Staff Meeting Bulletin
Hospitals of the » » »
University of Minnesota

Syphilis of Eye

Volume XII | Friday, January 31, 1941 | Number 14

STAFF MEETING BULLETIN
HOSPITALS OF THE . . .
UNIVERSITY OF MINNESOTA

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Published for the General Staff Meeting each week during the school year, October to May, inclusive.

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William A. O'Brien, M.D.

I. LAST WEEK

Date: January 24, 1941

Place: Recreation Room
Powell Hall

Time: 12:15 - 1:25

Program: Movie: "Bone Trouble" -R-K-O.

Present Status of Sulfonamide Therapy
Wesley W. Spink
David W. Hilger

Discussion
Wesley W. Spink
Cecil J. Watson
Raymond N. Bieter
John L. McKelvey
Gerald T. Evans

Present: 144

Gertrude Gunn
Record Librarian

- - -

II. MOVIE

Title: "That Inferior Feeling"

Released by: M-G-M

- - -

III. ANNOUNCEMENTS

1. BABIES

Dr. and Mrs. G. Hamilton Crook (Child Psychiatry) announce the arrival of Guy Hamilton III on Wednesday, January 22. Weight 10 pounds, 3 ounces.

Congratulations!

2. CENTER FOR CONTINUATION STUDY

Uterine Bleeding - Feb. 3, 4, and 5. Guest faculty will include George W. Bartelmez, Professor of Anatomy, University of Chicago; Ralph A. Reis, Assistant Professor of Obstetrics and Gynecology, Northwestern University Medical School.

3. GEORGE CHASE CHRISTIAN LECTURE on "Present Knowledge of Carcinogenesis' on Wednesday, February 5 at 8:15 p.m. by F. Peyton Rous at the Auditorium of the Natural History Museum.

4. PHYSIOLOGY-PHARMACOLOGY SEMINAR

Winter Quarter
1941

Room 116, Millard Hall
Tuesday, 12:30 P.M.

Program

Feb. 4
O. H. Schmidt.- The electron microscope.

Feb. 11
Ancel Keys - The Müller and Valsalva phenomena.

Feb. 18
R. L. Varco - Recent studies of gastric hydrochloric acid secretion.

Feb. 25
G. O. Burr - The present status of the essential fatty acids.

March 4
W. E. Petersen - Fat metabolism in the bovine mammary gland.

March 11
J. T. King - Factors effecting hemoglobin formation.

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IV. SYPHILIS OF EYE

Francis M. Walsh

The basic pathology of syphilis consists of the following changes:

a. Accumulations of mononuclear cells, diffuse or in clumps.

b. Perivascular infiltration and the production of vascular endothelial proliferation.

c. Formation of lesions consisting of necrotic centers, surrounded by giant cells and epitheloid cells, and outside this a zone of small lymphocytes and plasma cells, called a gumma but not a great deal different from a tubercle.

This appearance is subject to change only by virtue of the specific tissue involved, the degree of local cellular reaction and by the degree of immunity protecting the organism at the time the inflammation occurs.

This holds true for the eye as elsewhere. In the following it will be attempted to prove that the gross clinical syphilitic lesions in the eye can be resolved into the above mentioned basic pathological changes.

Syphilis of the uveal tract follows that found elsewhere in the body.

1. Pathological Changes in Uveal Syphilis

With exception of advanced gummatous lesions, the picture is essentially that of any non-descript chronic inflammation. Hereditary syphilis differs from acquired only in the presence of myeloid elements, the immature elements used by the foetus to combat the infection. Essentially the infiltration consists of lymphocytes and plasma cells which have a strong tendency to become aggregated into nodular form. There is the same tendency to fibrous tissue formation in atrophic areas as occurs in non-specific inflammation generally. Vascular changes are by no means characteristic.

In the choroid the same process occurs, namely, a diffuse infiltration with lymphocytes and plasma cells which tend to aggregate in clumps. The outer layers are least affected. Most of the inflammation occurs along the inner layers, namely the choriocapillaris. The inflammation may be intensified near the posterior pole where the entire choroid may be destroyed. Bruchs membrane remains intact though the overlying pigment epithelium may show changes.

The retina is usually atrophic and adherent to the choroid. The rod and cone layer has disappeared and the nuclear layers and the ganglion cell layer is atrophic. The retinal changes are often more general than those found in the choroid. Where Bruchs membrane is broken through an exudative infiltration from the choroid followed by newly formed blood vessels, penetrates into the retinal tissue so that the two are eventually welded into an atrophic patch.

Syphilomata

In many cases the nodular distribution of inflammatory cells becomes accentuated and gathering together in larger aggregations, granulomatous masses are formed. There is no qualitative difference between the smaller nodules and the larger masses. The nodules are made up of plasma cells and lymphocytes supported in a reticulum, with masses of epitheloid cells arranged frequently in the central parts so as collectively to resemble a multinuclear giant cell. At other times typical giant cells are formed. In contradistinction to the avascular nodules of tubercle, these syphilitic nodules are supplied with newly formed capillaries, but when they occur on avascular sites like the pectinate ligament, they may be avascular or alternately are supplied by vessels from neighboring structures as the iris.

Such nodules often occur in the iris chiefly in the stroma near the posterior

pigment epithelium, and grow forward. In the choroid they occur in the choriocapillaris. An aggregation of such nodules form a papule. This papule may retain its vascularity and ultimately disappear leaving only an atrophic scar, or alternatively the changes of a syphilitic obliterative endarteritis may ensue. Subsequent necrosis produces a gumma which in turn may fill the globe with necrotic tissue and perforate the sclera. It is curious to note that spirochetes have been found only rarely in syphilis of the eye.

