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Exudative Conjunctivitis.

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EXUDATIVE CONJUNCTIVITIS.

Conjunctival exudations have been observed for many years in some parts of Germany, but in England and the United States their occurrence has been comparatively rare. J. Soelberg Wells¹ stated that he had never met with a case in England of "true diphtheritic" conjunctivitis, but had seen many cases in Von Graefe's clinic in Berlin. Carter² admits its prevalence in Germany, especially in Berlin, but says he believes it to be "wholly unknown in England." Others, however, have observed "diphtheria" of the eye in England and other parts of Great Britain, and have reported undoubted typical cases, even such as have been common in some parts of Germany, of which the earliest and most complete description was given by Von Graefe.³

Pritchard,⁴ in 1857, stated that he had seen nine or ten cases of acute conjunctivitis in which "fibrin had been effused, of the same physical characters as that effused in a recent case of pleurisy, which had adhered to the lids, and when unchecked by treatment had spread over the surface of the globe and destroyed the sight." He gives the history of one case occurring in connection with scarlet fever, other members of the family having diphtheria of the throat.⁵ Johnathan Hutchinson,⁶ in October, 1859, recorded a very marked and severe case.

¹ "Treatise on the Diseases of the Eye," third Am. edition, 1880, p. 76.

² "Practical Treatise on Diseases of the Eye," Am. ed. by Green, 1876, p. 231.

³ "Von Graefe's Arch. für Ophthal.," 1854.

⁴ "British Medical Journal," 1857, p. 981.

⁵ See Mason, "Royal London Ophthalmic Hospital Reports," vol. vii, p. 167.

⁶ "Royal London Ophthalmic Hospital Reports," vol. ii, p. 130.

Since then numerous cases have been observed in Great Britain by Fredrick Mason,¹ Samuelson,² Nettleship,³ Tweedy,⁴ A. Critchett and H. Juler,⁵ J. E. Adams,⁶ Hogg, Streatfield, and others.

To show the comparative frequency of this disease in different countries, I will quote from the excellent work of Ernst Fuchs.⁷

Country.	Town.	Author.	No. Patients.	Per Thousand.
Germany . . .	Königsberg.	Jacobson.	10,000	6.2
	Berlin.	Hirschberg.	21,440	2.0
	Berlin.	Schöler.	10,000	0.6
	Düsseldorf.	Mooren.	108,416	1.1
	Leipzig.	Coccius.	7,898	0.2
	Heidelberg.	Becker.	7,547	1.2
Holland	Stuttgart.	Berlin.	9,827	1.2
Austria	Utrecht.	Donders.	3,000	2.3
France	Vienna.	Adler.	12,000	6.2
France	Paris.	Fieuzal.	34,577	0.4
England	London.	{ Moorfield's } { Hospital. }	22,130	0.2

American statistics of this disease have not yet been collected. It is, however, rarely seen, and practitioners here have written very little upon the subject. Landesburg⁸ has contributed an article, and Knapp⁹ has reported two cases, with remarks upon the disease. Alt¹⁰ has recently recorded nine cases.

It would appear from Knapp and Alt that in New York city and vicinity it is much more frequent than elsewhere in

¹ "Royal London Ophthalmic Hospital Reports," vol. vii (Nov., 1871), p. 164.

² "Transactions International Medical Congress," 1873, p. 127.

³ "St. Thomas Hospital Reports," vol. x, 1880.

⁴ "Lancet," 1880, vol. i, pp. 125, 282; and 1882, vol. i, Jan. 7.

⁵ "Transactions Ophthalmological Society of the United Kingdom," vol. iii, 1883, p. 1.

⁶ "Royal London Ophthalmic Hospital Reports," vol. x, p. 211.

⁷ "On the Causes and Prevention of Blindness." London: Baillière, Tindall & Cox. 1885, p. 171.

⁸ "Medical Bulletin," Philadelphia, vol. iv, no. 5.

⁹ "Archives of Ophthalmology," vol. xi, 1882, p. 1.

