an erythematous eruption with mild to marked lichenification on the skin of the face, neck, arms, upper chest, and back, antecubital spaces, and a small area in the left popliteal space. There was thickening of the upper and lower eyelids with excoriation of the lower lids and inner canthal areas (Fig. 11).

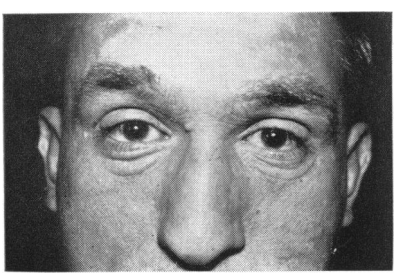

FIGURE 11. CASE 4, ATOPIC ECZEMA OF EYELIDS AND FACE

The conjunctiva was inflamed and somewhat thickened. There was a pannus-like lesion in the superior and temporal limbus of both eyes (Figs. 12 and 13). Vision in the right eye was 20/30 and in the left eye was 20/25. After dilatation of the pupils the lenses showed some early subcapsular changes in each eye. Laboratory studies were negative except for the hemogram which showed an 11 per cent eosinophilia. The eyes were treated with cortisone acetate suspension, 1:4 dilution, every two hours. Marked improvement was noted objectively and subjectively. On April 6, 1952, he developed a severe attack of asthma which gradually became worse for several days and responded eventually to aminophyllin, adrenalin-like compounds, and barbiturates.

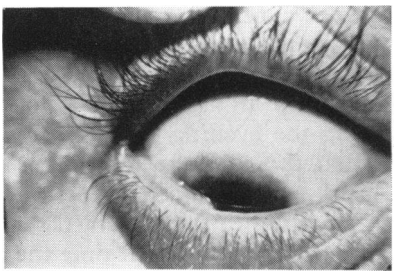

FIGURE 12. CASE 4, CORNEAL SCARRING IN ATOPIC KERATOCONJUNCTIVITIS

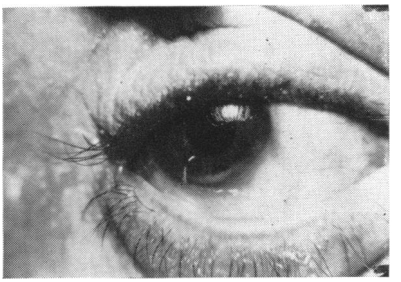

FIGURE 13. CASE 4, LIMBAL SCARRING AND VASCULARIZATION IN ATOPIC KERATOCONJUNCTIVITIS

The dermatitis gradually improved. Complete studies in the allergy clinic including skin tests showed the patient to be positive only to house dust. It was not considered advisable to attempt desensitization. Cultures of the eyes on April 17, 1952, showed many colonies of hemolytic, mannitol-positive staphylococcus aureus in both eyes. Scrapings showed a few polymorphonuclear leukocytes, staphylococci, and an occasional eosinophil in each high-powered field. The patient was continued on topical cortisone every two hours and from an ocular standpoint remained symptom-free and showed no sign of progression of the vascularizing corneal lesion.

CASE 5. Chinese schoolboy, aged 6½ years.

Chief Complaint: Blurring of vision for one month. Red inflamed eyes for two years.

Past History: The patient had an infantile eczema which failed to respond to treatment. For two years he had suffered from asthma and a rhinitis. The eyes had always been slightly watery, hyperemic, and itchy.

Family History: There was no history of familial allergies.

Present Illness: The vision had been found to be poor at school and an examination was recommended. The watering, itching, and congestion of the eyes had continued with slight exacerbations for several years.

Examination: Vision in the right eye was 20/70 and in the left eye 20/70. There was a typical atopic eczema of the skin of the lids. The conjunctivas were slightly congested, without discharge. The corneas were somewhat hazy and attempted examination caused photophobia and tearing. Corneal microscope and slit-lamp examination showed a large number of fine gray epithelial infiltrates scattered over both corneas. Some of these infiltrates were stained with fluorescein. There

was peripheral vascularization of the corneas in an irregular fashion for one to two mm., with some opacification of the stroma of the right eye in the upper outer quadrant. Cultures showed pathogenic staphylococci on the lids, but none in the conjuctival sac. Conjunctival scrapings showed a few polymorphonuclear leukocytes, occasional staphylococci and no eosinophiles.