Congenital syphilis,
Underlying Pathologic Changes

The underlying lesion is in the choriocapillaris so that the pigment epithelium is affected, producing a diffuse mottling, or a proliferation, or destruction, leaving an atrophic patch. The white patches are probably due to an obliterative endarteritis of the choroid which produces white patches of fibrous scar. Such choroidal changes are often associated with a waxy disc, diminution in the size of the vessels and loss of visual field. (Ascending atrophy?)

Clinical manifestations divided as:

Early - generalized systemic infection-uveal inflammation in 5% of cases.

Late - No treatment.

25% after first generalized infection, a complete cure occurs with a negative Wassermann. No treatment.

25% have no evidence of the disease clinically but the Wassermann remains positive.

25% tertiary fibrotic and degenerative lesions affecting the cardiovascular, and central nervous system.

25% become sensitized, so that, in the presence of a few organisms, late violent inflammatory reactions occur. Here belong most of the cases of late uveal syphilis.

"From the clinical point of view uveal syphilis presents a great variety of heterogenous pictures, but the change underlying them all is very similar. Nor is there any real fundamental difference between the manifestations of the inherited and the acquired type of the disease. It is convenient, however, to study these conditions in separate categories although it must be remembered that the variations are quantitative rather than qualitative, one type frequently merges into the other imperceptably, and that more than one may co-exist."

Acquired syphilis

Roseola of the iris.

An early manifestation of a general systemic infection, due to a mild and transient tissue reaction to small treponemal capillary emboli. They often occur in the initial stage of the secondary period, as early as the 6th week after the primary lesion. Are frequently associated or precede the macular eruption.

Early Roseola:

Is a hyperemia of the vascular loops of the iris, is fleeting and causes no symptoms.

Recurrent Roseola:

May appear up to the second year after infection. Appear as local patches, are associated with inflammatory changes and may persist as papules.

Syphilitic Iridocyclitis

In general: Occurs typically at two epochs: at the early secondary stage, and as a late tertiary lesion. Is also associated with treatment as the Jarisch Herxheimer reaction, or as a recurrent iridocyclitis following inadequate treatment.

Secondary Syphilitic Iridocyclitis

Occurs in about 4.5% in the early secondary stages. Rarely before the 3rd month. Most often associated with the maculopapular eruption. The inflammation is severe but the prognosis is good and relapse is seldom if treatment is thorough.

Tertiary Syphilitic Iridocyclitis

Rarer than the secondary form. May occur anytime from 1 to 20 years but most often about 10 years after the chancre. Frequently accompanied by other tertiary lesions as cardiovascular disease or neuro-syphilis. May be mild or severe, and relapses are common.

The Jarisch Herxheimer Reaction

Consists of the development of an acute iritis in a previously uninvolved eye 24 to 48 hours after the first injection of arsenical. It is part of a general sudden intensification of the syphilitic lesion and clears up rapidly on continued antisyphilitic therapy.

Recurrent Syphilitic Iridocyclitis (recidive reaction)

Rare because recurrent syphilis is rare. Bilateral 17% of the time and follows the cessation of therapy as a rule in 4 to 6 months. It does not follow an early secondary iritis, but rather appears as a new phenomenon. Unusual for it to occur with other lesions, only 15% of the time. 50% severe, and 50% are mild.

Theory: Occurs most often with meningeal lesions, in the absence of general systemic infection, and in the face of a positive Wassermann. Suggested arsenicals have killed all treponemes in the blood stream but not in the central nervous system. Because use of the drug has prevented the organism from developing a natural immunity, spirochetes in the central nervous system and in the eye grow rapidly, as though introduced experimentally. Thus after a suitable incubation period an iridocyclitis develops.

The eye is painful and photophobic. A profuse fibrinous exudate develops, with a positive aqueous flare and a muddy iris. Many keratitis punctata spots occur. Adhesions bind the iris to the lens.

Pathologically the lesions are nodular and the synechia are mesodermal, a peculiar characteristic of this type of iritis. Five per cent of the time these nodules become syphilomata. The entire choroid becomes involved and there may be a secondary neuroretinitis and an optic neuritis.

Microscopically in Chronic Iridocyclitis

Round cell infiltration and cuffing of the retinal vessels occurs with proliferation of vascular endothelium. There is a fibrous exudate over the retina.

Syphilitic Chorioretinitis

Only 8% of all chorioretinitis in adults is due to syphilis, while 83% of the chorioretinitis found in children is due to congenital syphilis. There is nothing to differentiate this from choroiditis of other causes.

Diffuse Choroiditis

Extremely rare, is a widespread gray disturbance which disappears on treatment.

Disseminated Syphilitic Chorio-retinitis

Commonest manifestation of chorioretinal syphilis. Occurs in the late secondary stage, but may be delayed 10 years. Bilateral in 50% of cases. Inflammatory foci may be few or numerous and become confluent. Affect the region about the disc, a characteristic syphilis. Later pigment changes occur, may be masses or only fine tracings. No difference between single and large confluent

lesions as it has been suggested the pigmented lesions are due to small areas where Bruchs membrane has broken through, the whole choroid being affected. The variation in retinal picture is accounted for in this way, as the choroid is always found to be entirely involved. Thus the fundus picture is determined by: the extent of perforations by the choroidal infiltration, and, on the subsequent vascular atrophy and sclerosis in the choroid, in severe cases.