¹⁰ "American Journal of Ophthalmology," vol. iv, 1887, p. 41.

this country. Knapp says that Dr. Born, during his three years residence in the New York Ophthalmic and Aural Institute, collected notes of seventy well marked cases, and that mild cases of "croup" of the conjunctiva are not infrequent in his practice. Dr. Alt says he has seen at the same institution sixteen cases. Green¹ stated, in 1876, that he had never seen but one case, and that not very well marked.

Thus it is generally conceded that exudative inflammation of the eye in any of its varieties is very uncommon in this country; and this, too, has been my own experience. Among several thousand eye patients seen by me during the past ten years, I have met with only seven cases. I will give the history of one of these cases in detail, and the others I will refer to only in brief.

On April 7, 1886, I was called in consultation by Dr. S. G. Dorr, of Buffalo, to see Nellie R., aged one and one half years, who had been sick a few days with febrile symptoms, and had a rash resembling that of scarlatina. She had also had trouble with the right eye for three days, which was at first considered to be purulent conjunctivitis. The doctor had prescribed suitable remedies for the patient, but the eye continued to get worse.

At this visit the child was feverish, very restless, and the eruption on the skin and the strawberry appearance of the tongue were like those of scarlet fever. The throat was normal in every respect, and there was no manifest disease of the upper air-tract at any part. The left eye was healthy, and the right presented the following appearances: The lids were much swollen, tense, shiny, and red; the swelling extended considerably over the right side of the face and across the nose; the upper lid seemed elongated vertically, and projected over the lower lid, to which it was apparently adherent. The parts were very sore and tender, and the child was given chloroform to facilitate further examination. Anæsthesia having been induced, the lids were found to be very stiff, and where the edge of the lower lid was in apposition to the inner surface of the upper they were more or less adherent. They were separated with some difficulty, and with a lid elevator the upper one was lifted and turned out a little, when it was found that the upper and the lower lids were firmly glued to the eye-ball by the exudation, which had taken place from both the palpebral and ocular portions of the conjunctiva in their whole extent, and consolidated the surfaces in contact into one mass.

¹ "Carter's Practical Treatise on Diseases of the Eye," Am. edition, 1876, p. 232.

The cornea, which was exposed with great difficulty, was free from exudation. It was clear except in its extreme lower part, where it was cloudy. The lower lid was forcibly detached from the ball for a little distance, and the exudation was found to be of considerable thickness, and firm, and evidently had thoroughly infiltrated not only the ocular and palpebral conjunctiva, but more or less of the tissues beneath. While the lower lid was apparently adherent to the ball throughout, the upper was free for some distance from the margin, where it projected over the cornea and lower lid, and was adherent to the ball above the cornea and toward the retro-tarsal fold. No effort was made to break up the adhesions above. The exudation, as seen on the free portion of the conjunctiva of the upper lid and the detached portions of the lower, was of a color and appearance resembling wet chamois leather. It was tough, could not be wiped away, and there was no hæmorrhage when torn. The discharge from the eye was not great, and was watery and straw-colored.

The treatment advised consisted in frequent cleansing of the eye (every half hour) with one part of corrosive sublimate to 5,000 of a saturated aqueous solution of boric acid, and the constant application of compresses to the eye, kept wet with the same. The left eye was protected by being covered with a compress of absorbent cotton, covered and held in place by a bandage. The patient's head was also kept inclined to the affected side, so that the secretions and wash would not gravitate toward the sound eye. Internally, Dr. Dorr prescribed remedies principally to keep the child quiet. I was requested by the doctor to continue with him in the case, and I therefore watched its progress and aided in the treatment to the end.

April 8, the condition of the parts was unchanged, except that there was more swelling of the lids and face. The treatment of the previous day was continued, and to this was added the introduction of powdered boric acid, as much as could be contained, into the palpebral fissure, on the cornea, and as much as possible beneath the lids. This was repeated as often as the powder became dissolved, the parts being previously cleansed each time with the bichloride and boric acid solution.