Refraction: O.D., +1.75 = +1.00 ax 80 20/40. O.S., +1.50 = +1.00 ax 100 20/40.

Physical examination showed an extensive atopic eczema of the skin of the face, ears, neck, and chest. The skin was thickened, scaly, and thrown into numerous fine folds. A blood eosinophilia of 4 percent was present. Scratch and intracutaneous tests showed numerous positive reactions to foods, house dust and pollens. It was not considered advisable to attempt desensitization.

Treatment: Topical cortisone acetate suspension diluted 1:4 with normal saline was ordered to be used every hour in each eye.

Course: Subjective and objective improvement was noted within three days. Since this time the eyes have been continuously normal and the epithelial infiltrates have disappeared. The peripheral vascularization persists.

DISCUSSION

It is evident from these descriptions that the keratoconjunctivitis is a specific entity and is definitely related to the atopic eczema. As criteria to establish the diagnosis of this form of keratoconjunctivitis the following are considered essential:

1. Typical cutaneous changes consisting of persisent and symmetrically distributed areas of chronic inflammation of the sides and back of the neck, face, axillae, shoulders, thorax, antecubital, and popliteal areas. The dermis is thickened and scaly and the skin folds are exaggerated. The eczema comes on early in life, persists for years, and is subject to exacerbations and remissions. Itching is severe during exacerbations.

2. A hereditary allergic tendency is exhibited in most cases.

3. Associated allergies such as hay fever, rhinitis, asthma, and urticaria are very frequent. Very commonly the patient gives a history of severe infantile eczema which may subside, or persist through childhood into adult life as an atopic eczema.

4. A keratoconjunctivitis, associated with exacerbations of the skin condition and characterized by hyperemia and thickening of

the bulbar and palpebral conjunctiva and superficial infiltration and haziness of the peripheral cornea. Vascularization of the corneal stroma follows each attack. Any portion of the cornea may become affected, and in severe cases the entire cornea may become scarred and vascularized.

5. Laboratory investigations show an eosinophilia in the blood, especially during the active phases of the disease. An eosinophilia is also found in other exudates, including the conjunctival secretions. Positive intracutaneous and scratch tests of the "immediate type" to a number of antigens are usually found. Patch tests are usually negative.

If these criteria are accepted one is not likely to confuse the conjunctival and corneal changes associated with other dermatoses with those of atopic eczema. The cutaneous changes of acne rosacea are typical, and are restricted to the face. The condition is unassociated with allergy or allergic diseases. The keratoconjunctivitis is characterized by exacerbations and remissions and the peripheral cornea is principally affected. Eosinophilia in the blood or conjunctival secretions is not found.

Infectious eczematoid dermatitis is associated with a keratoconjunctivitis which is usually of an infectious type. Cultures of the lids and conjunctiva are almost constantly positive, usually for staphylococci. An eosinophilia is not found. The cornea is usually involved as a result of infection by staphylococci or the action of staphylococcus toxin with formation of peripheral catarrhal infiltrates or ulcers which lead to secondary vascularization. Phlyctenulosis of the conjunctiva and cornea is commonly associated with this form of dermatitis. When the phlyctenules affect the cornea the condition is frequently referred to as eczematous keratitis which should not be confused with atopic keratitis. Catarrhal ulcers or infiltrates may occur during the course of atopic keratoconjunctivitis, but when they appear they are clearly differentiated from the primary disease.

Corneal lesions similar to those described heretofore have never been seen in seborrheic dermatitis.

The first four cases in this report show the features of a typical atopic eczema with a keratoconjunctivitis. The fifth case

is presented because we feel that it showed: (*a*) the transition of infantile eczema into adult atopic eczema, and (*b*) the early corneal changes characteristic of this condition. The cutaneous changes in all cases were characteristic as to form and distribution and were persistent, with exacerbations and remissions. A hereditary tendency was exhibited by two of the cases. Two cases commenced with an infantile eczema which continued into adult life and three cases showed associated allergies, such as asthma and hay fever.

An eosinophilia was found in the conjunctival secretion in three cases, and in the blood in two cases. Most of the cases showed numerous positive intracutaneous or scratch tests to various antigens, but the allergists or dermatologists did not feel that desensitization would be of value.