When the inner surface of the retina is viewed with a hand lens there is an intense pigmentary change in the choroid as well as the retina. At the equator there is much black stellate pigment. Near the disc most of the pigment is destroyed, existing only in the region of the nerve head itself and the macula. In the region of the macula is a small oval opening through which choroidal pigment is plainly visible.

Sections through the retina show the retina to be transformed into a fine fibrous areolar tissue. Near its free surface are numerous tracts of pigment, some of which encircle the thickened walls of the vessels while others are scattered in the areolar tissue. These latter are connected with the degenerated epithelium of the atrophied choroid, by a thick tract of pigment which passes vertically through the retina. On the right of this tract the retina and choroid are firmly adherent. Recurrences are common, many times after a year or more period of quiescence. Ring scotomata indicate nerve fiber damage.

Peripheral Anterior Choroiditis

Occurs as small flecks in the region of the posterior pole and occurs most often with congenital syphilis, accompanying interstitial keratitis.

Localized types of Syphilitic Choroiditis

Rarer and occur usually at a later stage in the disease than the disseminated type. They cannot be differentiated from choroiditis of other causes. Choroiditis juxtapapillaris, central choroiditis. Note: (Friedenwals).

Pigmentary degeneration of the retina resembling retinal pigmentary degeneration: primary, with the typical equatorial bone corpuscular type of lesion is rarely found in acquired syphilis except in the late tertiary stage often accompanying tabes dorsalis. Similar lesions are however common in congenital syphilis,and the pigment present in both lesions tends to diminish with treatment, suggesting a similar immunological reaction of the body in these two aspects of the disease.

Syphilomata (Granulomatous Tumors)

Note: The granulomatous lesions occurring in uveal syphilis are all of the same essential nature and represent aggregations of the nodular infiltration typical of the disease. The single term syphilomata would probably be more universally correct. The facts that multiple vascular transient granulomata are common in the early secondary stage, and that larger granulomata occur at any stage, which may or may not necrose according to the presence or absence of an obliterative endarteritis justify the clinical differentiation of the two. Thus "papules and gummata."

Papules: Occur frequently in association with syphilitic iritis; vary in size and color, yellow to reddish brown. Occur at the peripheral or ciliary border, are surrounded by inflammation, persist for some days or weeks and disappear, leaving a pigmented spot on the iris. These lesions usually occur in the mesodermal layers.

Superficial early papules: develop near the margin of the iris from persistent roseola.

Deep early papules: start deep in the mesodermal tissue and grow out, adhere to the lens and form typical broad base syphilitic synechia. Ultimately they die down to leave a fibrinous exudative iritis.

Late papules: occur deep in the ciliary region or near the sphincter and are characterized by much less edema and inflammatory reaction. They are grey or yellow, solitary, persist longer, but usually disappear, leaving a pigmented atrophic iris fault.

Gummata: Said to be a manifestation of syphilis of an unusually severe character. Most of them occur in the ciliary body though they may occur in the iris, or choroid. Untreated they undergo necrosis and produce a violent plastic iridocyclitis. Resolve readily under treatment however.

Syphilitic Atrophy of the Iris

Localized areas of atrophy characterizing localized healed granulomata.

Numerous in congenital syphilis.

Small isolated white patches in the secondary stage, comparable to leukodermia, called leukiridia.

A generalized atrophy of the iris associated with tertiary neurosyphilis and usually with pupillary paresis. Is trophic and not inflammatory.

Congenital Syphilis

Is characterized by acute iritis, interstitial keratitis with anterior uveitis, chronic iridocyclitis, choroiditis, and vitrous opacities. (See later)

Acute Iridocyclitis

Commonest cause of this inflammation in infants is syphilis. May occur in utero, but is commonest at 5 to 6 months. May be unilateral, or bilateral, is acute fibrinous in character, and responds well to treatment though frequently an exudative membrane occludes the pupil, or a massive exudation in the posterior chamber leads to a pseudoglioma, or vitreous opacities.

Anterior Uveitis

This accompanies, or possibly is the essential lesion of interstitial keratitis. A fibrinous iridocyclitis is invariable and frequently an anterior choroiditis follows.

Chorioretinitis

Presents a variety of pictures, may occur with interstitial keratitis or may occur alone. Is usually present early in life, often at birth and is almost always quiescent.

Finely Pigmented Salt and Pepper Fundus

Characteristic of hereditary syphilis. Fundus is dusted with small bluish pigmented spots between which lay rounded yellowish depigmented areas. Most marked toward the periphery. Is frequently associated with optic atrophy and narrowing of the vessels.

Isolated Pigment Spots

Two or three in number, surrounded by a halo, and occurring in the periphery.

Grossly Pigmented Areas

Scattered over the fundus either as confluent masses or discreet places. Smaller than the disc and may have a small amount of pigment either centrally or as a peripheral ring.

General Consideration of Congenital Syphilis

The above lesions frequently occur together. They may occur peripherally, accompanied by an interstitial keratitis or the macula alone may be affected.

Diagnosis

With exception of iritis papulosa, gummata, certain cases of chorio-retinitis

most cases of syphilitic inflammation cannot be differentiated from inflammations of other causes with certainly. The diagnosis rests on study of the patient as a whole. Conversely every iritis or choroiditis occurring in a syphilitic subject is not necessarily due to this disease. In early syphilis over 95% of the cases of ocular disease are associated with evidence of the other lesions in only 50% of cases of late syphilis. In congenital syphilis other stigmata are common. The diagnosis here should rest when possible on examination of the parents.