April 9, the cornea was as clear as when I first saw it. The face and lids were still more swelled, and the tissues of the lower lid seemed more infiltrated with the exudation. The skin of this lid was also vesicated, the vesication extending downward from one half to three quarters of an inch from its margin, and one and one half inches transversely and outwardly from near the nose. The parts were very tender, and evidently painful, as the child was exceedingly restless, except when under the influence of narcotics. The secretion from the eye continued watery and yellow. The fever and rash were yet well defined, and the fauces were normal. The left eye was still unaffected, excepting that the lids were puffy from the extension of the swelling from the opposite

side. The protective covering was kept applied, and the treatment continued as before.

April 10, the lower eyelid showed a deposit of the exudation externally at the site of the previous vesication; and at about one third of an inch from the margin of the lid and toward the nose there were indications of breaking down of tissue and sloughing. The general swelling was about the same, and the corneal haziness had not increased. The treatment was not changed.

April 11, the exudates of the conjunctiva seemed to be softening, the secretions were more purulent, and the lids were beginning to loosen from the eye-ball. Pus was also discharging from the outside of the lower lid from a slit-like opening three quarters of an inch long, extending outwardly from the nose, parallel with and about one third of an inch from the margin of the lid. The lids and face were a little less swollen. The powdered boric acid was continued as before beneath the lids, on the cornea, and externally over the affected parts. The bichloride and boric acid solution was now used only for cleansing the parts, which was done every hour or two.

April 12, there was less swelling, exudates were clearing away in places, adhesions were giving way, and the discharge, which was purulent in character, was free both from the conjunctival surfaces and the sloughing part on the outside of the lower lid. The same treatment was continued.

April 13, the patient and the eye were decidedly better. The lids were no longer adherent to the eyeball, were still less swelled, the conjunctiva was becoming clean, there were no ulcerative processes, and its epithelium was reappearing. Pus continued to discharge as before, the cornea was unchanged, the rash had disappeared, and the patient was in every way comfortable.

From this time the eye improved rapidly, and by the 17th the exudation had nearly all disappeared, the conjunctiva was assuming a normal appearance, the haziness of the cornea was clearing up, and the lower lid was healing externally. By the 19th, the epithelium of the conjunctival surfaces had completely re-formed, and ulceration of the conjunctiva, contrary to my expectations, had not taken place. With such an amount of exudation and undoubted destruction of epithelium as existed in this case, I am still unable to understand why ulceration did not follow, with, possibly, cicatricial contraction or ugly adhesions, and how the parts could so favorably return to normal conditions.

The eye remained red for several weeks, and the place in the lower lid where the sloughing had occurred healed slowly. The right lachrymal passage seemed to be involved to some extent in the exudative and sloughing processes, so that it became obstructed, and constant stillididium followed the full recovery from the disease. A small scar was

left on the lower lid where there had been sloughing. With these two exceptions, the recovery of the eye was full and complete, and the child in a few weeks appeared strong and robust. The left eye did not become implicated at all, and was uncovered as soon as the discharge from the right eye had ceased to become purulent.

I will add that no diphtheria or scarlet fever was known to exist in the neighborhood; and that another child, a boy three or four years old, who had never had either of these diseases, and who could not be sent away, was in the house, and much of the time was in the room with the patient, but did not contract either scarlet fever or diphtheria; neither did any of the attendants, several in number.

It has been my fortune to see six other cases of conjunctivitis with exudation, but neither of them presented the characteristics of the above case. Two of these were young men, in whom the exudation appeared on the conjunctiva of the lower lid toward the inner canthus, and on the contiguous ocular conjunctiva. The exudation had the chamois-leather appearance, the infiltration extended into the tissues beneath the conjunctiva, and there was considerable swelling of the lid with chemosis and much pain and soreness. Corneal ulceration also developed. In each case the exudation apparently supervened upon an attack of acute purulent conjunctivitis. Under the use of a saturated solution of boric acid, both recovered, but with some destruction and cicatrization of the affected conjunctiva, and slight corneal opacity at the site of the ulcer. One of these cases I have previously reported.¹

Two other cases which I have observed were in adult males, in which there were patches of exudation on the conjunctiva of the lower lid of each eye, resembling that of faucial diphtheria, and which required several weeks to cure. These cases corresponded with those of so-called "chronic croupous conjunctivitis," described by A. Critchett and Juler,² and by Nettleship.³ Knapp⁴ also reports two cases of a similar character under the term "croup of the conjunctiva."

