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A CLINICAL LECTURE ON THE FORMS OF CON-
JUNCTIVITIS, WITH SPECIAL REFERENCE TO THE
TREATMENT OF OPHTHALMIA NEONATORUM.*

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INFLAMMATION of the conjunctiva, like cataract and inflammation of the cornea, presents itself in such various phases that it is difficult to take a comprehensive survey unless we adopt some logical method. In discussing, a fortnight ago, inflammation of the cornea, I employed a system of classification based partly on the anatomy of the cornea, partly upon its embryological descent, and partly upon its physiological and pathological relations and affinities. I shall follow a similar plan in considering inflammation of the conjunctiva.

We must remember that the conjunctiva is a mucous membrane, and is therefore liable to the same morbid changes as those to which the mucous membranes generally are liable. But the conjunctiva has certain special anatomical and histological properties which determine special forms of disease. For instance, we find in that portion of the conjunctiva which lines the lids, and is called the *tarsal conjunctiva*, there is a rich plexus of lymphadenoid tissue abounding in lymphoid elements. The presence of this lymphoid tissue determines one of the special forms of inflammation of the conjunctiva—namely, Trachoma or true granular lids, which has its primary “seat of election” in the tarsal conjunctiva. Then the portion of the conjunctiva that extends from the lid to the front of the eyeball, and is called the *conjunctiva of the fornix* or the lacunar portion, is thin, very loose, and contains many lymph-follicles. The presence of these lymph-follicles determines another special form of inflammation—namely, Follicular Conjunctivitis (best seen in the lower lid). Then, as the conjunctiva extends over the front of the eyeball, it is called *bulbar conjunctiva*, and covers the anterior part of the sclerotic and the cornea, forming, indeed, the epithelium of the cornea. As

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the conjunctiva approaches the cornea a gradual alteration takes place in the arrangement of the epithelium, and this, I believe, determines another special form of inflammation—namely, Phlyctenular Conjunctivitis. While the greater part of the conjunctiva is lined with columnar epithelium, the corneal epithelium is typically stratified and paved. The transition from the columnar to the stratified disposition takes place in the circumcorneal zone of the conjunctiva, which extends for about one-eighth of an inch from the corneal margin. A phlycten is a form of papulo-vesicle the anatomical requirement for which seems to be stratified epithelium.

Bearing these general and special anatomical and histological facts in mind, we may get a comprehensive and good working classification of the various forms of conjunctivitis. First we have inflammations affecting the whole extent of the conjunctival tract, and these may be divided into two classes—namely, (1) those which are accompanied by the ordinary products of inflammation, serum, muco-pus, and pus; and (2) those accompanied by special products, as croupous and diphtheritic exudations. The second group of conjunctivitis consists of localised inflammations, conditioned in a way already mentioned.

INFLAMMATION OF THE CONJUNCTIVA.

- I. Affecting the whole surface of the membrane.
 - (A) With ordinary inflammatory products.
 - (a) Simple.
 - (b) Catarrhal—epidemic.
 - (c) Purulent—infective :—
 - (1) Ophthalmia neonatorum.
 - (2) Gonorrhœal ophthalmia.
 - (3) Leucorrhœal.
 - (B) With special inflammatory products.
 - (a) Membranous, pellicular or croupous.
 - (b) Pseudo-membranous or diphtheritic.
 - (c) Bullous or pemphigus of the conjunctiva.
- II. Local inflammations, dependent upon special histological elements.
 - (a) The lids—Trachoma.
 - (b) The fornix—Follicular conjunctivitis.
 - (c) Circumcorneal :—
 - (1) Phlyctenula.
 - (2) Spring catarrh—phlyctenula pallida.

You know already the general morbid anatomy of an ordinary inflammation of a mucous membrane. Always there is enlargement of the vessels going to the inflamed tissue causing the inflammatory redness, with increased secretion of mucus, some infiltration into the membrane itself and the sub-mucous layers, more or less inflammatory exudation on the surface, mixed with epithelium, pus, and so-called "goblet cells." If the inflammation is more pronounced or due to more active poison, there is a large escape of leucocytes from the superficial vessels, giving rise to a purulent discharge. In a still higher degree of inflammation, or when the damage to the tissues is greater, there is an extensive destruction of the epithelium, with more injury to the blood-vessels; an abundant exudation takes place on the surface, and the exudation coagulates into a greyish or yellowish membrane. This is pellicular or croupous conjunctivitis, and physically differs from the diphtheritic form in several ways. The croupous membrane lies on the surface, and can, as a rule, be readily wiped off with a rag or stripped off with forceps, exposing a red, easily-bleeding surface. In diphtheritic inflammation the epithelial cells seem to die without being shed, and a copious exudation takes place into the substance of the membrane and coagulates, so that there is not an exudative layer lying on the surface of the membrane, but a firm coagulated mass or pseudo-membrane in the substance of the tissue, which cannot be wiped or stripped off, but which may eventually be shed partly by disintegration and partly by formation of lines of demarcation in the healthy tissue. Pemphigus of the conjunctiva is so rare that it need only be mentioned here. The *localised* inflammations are determined by the special histological conditions, and not by any peculiar course or phase of the inflammatory process.