"It is evident, therefore, that while these serological tests (Kahn, Kline, Wassermann) are a good diagnostic guide in the secondary stage of the disease, reliance on them alone will lead to the mis-diagnosis of some 20% of the later cases." Duke Elder Vol.III.

Prognosis

Varies with type and stage, but lesions occurring in the secondary stage respond well to treatment though 10% are left with considerable damage. In later stages, i.e., tertiary, chiefly because of the late development of glaucoma, only half of the cases do well, and of the remainder who have impaired vision 10% become totally blind. In cases of choroiditis the prognosis should be guarded as recurrences are common, and nerve damage frequent.

2. Syphilis of the Retina

General consideration: Syphilitic affectations are most often associated with choroidal disease as a chorioretinitis. There are, however, a number of cases where the retina alone is involved, hence the term syphilitic retinitis, or when the nerve head is included, syphilitic neuro-retinitis. There can be a typical perivascular round cell infiltration, and accumulations as previously described. Endarteraritis also occurs.

Diffuse Internal Retinitis: Though most often syphilitic, is fairly rare in comparison with secondary retinitis due to an extension of a choroidal inflammation. The lesion appears as a diffuse gray white opacity spread over the retina, most marked at the disc, which appears redder. The vessels are obscured, and yellow lines along their borders indicate a perivasculitis. This is thought due to a distention of the lymphatic spaces with leucocytes. There are no hemorrhages and no pigment spots.

It is not known why this inflammatory edema is confined to the retina, nor why it remains for such a long time. The disease is usually unilateral but may involve both eyes. The disease ends in one of three ways: (1) Vascular changes with narrowing of the arterioles, peri-vasculitis, or total occlusion with transformation of the vessels into white cords: (2) Atrophy of retina and choroid with a secondary pigmentation: (3) If the optic nerve is involved a retinitic atrophy may develop.

This type of retinitis can be differentiated from an extensive neuro-retinitis by the slight changes and lack of elevation in the disc, and lack of distention of the veins; from a renal retinosis by the absence of hemorrhages and white spots and from an occlusion of the central artery by the absence of the cherry red spot at the macula and behavior of the arteries.

Diffuse Syphilitic Retinochoroiditis

When the virulence of the spirochete is marked the inflammation starts in the superficial layers of the choroid and then involves the retina.

Pathology

Edema infiltrates the entire thickness of the retina. The choriocapillaris is infiltrated with leucocytes in a nodular fashion. From here they spread to the retina. The disc becomes hyperemic, the large veins tortuous, and the whole fundus is diffusely cloudy and grey. Dirty greyish yellow patches are scattered about Present on the macula in one third of the

cases. The exudate invades the vitreous and may form opacities here. At this period no pigmentary changes are found.

When the inflammation subsides the media clear and the cloudiness of the retina subsides. Later pigment appears around the foci of exudation or in irregular patches, and often migrate to the surface of the retina, collecting around the retinal vessels in the shape of bone corpuscles - "perivascular retinal pigmentation." The pigmentary degeneration, contrary to that in the primary type of pigmentary retinosis, is frequently confined to a part of the fundus and its design is more irregular and rounded. White patches of chorioretinal atrophy occurring in the picture establish the existence of a previous inflammation of these membranes.

Etiology

Acquired syphilis, from one to two years after the onset. One eye alone may be involved, but generally the other eye is sooner or later also involved. The course is chronic though the onset may be acute.

Treatment and Prognosis

Prognosis varies with severity of the the lesion, period when treatment is begun and vigor of the treatment. Early and extensive treatment may check the course and diminish the inflammation. Delayed treatment may involve serious risk of loss of vision. Many cases relapse however in the face of adequate therapy.

Syphilitic Endarteritis and Arteriosclerosis

When the virulence of the spirocheta is not very marked the retinal vessels only are involved, and not the other tunics as described above. The lesions in the blood vessels are first inflammatory, then sclerotic, and absolutely similar to those found in the brain and other organs. The treponema affect the adventitia of the larger arteries and the intima of the smaller ones at the same time. The arteries are thickened by a low grade inflammation with cell proliferation, and their lumina are narrowed or completely occluded, with resulting nutritive changes and even necrosis of the tissues (gummas).

Gross Appearance

White stripes appear along the sides of the vessels- so called perivasculitis. The blood column narrows, then disappears and leaves a white cord. White patches may appear along the vessels concealing them in places. They may be found near the papilla or macula. The color of these exudates is not white but gray or slightly yellow. They are round, irregular and have indistinct margins. They change in size and shape, and may disappear leaving atrophic scars. Hemorrhages may appear near the involved vessels and are usually a manifestation of obstruction. From the vessels the infection often spreads to the optic nerve, retina and choroid.

In chronic cases of syphilis especially when treatment is neglected, degenerative changes often develop in the shape of extensive and severe sclerosis of the retinal vessels, with the characteristic but exaggerated symptoms of senile sclerosis.

Thrombus and Hemorrhagic Retinitis

Obstruction of the larger arteriolar trunks has as a result serious consequences to the supplied area of retina. The retina becomes hazy and assumes a yellow discoloration. If the veins are involved hemorrhages appear. With proper treatment exudations and hemorrhages disappear, but vascular arteriolar obstruction leaves permanent scotomata.