¹ "Buffalo Medical and Surgical Journal," August, 1884.

² "Transactions Ophthalmological Society of the United Kingdom," vol. iii, p. 1.

³ "St. Thomas Hospital Reports," 1880.

⁴ "Archives of Ophthalmology," vol. xi, 1882, p. 1.

Another case¹ of such conjunctival exudation has been seen by me, in which a thin pellicular membrane formed on the conjunctiva of one upper lid in a young man, debilitated and anæmic. There was marked conjunctivitis of a low type, and the pellicular exudate was easily removed with forceps, leaving the surface beneath bleeding at points, but only to re-form again soon. The disease was cured in a few days by instillations of boric acid solution.

Still another case which occurred in my practice several years ago was that of a little girl seven years old, in whom the diphtheritic exudation seemed to extend from the throat through the nose to both eyes. The eye-lids became very much swollen, stiff, and discolored, and there was considerable yellowish, watery secretion. The child died soon after the disease made its appearance in the eyes.

GENERAL REMARKS.—As to the nature and classification of exudations of the conjunctiva there appears to be a difference of opinion. Mackenzie,² the late renowned oculist of Glasgow, some years ago objected to making “diphtheritic conjunctivitis” a “genus or species” in the classification of eye diseases, and regarded it rather as a symptom of “much more serious changes going on in the deep-seated textures of the eye,” viz., of “ophthalmitis,” which might be “idiopathic, traumatic, and phlebitic,” and might “follow measles, small-pox, *scarlatina*, and *typhus*, being in these last instances, in all likelihood, pyæmic, or dependent on purulent infection of the blood.” But few, if any, who have had experience with this disease can agree with Mackenzie in his pathological views.

There are those who hold that this is primarily a local disease, while others believe it to be secondary, and but a local manifestation of a systemic disease. Some regard all exudative cases as really *diphtheritic*, but in different degrees of severity. Others make two distinct varieties. One form they term “croupous” or “membranous,” in which the exudation

¹ Reported in the “Buffalo Medical and Surgical Journal,” August, 1884.

² “Royal London Ophthalmic Hospital Reports,” vol. ii, 1860, p. 176.

is upon the surface of the conjunctiva, and may be easily wiped away, but soon to reappear again, which is generally limited to the palpebral portion, may be more or less chronic in character, and may proliferate into polypoid or cauliflower-like excrescences. The other form they designate "diphtheritic," in which the exudation takes place upon and within the conjunctiva, both ocular and palpebral, and into the tissues beneath, and which cannot be wiped away or removed without doing more or less injury to the adjacent parts. Other observers distinguish such varieties as "circumscribed," "confluent," and "diffuse" diphtheria (Hirschberg), and still others as "partial" and "total."

I hold that a distinction should be made between the exudative forms of conjunctival disease; and the division into croupous and diphtheritic conjunctivitis seems to me to be rational. In the first form, the exudation is fibro-plastic, superficial, partial, or more or less circumscribed; it can usually be removed easily, but re-forms again, and may supervene upon an attack of catarrhal or purulent conjunctivitis. The symptoms vary in character, sometimes being mild and at other times severe, with swelling of the lids, chemosis, ulceration of the cornea, and much pain. The discharge is generally muco-purulent, sometimes altogether purulent. The exudation is not reproduced in others by communication.