Pathogenic staphylococci were cultured from the lids and conjunctivas of the first four cases reported. The organisms were considered as incidental pathogens, however, since the lesions encountered in the corneas were not typical of those due to staphylococci or staphylococcus toxin. In Case 1 the organisms could not be eradicated from the conjunctiva, but after parenteral cortisone therapy, and subsidence of the inflammatory signs, they were easily eliminated by antibiotics.

All the cases presented responded rapidly and effectually to topical or parenteral cortisone. In two cases when treatment was discontinued the disease remained in a state of remission. These findings corroborate the studies of Ferber and Walton (6) and of Sternberg and his co-workers (7) on atopic eczema.

Case 1 is of interest in that the conjunctival and corneal inflammation gradually became refractory to topical cortisone, but responded immediately to hydrocortisone (Compound F).

Only one case (Case 4) showed lenticular changes.

SUMMARY AND CONCLUSIONS

1. Five cases of atopic eczema with a keratoconjunctivitis are presented.

2. Atopic keratoconjunctivitis is a specific entity and the diagnosis is based on the following findings:

a) A hereditary history of allergies
b) Associated allergies, such as asthma, hay fever, rhinitis, urticaria and infantile eczema.
c) A typical persistent dermatitis affecting the face, neck, shoulders, axillae, thorax, popliteal and antecubital areas. Exacerbations and remissions over a period of years are characteristic.
d) A keratoconjunctivitis, associated with activity of the skin condition and characterized by thickening and hyperemia of the conjunctiva and opacification and vascularization of the cornea.
e) An eosinophilia in the blood and in the conjunctival secretion.

3. A prompt response to treatment with cortisone orally or topically occurred in all cases.

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DISCUSSION

DR. JAMES H. ALLEN. I am very happy to be asked to discuss this paper. For some years I have been interested in various forms of allergic disease of the eye and have wondered why corneal lesions have not been observed in atopic dermatitis, also what type of lesion might occur. Ironically enough, I think I saw my first case the week before I left to come to the meeting. Therefore, since I can add little to the description of the lesions, I would like to emphasize a number of points I think are important, particularly in relation to differential diagnosis. First, however, I would like to commend Dr. Hogan for

disregarding the staphylococci in these cases. There seems to be a popular misconception that ocular staphylococcic infection is commonly associated with eosinophilia of the conjunctiva. In pure cases of staphylococcic infection we have never found eosinophilia of the conjunctiva. In those cases in which eosinophilia occurs we believe and teach that the eosinophilia should be accounted for on some basis other than the presence of staphylococci.

I should like to emphasize the differences between the lesions described and the lesions of staphylococcic keratitis. The corneal lesions of staphylococcic keratoconjunctivitis may be divided into two general classes. The first is a mild corneal lesion characterized by superficial punctate epithelial keratitis. This type of keratitis is not different from the superficial keratitis seen in any severe acute conjunctivitis. It is mild, self-limited, and subsides with relief of the infection. The second class is a more serious type of corneal lesion. It is characterized by marginal corneal infiltration in the stroma with overlying ulceration. The infiltration is seen near the margin of the cornea, but separated from the limbus by a clear zone. A single round infiltration may occur in the milder cases. In more severe infections several isolated marginal infiltrations may appear and unless controlled may spread laterally until they coalesce to form a single long infiltration concentric with the limbus. Superficial ulceration appears over the infiltration and spreads similarly. In the most severe cases a marginal ring ulcer may form.

A somewhat similar infiltration may develop in contact keratitis. However, ulceration rarely develops in this lesion. Characteristically a dense grayish-white infiltration occurs near the margin of the cornea. It may be small and round, multiple small round marginal infiltrations, or a single long infiltration concentric with the limbus.

Several other corneal lesions should be discussed in a complete differential diagnosis, but time does not permit. Therefore, in closing, I would like to congratulate Dr. Hogan on his observations and a beautiful description of a new corneal lesion.

DR. M. J. HOGAN. I have nothing to add, except to say that during the course of the atopic keratoconjunctivitis many of these patients exhibit positive cultures, usually staphylococci. They may, in addition to the atopic keratitis, develop a super added staphylococcic catarrhal ulcer or infiltration near the limbus.