Central Relapsing Retinitis

This is a rare form of isolated involvement of the macula occurring as a late manifestation of syphilis. The

disease starts with a faint cloudiness in the region of the macula. Next a large grey or yellow patch sometimes twice as large as the disc may develop. Small round pigment dots may appear in the region of the lesion. The lesion later subsides to form a mass of connective tissue and pigment changes. There is a positive central scotoma.

Aside from a general involvement including the macula (diffuse retinitis) so far, nothing has been found except this one isolated rarity regarding macular involvement.

Toxic Exudative Syphilitic Retinitis

Occurs in secondary syphilis and is frequently found to be accompanied by a macular star. (Macular stars are not characteristic of a disease but rather due to some toxic disturbance, thought occurring because of the avascularity of the perimacular region plus the loose nature of Henle's layer- exudate and edema can accumulate here and are not readily carried away.)

Circumscribed Gummatous Lesions

In the retina are rare, and usually are due to a secondary infiltration from the choroid or ciliary body. In the region of the lamina cribrosa the lesion takes the form of chorioretinitis juxtapapillaris.

Syphilitic Arteriosclerosis

Unlike the aorta and coronaries, the retinal vessels show little predilection for syphilitic sclerosis. If hypertension is present sclerotic changes are marked though there is nothing distinctive of syphilis.

Treatment of Syphilitic Infections - Retinal

Consists of general treatment but like central nervous system lesions, they do not respond rapidly. In many cases the old mercury and iodide treatment works better than arsenic and bismuth.

Hereditary Pigmentary Retinoses

These are mostly degenerative lesions in the severe forms with migration of pigment into the retina around the vessels, the spots taking the characteristic bone corpuscle shape. Milder cases have pigment only at the equator, but as the severity increases, the pigment changes migrate to the pole. They are divided into clinical types.

Type I

a. Mild Type -- The lower peripheral fundus is dotted with small yellowish red round spots. Between them the retina is stippled with numerous minute spots of pigment giving the yellowish dots a black sandy background. These changes are probably due to the proliferation of the pigment epithelium cells. The yellow spots are thought to be due to an inflammation of the choriocapillaris which has extended into the retina and probably due to an intrauterine choroiditis. They remain unchanged throughout life. The disease is found in children and almost always bilateral.

b. Severe Type -- The pigment dots are more conspicuous and in rare cases take on bone corpuscle shapes. The yellow pigment dots may have pigment in their centers and extend toward the disc. The fundus may be discolored grayish blue. Especially characteristic is the involvement of the optic nerve. The disc is pale, the margins are indistinct or sharply outlined. The vessels are narrow and may show a perivasculitis or may be transformed into white strands. This condition is probably due to a neuroretinitis which ran its course during infancy; in fact, optic neuritis is very common in syphilitic infants (40% to 80%). Vision may be diminished fields contracted and there is hemeralopia.

Type II

Course spotted form. This form may

arise as an independent disease of secondary to acute conditions as during the course of an acute syphilitic iritis or interstitial keratitis. Appear as black masses of rounded or linear shape, forming coarse networks with rounded spaces between. In the background round yellowish spots may appear but these are located only behind the ora serrata. When the changes are primary they start as large reddish yellow or whitish spots or round shape and indistinct margins. In the beginning there is no pigment, but later they may coalesce to form yellow elongated patches. These are thought to be cellular exudations originating in the choriocapillaris and the choroid. White atrophic spots accumulate in the center of the yellow patches. The disease is generally bilateral and more frequent than Type I.

Type III

"Syphilitic Pigmentary Retinosis." The picture here is no different than that found in non-syphilitic pigmentary retinosis; i.e., retinitis pigmentosa. The same perivascular bone corpuscle pigment distribution is present. There may be additional rounded black spots advancing to the vicinity of the disc. Yellow spots surrounded by a rim of pigment can be found. Retinal vessels are extremely contracted, choroidal vessels are normal or show a perivasculitis.

3. Syphilis of the Optic Nerve

Syphilitic Optic Neuritis

Optic neuritis or papilledema occurs not infrequently in the earlier stages of syphilitic infection. Sometimes the ophthalmoscopic changes are unaccompanied by any disturbance of function or signs of cerebral involvement; at other times there is a transitory derangement of vision and signs of mild cerebral irritation such as violent headaches; relatively rarely the clinical picture of acute syphilitic meningitis and meningoencephalitis develops with widespread central nervous symptoms. All types are presumably due to an involvement of the optic nerve in a central syphilitic process of greater or less severity.

Field changes vary with the severity of the disease, but are not characteristic. Concentric contraction is the rule.

Pathologically

The characteristic change is a diffuse round cell infiltration of the pia-arachnoid in which lymphocytes predominate. The infiltration is essentially perivascular, producing an intimal proliferation without degenerative changes, and it may follow the blood vessels into the brain tissue to form encephalitic areas.

Diagnosis

Is based on the history of infection, evidences of syphilis elsewhere, and positive serology. Blood Wassermann is positive 85% of the time, and spinal fluid is almost invariably so. The colloidal gold curve may vary, i.e., it may be syphilitic or paretic.

In many cases the prognosis is good if treated early. Vision may completely return. Recurrences are rare. In cases which have been severe optic atrophy ensues.

Treatment

Should be early and intense. It should be that of cerebral rather than ocular syphilis.

Neuritis Papulosa

Is frequently associated with a triad of: (1) Optic neuritis, (2) Periphlebitis, and (3) Chorio-retinitis. Occurs within the first two years after the primary infection and may be unilateral or bilateral. The primary focus is a syphilitic infiltration of the papilla which protrudes into the vitrous as a gray yellow mass, terminating by anchoring itself to a patch of chorioretinitis in the fundus. Hemorrhages and mascular stars are frequent.