On the other hand, in the truly diphtheritic form the exudation is less circumscribed, is thrown out upon the surfaces of the conjunctiva, where it congeals into a semi-solid mass, frequently gluing the lids and the ball firmly together, and is also infiltrated into the tissues beneath. The lids become very stiff and much swelled, the upper one is elongated and overlaps the lower, the inner surfaces look yellowish-gray and anæmic, and the outer surfaces are dark-red and shiny. Frequently the skin of the lids vesicates, the vesication being soon followed by an external deposit of the diphtheritic exudation. The deposit upon and within the tissues so compresses and chokes the blood-vessels that the nutrition of the cornea is seriously compromised, and too often it succumbs

and sloughs, with permanent loss of sight. The discharge at first is comparatively scant, watery, and yellow. After three to eight days the exudation begins to soften, and the discharge becomes purulent. The constitutional disturbance is generally very great; an eruption resembling scarlatina is sometimes noticed, and the patient often dies. If death does not take place the eye recovers, sometimes with good vision, but more frequently with blindness, or with changes which very much deform the eye or impair its functions, these changes being due to the ulcerative processes, which are so destructive to the cornea and conjunctiva. The course of the disease is marked by much suffering, and it develops a specific virus which makes it directly communicable from one person to another.

Thus it will be seen that the two diseases, croupous and diphtheritic conjunctivitis, present very different pictures in symptoms, results, and ætiology, and that the one is easily distinguished from the other.

These diseases also differ in the indications for treatment. While it is not well determined as to what remedies should always be used, it is well determined what at certain stages and in certain forms should not be used. Certain caustics and stimulating agencies, properly applied, are permissible in croupous conjunctivitis, but in the diphtheritic form they are emphatically injurious.

The proper treatment of croup of the conjunctiva seems to me to consist in strict cleanliness of the parts, the use of antiseptic remedies, and the occasional removal of the pseudo-membrane. In acute cases mild astringents should be frequently applied, and for this purpose, and also as an antiseptic, I prefer boric acid solution. Weak solutions of nitrate of silver are also efficacious. In chronic cases, the careful cauterisation of the diseased surface, after the removal of the exudation, seems to be beneficial. As to other local applications, a great variety have been tried, but without any definite opinion having been formed as to their value.

In treating diphtheria of the conjunctiva, Von Graefe's

original methods are still followed by many. These consisted in strictly avoiding caustics, at least until the onset of the purulent stage, and in using ice applications, leeching and other local blood-letting, mercurials, and most rigid and antiphlogistic regimen. In some cases, instead of cold, he used hot applications to the affected eye. Knapp¹ says he "knows of no more important remedy than the energetic and persistent application of cold," and he does not endorse Mooren and Berlin, who use warm applications in the exudative stage. Arlt² recommends local bleeding in vigorous persons, and the use of cold to the lids proportionate to the degree of temperature in them. If "the lids no longer feel hot, and especially if the applications are unpleasant to the patient, they should be stopped, or warm applications substituted," providing these are not contra-indicated by corneal ulceration. He doubts the utility of mercurials in this disease. He says that a one per cent. solution of nitrate of silver, solutions of permanganate of potash, borax, chlorine water, etc., may be used later for the purpose of diminishing the secretion; but even without them "the conjunctiva returns, in a few weeks, to its natural condition, so far as it has not become phthisical."

De Wecker³ says, "Cauterisation and scarification should be avoided. Even cold must be employed but sparingly in severe cases. Alone of all the others, antiseptic treatment can be resorted to without misgiving from the very outset." The amount of purulent discharge will decide the extent of cold that should be applied. The more marked the diphtheritic state, and the less the discharge, the greater the indication for heat. If the cornea becomes dull, and sloughs, abandon cold and use "warm aromatic fomentations, or compresses moistened with carbolised water, or a half per cent. solution of salicylic acid." The only caustic "that can be directly

¹ "Archives of Ophthalmology," vol. xi, 1882, p. 10.

² "Clinical Studies on Diseases of the Eye, including those of the Conjunctiva, Cornea, Sclerotic, Iris, and Ciliary Body." Translated by L. Ware, M. D. Philadelphia, 1885, p. 70.

³ "Ocular Therapeutics." Translated by Litton Forbes, M. A., M. D., F. R. C. S. London, 1879, p. 68.

applied to the mucous membrane in these cases," he says, "is a strong solution of salicylic acid," 1 to 10 of water with sufficient biborate of soda to dissolve the acid. "A preliminary application should be carefully tried, followed immediately by ablution in order to mitigate the pain." If the vascularity of the conjunctiva is increased, its use may be persisted in. In some cases he advises certain forms of blood-letting, and, if not contra-indicated by weakness, bringing the patient under the influence of mercury, preferring inunctions for this purpose. The diet requires careful attention.