The classification just given presents the main types of inflammation of the conjunctiva, though not all the clinical varieties, nor the modes in which they present themselves, such as acute, subacute, and chronic.

As regards their course and effects, some forms of conjunctivitis are comparatively mild, some malignant. Diphtheritic ophthalmia is perhaps the most fatal to sight, but it

is rare in this country; indeed, many persons even of large experience as surgeons state they have not seen a genuine case. Next in virulence and fatality as regards vision is Purulent Ophthalmia, which is more frequent, and may come under the observation of any medical man at any time. It is important, therefore, that all practitioners should be able not only to recognise it in its earlier stages, but also know how to promptly and efficiently treat it. This is especially so as regards Ophthalmia Neonatorum, which is one of the commonest causes of permanent blindness, and yet, if recognised in its early stages and properly treated, almost invariably ends favourably. This may seem to be a strong statement, especially in view of the fact that ophthalmia neonatorum causes from 30 to 50 per cent. of the blindness in Europe. Though, for obvious reasons, I rarely see any but severe cases, I cannot recall a case of purulent ophthalmia in an infant that did not recover with sound eyes provided the corneæ were clear at the beginning of treatment and the treatment was diligently pursued. Others have, no doubt, had similar experience.

I propose, therefore, to describe briefly the treatment of this disease, though I have nothing new to say about it, no new procedure to propose, and no new medicament to suggest. It is a common disease, and is to be treated on a plan respecting which there is a general agreement.

Much may be done by way of *prevention*, especially in maternity hospitals and kindred institutions. Whenever there is the slightest suspicion of any infective character about the maternal discharges, preventive measures should be adopted immediately after the birth of the child. The outsides of the eyelids should be gently and carefully washed with lint or clean rags moistened with plain and recently boiled water, and then a solution of nitrate of silver, 10 grains to the ounce, dropped on the lids over the palpebral fissure. After wiping the lids again with a piece of dry rag, the lids should be carefully separated, and a few drops of the nitrate solution, trickled well inside both lids, made to flow freely over the whole surface of the conjunctiva. If this be carefully and thoroughly done, few cases of ophthalmia neonatorum will occur.

If the disease does begin, the first sign of anything wrong is—two or three days after birth the eyes look weak and watery; there is increased secretion of tears and mucus, and the lids are glued after sleep. The margins of the lids become red and swollen, and the eyeball is bloodshot, and thin, yellowish serous fluid, not unlike bile, escapes from the conjunctival sac when the lids are opened. In a day or two the redness and swelling of the lids increase, the eye becomes very red, the bulbar and palpebral conjunctiva vascular and swollen, and the serous discharge is replaced by thicker muco-pus, which soon becomes purulent. So that in a few days there is a copious discharge of thick yellow pus.

What is to be the treatment? This will depend somewhat upon the stage of the disease. In the earlier stages some authorities advise mild and simple measures, and are content to use weak lotions of perchloride of mercury, boric acid, or alum, or something of that kind, deeming it unnecessary and undesirable as yet to employ any very active measures. This is not my opinion, and is not in accord with my experience. The more I see of these cases, the more am I disposed to use vigorous measures as soon as there is reason to believe that the case is genuine purulent ophthalmia. From the beginning I should institute what is called the nitrate of silver treatment, though the solution used in the serous stage should, perhaps, be less strong than in the purulent stage—say 5 grains in the former and 10 grains to the ounce in the latter.

Some precautions are necessary to obtain full efficiency of the remedy, and care should be taken not to neutralise or decompose the nitrate of silver solution either by using a soiled brush or allowing plain water or so-called "antiseptics" to come in contact with it. A little of the solution should be poured into a small wide-mouth bottle or into a minim medicine measure; the brush should, before being used, be wiped on dry lint or rag, and only distilled water should be used to wash off the excess of the solution from the conjunctiva; otherwise the nitrate of silver may be decomposed and its potency destroyed.