Pathologically there is a round cell infiltration in the posterior segment associated particularly with the retinal vessels, where the arteries are encircled by a cuff of lymphocytic elements and their lumen is obstructed by proliferating endothelium. Visual loss is great and early and only small amounts are recovered.

The disease runs a long and chronic course despite continued therapy.

Gummata

Of the optic nerve are rare. The intracranial part of the optic chiasm is most often affected either being directly involved or being attacked by the extension of a gummatous meningitis which is relatively common in the chiasmal region.

Gummatous formations on the optic disc are also rare. Clinically they resemble tumors of the optic disc. The disc being enormously swollen and elevated, and the surrounding retina edematous and detached.

Pathologically

The nerve head is enormously thickened and with an intense small round cell infiltration interspersed with areas of caseation and necrosis, the process causing a thrombosis and obliteration of the central vein and complete destruction of the nerve fibers.

The treatment is the same as for syphilitic interstitial neuritis.

Para-syphilitic (Primary) Optic Atrophy

The atrophy of the optic nerve associated with the late manifestations of neurosyphilis -- dementia paralytica, the tabetic form of dementia paralytica and, more particularly, tabes- and occurring apparently sometimes as an isolated phenomena, has been traditionally called primary optic atrophy, since it was conceived to be due to a primary degeneration of the ganglion cells of the retina owing to the action of syphilitic toxins; nowadays it is generally conceded to be a secondary atrophy following inflammatory mischief in the nerve, but although the term "primary" is thus pathologically speaking a misnomer, its retention has considerable justification in the clinical sense insofar as the atrophy is not preceded by any ophthalmoscopically visible changes.

The occurrence in para-syphilitics is fairly common and accounts for some 1% of eye diseases among them. It is found among 6.5% of tabetics, 8% to 10% of general paralytics, and as high as 50% of juvenile tabetics are affected. Moreover a number of cases exist where the atrophy of the optic nerve seems an independent para-syphilitic manifestation quite apart from other evidences of central nervous disease. In all cases it appears some 10 to 15 years after the primary infection, between the ages of 30 and 50 and in congenital cases the juvenile forms become evident as a rule about the tenth year of life.

The atrophy appears first unilaterally but the second eye always becomes affected, usually showing the same type of field defect, but lagging behind the other in its development. Sometimes it progresses rapidly, but usually slowly, until eventually after some months or years it becomes complete and blindness is absolute with a fixed and dilated pupil.

Clinical Symptoms are:

(1) A loss of dark adaptation.
(2) A contraction of color fields.
(3) Subjective light phenomena.
(4) Defects in the visual field.
    Peripheral concentric loss.

The usual course of development of these symptoms is that of a progressive and steady deterioration without remissions, blindness resulting in an average time of 2 to 3 years; as extremes limits of 2 to 12 years may be set.

In appearance the disc becomes gray or dead white. The cribriform plate appears as a stippled area. The margins are sharply defined and the adjacent re-

tina is normal. Owing to the disappearance of nerve fibers the disc may be saucer-shaped. The vessels are normal and the absence of fibrous tissue or other proliferating or mesodermal elements distinguishes it from a post-neuritic optic atrophy.

Pathology

The pathology here as in other para-syphilitic lesions still is a matter of dispute. The most popular theory today contends the optic atrophy in tabes, tabo-paresis, and dementia paralytica is essentially of the same type and is due to a primary peripheral and interstitial neuritis arising as an extremely chronic exudative process essentially from the pia, due to the local production of toxins in the presence of the treponema, with a secondary degeneration of the nerve fibers and their parent ganglion cells.

The process becoming apparent first in the periphery of the nerve and most frequently in the intracranial portion distal to the chiasm.

This theory is not satisfactory. Briefly, the other two theories of the day are: (1) An exudative theory involving an extension of a chronic inflammation of the meninges along the septa of the nerve producing a secondary gliosis; (2) The other school contends that the gliosis is primary and the changes are secondary to it. Which is correct?

Prognosis

Bad. Despite the most efficient and radical treatment any persistence of vision beyond 6 to 8 years is exceptional.

Treatment

The treatment of this type of optic atrophy is an unusually unsatisfactory and melancholy record of failure. In all cases, no matter what treatment is tried, atrophic fibers cannot be regenerated; no treatment is therefore of value unless it is given early before extensive atrophy has been established. The best treatment is prophylaxis. The patient with neuro-syphilis should remain under the care of a syphilologist, and should have periodic perimetric examinations as this is the only method of detecting this insidious symptom, in its infancy. Although the disease becomes worse in some cases under treatment, the evidence is that in the majority of patients its progress can at any rate be delayed, and in a few exceptional cases the vision can be temporarily improved, or held stationary for a considerable number of years. The value of arsenic is debated. Some advise against it as having a harmful effect, others advocate its use but watch the visual fields with grave concern. The latter is the policy here.

Comparative studies have been made with the use of subdural injections, Swift Ellis treatment, intra-cisternal injections, fever therapy, malaria, various retrobulbar injections of vaso-dilators and a host of other methods. There may have been some prolongation over the 2 to 3 year period to blindness in untreated cases, but all were blind in 8 years.

On the whole treatment of syphilitic optic atrophy is a disappointing affair, and despite all the ingenuity which has been expended upon it, the problem has proved insurmountable.