Twedy¹ recommends the use of a solution of quinine, to be applied constantly to the eye by compresses wet in it, and frequently instilling it into the conjunctival sacs. His formula is,—

R Quiniae sulph. gr. iij.
 Acid. sulph. dilut., q. s.
 Aquaë, ℥j.

Nettleship² says, "The agents to be relied upon are (1) either ice or hot fomentations,—ice, if it can be used continuously and well; fomentations, to encourage liquid exudation and determination to the skin, if the cold treatment cannot be carried out, or fails to make any impression on the case; (2) leeches, if the patient's state will bear them; (3) great cleanliness."

Hirschberg, who has written considerably on this disease, advises iced applications and bran poultices, with mercurials.

Dr. Bergmeister, of Vienna, and others, have used insufflations of flores sulphuris (flowers of sulphur) with improved results.

A. Vossius,³ of Giessen, has used a four per cent. solution of salicylic acid in glycerine, when aqueous solutions of carbolic, salicylic, and boric acids had failed to benefit. The glycerine solution was painted on the conjunctival surfaces every half hour, with an immediate reduction of the swelling

¹ "Lancet," vol. i, 1880, pp. 125 and 282.

² "Students' Guide to Diseases of the Eye." Third Am. edition, 1887, p. 112.

³ "Klin. Monatsbl. f. Augen," 1881, Nov., p. 418; "Ophthalmic Review," vol. i, 1882, p. 155.

of the lids and chemosis, and the healing of a large corneal ulcer, which threatened the destruction of sight.

Dr. Mayweg,¹ of Hagen, at the Heidelberg Ophthalmological Congress, 1884, spoke highly of the use of iodoform. His method was to open the lids, and, after thorough cleansing, fill the conjunctival sac with powdered iodoform, and then apply a pressure bandage. He stated that he had never failed to save the eyes when this treatment was begun before the cornea became affected.

Alt,² of St. Louis, contrary to the practice of most others, "treated the lids which came under my [his] observation, when the diphtheritic membrane was not yet large, or during its development, at once with nitrate of silver, thinking that the coagulation of the albuminous masses would act virtually in an antiseptic sense. The results were in the main satisfactory." He admits, however, obtaining the best results in his last case, in which a continued antiseptis was kept up by instillations of bichloride of mercury, 1 to 2,500, every hour, and a solution of cocaine and atropia in a four per cent. solution of boric acid instilled every three hours. No nitrate of silver or other caustic treatment was used in this case.

Other measures of combating this terrible disease, whose results are so disastrous to sight, have been recommended from time to time, but there is still much to be desired. My own treatment served me well in a most severe case, as well as in the more mild ones, but the experience is too limited to make it more than suggestive. I certainly shall repeat its use, if opportunity again presents itself. To recapitulate, it consisted essentially in cleansing the eye every half hour or hour with bichloride of mercury in a saturated solution of boric acid, 1 to 5,000, keeping compresses constantly applied wet with the same, and filling the conjunctival sac and palpebral fissure, and covering the cornea, with powdered boric acid, renewing it as often as dissolved or otherwise removed.

¹ "Ophthalmic Review," vol. iii, 1884, p. 322.

² "American Journal of Ophthalmology," vol. iv, 1887, p. 48.

When the purulent stage was established, mild astringents and antiseptics were used, and, as such, the saturated solution of boric acid was selected.

Other remedies may be used, and especially such as are indicated, when the cornea is affected, should be applied. As to prophylaxis in the diphtheritic form, isolation is important, at least from other children, as it is peculiarly a disease of childhood. When one eye only becomes affected, the other should be carefully protected.

In this paper I have not attempted to present a systematic study of the subject, but rather to place on record some interesting cases of these rare forms of disease, and to direct attention to some methods of treatment that have commended themselves to other practitioners and to myself.