Before applying the nitrate solution, all discharge should

be gently removed from the outside of the lids and from the conjunctival sac by means of pledgets of lint or rag. The lids should then be thoroughly everted, so as to expose the swollen tarsal and lacunar portions of the conjunctiva; and then the exposed membrane should be painted with a camel-hair pencil well moistened in the nitrate solution; especial care being taken to make the application as far back as possible, because it is from this part that the pus is chiefly secreted. Most authorities recommend that any excess of the silver solution should be neutralised by means of a solution of salt; but this is, I think, neither necessary nor desirable, as any spare solution may be usefully employed in destroying the virus lying in the deeper parts of the conjunctival sac.

The application may or may not have to be repeated in a day or two—I am speaking, remember, of the earliest stage only at present. One application may stop the disease short, or at least destroy its virulence. Meanwhile the nurse or attendant should employ some lotion, dropped inside the lids every two or three hours; and perhaps there is nothing better than either perchloride of mercury (1 in 5,000) or chloride of zinc, one or two grains to an ounce.

I may parenthetically remark that some surgeons use alum lotion; but though this is often very useful, it is not, I believe, always safe. I have seen several cases in which perforation of the cornea has been favoured by the use of alum. In all forms of conjunctivitis, and especially the more severe, the epithelium of the cornea is apt to become soft and eroded; and this event constitutes one of the great dangers in purulent ophthalmia. When there is erosion of the corneal epithelium, the solution of alum comes in contact with the corneal cement and dissolves it, thereby separating the corneal fibrillæ and favouring perforation of the cornea. There is another medicament which has lately come into vogue in purulent ophthalmia to which I think the same objection applies—namely, solutions of permanganate of potash. Solutions of permanganate of potash are sometimes employed by histologists to dissolve the corneal cement in making preparations of corneal fibrillæ; and though I cannot say I have actually seen any damage arise from the use of permanganate of potash, I

believe the danger exists. Perchloride of mercury or chloride of zinc are quite as efficient, and they are not open to the same objections. If there be erosion of the corneal epithelium, the application of either of these medicaments causes coagulation of the albuminous material in the floor of the erosions, and thereby forms a limiting membrane. Nitrate of silver does the same.

If the disease has passed beyond the serous stage and has reached the *purulent stage*, the same line of treatment is to be employed only more assiduously. Instead of the 5-grain solution of silver nitrate, a 10-grain solution should be employed. The lids are to be well everted, all the pus wiped away, the conjunctiva painted in the same way and with the same precautions as in the earlier stages. But one application will certainly not suffice now. It becomes a question, therefore, how often and when the applications should be repeated. This will depend very much upon the severity of the inflammation and the amount of pus. The usual course is somewhat as follows:—You make an application, and find for the first few hours there is a certain increase of irritation, but there is less pus and more serum. Then for some hours the eyes seem to be better, the amount of pus is less, the pain is less, and the general symptoms are much improved. There is a period of remission. A few hours later the case begins to relapse: the inflammation increases and the pus becomes more copious, and the pain and other symptoms return. The time for the reapplication of the nitrate of silver is, so far as you can determine, at the end of that stage of melioration and remission, or just at the beginning of the stage of recrudescence. It may therefore be necessary to repeat the application daily, or on every second day, or at longer intervals, according to the severity of the disease. In any case, as the disease improves the intervals may be lengthened and ultimately the applications discontinued; though it will be necessary to bathe the eyes with mild astringent and antiseptic lotions long after the indications for applying stronger nitrate of silver solutions have disappeared.

There is one other question—that is: What is to be done when corneal complications arise, when ulcers have

formed, and the cornea is infiltrated and threatening to break down? Are you still to use nitrate of silver? Certainly; and, if possible, more vigorously than ever, because it is the inflammation of the conjunctiva and the infective character of the fluids which cause the damage to the cornea; hence you must combat the inflammation and lessen the virulence of the infective material. Nothing will accomplish the double purpose so well as applications of nitrate of silver solution. Indeed, it would be well to paint the ulcers of the cornea also. In my own practice, when the cornea is implicated I usually substitute, for any other lotions which may have been used, solutions of sulphate of quinine (four grains to the ounce, made with the smallest quantity of dilute sulphuric acid that will keep the quinine well in solution). Quinine thus prepared is a powerful antiseptic, and, unlike most other antiseptics, it is also antiphlogistic. The quinine is, of course, only to be used in the intervals, and not as a substitute for the nitrate of silver; for nothing, I believe, can be relied upon to save the eyes in purulent ophthalmia, whether in infants or adults, except the intelligent, determined and systematic use of the nitrate of silver treatment.