4. Syphilitic Involvement of the Cornea

Definition:

Parenchymatous or interstitial keratitis denotes an inflammation of the substantia propria of the cornea, not involving primarily its anterior or posterior surfaces. Most of all interstitial keratitis is syphilitic in origin, figuring 70 to 90 per cent, and most of this is due to hereditary syphilis. 3% is due to acquired syphilis.

Syphilitic Diffuse Interstitial Keratitis

This disease is characterized by an infiltrative inflammation of the corneal parenchyma, of a chronic course and benign tendency, associated with an inflam-

mation of the corneal parenchyma, of a chronic course and benign tendency, associated with an inflammation of the anterior uveal tract. Inflammation of the uveal tract is almost invariable and occurs in the form of an anterior uveitis.

This is considered one of the late manifestations of hereditary syphilis, is permanent and of value as a diagnostic criterion.

Three per cent of cases are due to acquired syphilis. Comes on as a rule as a late manifestation, averaging about 10 years after primary lesion. This corresponds roughly with the time of occurrence after birth in congenital cases.

In acquired cases many have been reported following chancres about the eye. In the acquired type, the keratitis is usually uniocular, is frequently milder, and limited to a sector shaped area of the cornea, and sometimes seems more amenable to treatment.

Etiology

The syphilitic origin is undisputed, but the mechanism is still in dispute. One theory has it that the lesion is due to treponemata in the cornea. This is disproven by the apparent inactivity of treponemata found on the cornea at birth in many cases. While in interstitial keratitis the organisms are seldom if ever found. Likewise, interstitial keratitis is not only resistant to arsenical treatment, but will often develop in the face of strenuous treatment. Many believe this process to be allergic, the allergens being toxic products produced by the treponemata. This theory is quite complex and far from being proven, however, it holds favor today. It is a proven fact, however, that trauma to the cornea will often precipitate an attack of acute interstitial keratitis.

Pathology

Because the disease is not destructive pathologic studies are scarce, and especially acute phases. In the main, however, the pathologic change is a necrosis of the corneal lamellae associated with a massive cellular infiltration, mainly of lymphocytes, which soon becomes heavily vascularized, while at a later stage reparation is effected partly by the proliferation of fixed corneal cells and partly by fibrous tissue derived from the invading elements.

The posterior layers of the cornea are most severely involved, and become so infiltrated with new vessels they appear as granulation tissue. Bowman's membrane may be thinned out to a thread-like structure. Prominent among the infiltrating elements are nodular aggregations of lymphocytes. The epithelium is seldom involved though the endothelium may be destroyed. Desemet's membrane is often wrinkled, and many accumulations may be present on the posterior surface. The most conspicuous feature is the invasion of the substantia propria by new vessels, a defense reaction, and the vessels run in different levels corresponding to the level of the infection. These vessels tend to remain long after the acute stage has passed off, appearing as endothelial tubes in an otherwise clear cornea.

Coincident Changes Found Elsewhere in the Eye

The cornea exhibits its densest infiltration at the periphery, and as a rule the region around Schlemm's canal is the most highly affected of all. Here the dense lymphocytic infiltration is continued into the anterior part of the sclera, while iritis, cyclitis, and anterior choroiditis are common, characterized also with nodular infiltrations of lymphocytes and sometimes showing giant cell formations. Occasionally gummatous-like masses occur in the ciliary body. Frequently an episcleritis occurs with a dense infiltration round the pericorneal vessels, sometimes with a tendency to pannus formation over the cornea.

Incidence

In congenital cases: 38% males and 62% females. In acquired cases 31% males

and 69% females. There is a very definite age preference for the second half of the first and second decades of life. An infant may be born with active interstitial keratitis. About 6% of the cases occur under 5 years of age, 23% between 5 and 10 years, 21% between 10 and 15 years of age, 21% between 15 and 20 years of age, 14% between the ages of 20 to 25, 8% between 25 and 30 years, 4% between the years of 30 and 40. Bilaterality occurs in three-fourths of the congenital cases, involvement of the second eye occurring within 12 months of the first eye.

Clinical Course

An endothelial edema with discrete precipitates and corneal nebulae occur long before onset of the inflammation. Probably due to an early beginning iridocyclitis.

Progressive Stage

Onset acute and accompanied by pain, lacrimation, photophobia, and blepharospasm, with circumcorneal injection and a corneal haze. Is associated with an iridocyclitis and an anterior choroiditis. Lasts a few weeks to a few months.

Florid Stage

Disease is at its height, the cornea is heavily vascularized. Usually lasts 2 to 3 months.

Stage of retrogression: Follows a course of many months. The corneal haze fades and the vessels shrink.

The corneal haze begins as small maculae discreet at first and advance onto the midline where they meet those coming from below. Keratic precipitates are always present indicating an iridocyclitis. Vessels invade following the maculae and along the same course. In severe cases the entire periphery is surrounded by vessels and gives the appearance of the salmon patch of Hutchinson. These vessels arise from the limbal loops. These vessels absorb the maculae as they reach them. This stage of invasion lasts 4 to 5 weeks and the cornea is denuded, dirty and appears hopelessly blind. However, as soon as the vessels reach the center the cornea promptly epithelializes and looks much better, and clearing starts. The cornea is thinned and clearing is extensive. There is usually some central haze and a few ghost vessels which do not carry blood remaining. These are diagnostic criteria. Often the iris is either bound by synechia or markedly atrophic, and the anterior choroid shows evidence of inflammation. Variations may occur in the above in that all processes may be limited to a sector or spot. Desemets may be injured and a posterior ulcer result but this is either extremely rare or obscured by the other corneal pathology. With all this pathology corneal ulcers are rare, hypopyon rarer still and hemorrhage into the anterior chamber with a plastic exudate still rarer.

Recurrences

Occur in about 9% of cases and may occur at any time. Usually they are only transient and seem to be instigated by cold and trauma. Successive recurrences may appear in different parts of the cornea.

Sequelae

Usually some central corneal haze, ghost vessels and a thinning of the cornea which may be so severe a large astigmatic error develops and even keratectasia appears. Wrinkles in Desemet's membrane cause an annular keratitis. The iridocyclitis may produce synechia which, with the thinned cornea may result in secondary glaucoma and even buphthalmos.

Prognosis

On the whole good. In spite of the profundity of the lesions 70% retain 20/20 to 20/60 and less than 10% are left with 20/200 or less.

Treatment

Little or nothing can be done to alter

the course. The most effective treatment is the constant use of atropine to prevent complications in the inner eye. Heat and smoked glasses make for more comfort.

General Treatment

Not because it helps the present lesion but for general purposes of prevention of other lesions elsewhere. The treatment of congenital syphilis does not prevent the development of a keratitis at a later date, nor does treatment during the first attack prevent development of a keratitis in the other eye.

"The most efficient general treatment in so far as the local disease is concerned, general tonics, fresh air, good food, sunlight, and kindness during the weeks of irritation and encouragement during the months of resolution.

Keratitis Pustuliformis

Profunda or acute syphilitic metastatic abscess is due to metastases of treponemata to the cornea, may be considered as gummatous and is the only corneal syphilitic disease which responds to antisyphilitic therapy and this response is spectacular.

Gummata of the Sclera

Rare but do occur. Appear as nodules of various sizes extending from the limbus to the equator, are not painful, break down and discharge a viscid fluid and, unless stopped by antisyphilitic therapy will penetrate the globe with subsequent loss of the eye.

5. Syphilis of the Lacrimal Apparatus

Syphilis of the lacrimal sac may develop either as an extension from the nasal cavity (commonest), or it may occur as a gumma of the lacrimal sac independent of adjacent structures.

Treatment

Treat the general disease.

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V. GOSSIP

President Guy Stanton Ford spoke with feeling and direction at the general assembly of the Farm and Home Week in regard to the place of the University in the general welfare of the State. He pointed out that the group itself had actually made his talk for him. Out through the windows we could see the lights of our students (their children) learning complicated subjects which would enable them to make a living when they left school. The farmers and their wives had come to the University for help on their personal problems (service). They expected the University faculty to present them with new and better means of solving their difficulties, and they knew without being told that this could be made possible only by investigation. He further pointed out that all university authorities wonder how it is possible for the Minnesota dollar to be stretched so far. The excellent reputation enjoyed by the University is further proof of the fact that the money for education is being wisely spent. It seemed to President Ford that the logical approach to this question of university support would be to have the people themselves decide how important these services have become and to express their opinions to the legislature. It is obvious that beyond a certain limit further development in the University cannot take place.....Even more important is the decision which must be made by society as to the relative merits of relief and education, which is the direct outgrowth of the growing number of older individuals in our society....It is pleasant to record the following extract of a letter received this week: "I have just finished reading the article on 'Cysts of the Lung' in Part II of the January 10 number of the Staff Meeting Bulletin, and I cannot refrain from expressing my appreciation of its excellence. It is without doubt, I think, far and away the best and most definitive presentation of this subject which has yet appeared, and should do much toward dispelling the confusion of the past few years. For the first time, thanks to Dr. Rigler, it should now be possible for those of us who see only the occasional case not only to recognize it but also to assess the therapeutic possibilities."....The following patients have registered in the Out-patient Department. All are sufferers from arthritis. Emma Achen, Vitalis Johnson, Ake Akeson, Mary Damshy, Mrs. Shebat and Dora Domm. In addition we note the following: Napoleon Bonaparte, Ezra Holl, Lucille Bustrack, John Peppersack and Ed. Goodwater.....Speaking of names, a negro choir once used the Center Chapel for practice. The soloist was Eulabelly Riley.....When Head Radiologist Leo G. Rigler was in Boston at his National Meeting, he brought back tales of Dr. Sosman's dog clinics for radiologists. One case was of interest. It had to do with a dog who was left with friends while the owners were taking an extensive trip. Within a short time the animal grew listless and refused to eat. Eventually weight loss occurred and defecation became scanty. The radiologists were shown full roentgenologic studies of the animal strongly suspecting that the dog had swallowed a rubber ball or some other immovable object. Cure occurred when the owners came home, for the dog was lonesome. A family dog upstate in Minnesota also became a diagnostic problem. He lost weight, refused to eat, scratched himself a great deal and eventually developed quite an odor. The family, suspecting fleas, applied flea powder without result. They decided to comb out his coat to see if they could get any parasites and discovered that the youngster in the household had put a rubber band around the dog's neck which was not evident because of the leather collar on it. At latest reports the animal is recovering....Hospital Administrator Felix Lamella of Porto Rico has been a registrant at the course for Hospital Administrators this week. He has many tales of his experiences and of the customs of his people. The other evening at the Museum of Natural History, he attempted to describe birds native to his country by giving their various calls (without results).....National Cancer Research Fellow Charles B. Craft addressed a meeting of laymen at Detroit Lakes Friday, January 24, on the subject of cancer from the layman's viewpoint. In our cancer education program we have spent so much time trying to tell people how to recognize the disease early that we have neglected to inform them of the problems of a person who has the disease.....