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TRACHOMA—RECENT ADVANCES AND THE PRINCIPLES OF PROPHYLAXIS*

BY

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A DISCUSSION of the social and legal measures which may be taken in different countries to reduce the incidence of trachoma, and to relieve the suffering and disability it causes, may be prefaced by a definition of what is meant by trachoma, and by a summary of the recent advances in our knowledge of the disease.

Trachoma is a specific contagious disease of the conjunctiva

* A report by A. F. MacCallan, President of the International Organization against Trachoma, read on April 3, 1935, at the Annual Meeting of the Organization held in London on the invitation of the Ophthalmological Society of the United Kingdom.

characterized by the new formation of lymphoid tissue which spreads to the cornea. It is followed by cicatricial changes in the affected tissues. It is chronic in nature.

The new formation of lymphoid tissue takes the form of follicles which may be present in several conjunctival diseases other than trachoma. Doubtful cases of trachomatous conjunctivitis may be decided upon by using biomicroscopical methods to detect corneal involvement, as shown by the characteristic vascular new formation at the periphery of the cornea. I drew attention to this more than 20 years ago (*Trachoma and its Complications in Egypt*. Cambridge University Press, 1913, p. 6).

It is of course impossible to apply biomicroscopical methods of examination to large groups of people, as when preparing statistics of the incidence of trachoma in a town or district. Many slight or early cases of trachoma must therefore be missed, and all geographical statistics must be greatly understated.

Recent Advances

The aetiology of trachoma is uncertain. It has not been proved to be of bacterial origin. Possibly it is a virus disease as it resembles other known virus diseases, such as psittacosis, in the exhibition in epithelial cells of inclusion bodies which are indistinguishable from similar bodies constantly present in virus diseases.

These cellular inclusions, which may also be found extracellularly, were first observed in the island of Java by Prowaczek and Halberstaedter in 1907 in a case of trachoma, and in the conjunctiva of an orang-outang inoculated with scrapings from the human case. My late revered friend Axenfeld believed in them as the aetiological cause of trachoma, though, in 1914, he had no knowledge of virus diseases.

In his introductory address to the Ophthalmological Society of the United Kingdom in 1931, Perdrau, of the National Institute for Medical Research, remarked that the presence of inclusion bodies is not necessarily evidence of the action of a virus, and that they have been produced in the rabbit's cornea by physical agents, such as ultra-violet rays (*Trans. Ophthalm. Soc. U. K.*, 1931).

Thygeson of Iowa, who first drew attention to the similarity between the cellular inclusions of trachoma and those of true virus diseases (*Arch. of Ophthalm.*, Vol. XII, 1934), has obtained certain of their constituents (elementary bodies) in sterile filtered and centrifugalized suspensions. There is still lacking, however, the conclusive evidence of the specific infective power of these filterable bodies. Until this is demonstrated final judgment must

be reserved. (Private communication from Hardy Eagles of the Lister Institute of Preventive Medicine.)

While in my experience uncomplicated trachoma is chronic, both in its onset and its course, a subacute form in which inclusions can easily be detected, but in which pathogenic bacteria are absent, has been described.

There is a form of ophthalmia neonatorum in which pathogenic organisms such as gonococci or streptococci are absent, but in which a careful scraping of the conjunctiva reveals the presence of inclusions in epithelial cells. Special staining methods must be used and a long search under the oil-immersion lens of the microscope may have to be made. This ophthalmia neonatorum with inclusions is a highly important clinical entity.

Inclusion bodies may also be detected in a certain form of conjunctivitis contracted by men in swimming baths. An exactly similar variety of conjunctival inflammation is occasionally met with in men who have never entered a swimming bath.

It may therefore be said that in a doubtful case of trachoma the presence or absence of inclusion bodies is not of diagnostic significance, and we have to depend on our clinical examination.

We owe the clarification of our ideas on these various forms of conjunctivitis to an important monograph by Morax (*Bull. Soc. Franç. d'Ophthal.*, 1933).

Owing to the fact that inoculations of trachomatous tissue from man into monkeys of various species never leads to trachomatous invasion of the cornea, as is invariably the case in man, there was until recently a doubt as to whether or not this experimental conjunctivitis was really trachomatous. However, Julianelle and Harrison have shown that this is the case (*Amer. Jl. of Ophthal.*, June, 1934).

Principles of Prophylaxis

In addition to these two difficulties, uncertain incidence and uncertain aetiology, there is in some countries a much greater one, the acute inflammation of the conjunctiva caused by bacterial organisms, which either precedes infection by trachoma or is grafted on to an already existing trachomatous conjunctivitis. This form of conjunctivitis, and not trachoma, is responsible for the high incidence of blindness, as the result of corneal ulceration, which attains its zenith in Southern Palestine and in Egypt, but is of common occurrence in Algeria, Morocco, Tunisia, Arabia, Persia and Iraq.

The seasonal ubiquity of these epidemics of acute conjunctivitis, for they occur every year when the atmospheric temperature rises in May, June and July, demands special consideration.

There is usually overcrowding in the villages, terrific dust-storms damage the eyes, absence of sanitation permits the breeding of innumerable flies which may convey infection, while the shortage of water, even for drinking purposes, is often serious. It should be realized that while these conditions persist there will always be trachoma and acute ophthalmias causing blindness, as there always has been for the last 5,000 years.

Egypt differs from other countries in the above category in that she is rich enough to provide ophthalmic clinics and develop propaganda for ocular hygiene on account of her immensely valuable cotton culture. Also there is no shortage of water, so that during the last 30 years the incidence of blindness has diminished very greatly, and will go on diminishing.

Desiccated countries such as Southern Palestine and Southern Tunisia, which are excessively poor, offer a heart-breaking task to the civil administrator. In Algeria an admirable organization for the relief of sufferers from conjunctival diseases has recently been proposed by Dr. Lansnet, Inspector General of the Department of Public Health, and it will be interesting to observe what success is obtained after the lapse of some years.

For Southern Palestine Dr. Strathearn has proposed a campaign against eye diseases which has the sympathy of the Palestinian Government.

I am inclined to think that in similar poor countries the issue by the Government of eyedrops, such as solution of zinc chloride 0.5 per cent., or zinc sulphate 0.5 per cent., in convenient bottles, would do a great deal to prevent the worst ravages of ophthalmia. It would be necessary to see that the issue was abundant, and that the local agents for distribution made no illegitimate profit out of the affair.

In these countries the influence of intercurrent diseases causing debility, such as malaria, ankylostomiasis and bilharziasis, is important in causing lack of recuperative power in the individual attacked by ophthalmia with corneal ulceration.

It has been necessary to lay particular stress on the acute ophthalmias which complicate trachoma in a few countries, since they are responsible for the heavy incidence of blindness which obtains there. However, in the great majority of countries where trachoma is endemic the disease begins insidiously and pursues a chronic course.

In countries where trachoma is a common disease, infection occurs in the family life at home from an infected mother or servants, it is only rarely that a child becomes infected at a day school. But boarding schools are a very different matter. The admission of a child with trachoma to a boarding school may result in a mass infection of the pupils. It is, therefore, incumbent on

the principals of boarding schools to exercise care in the admission of new pupils from trachomatous countries. Institutional trachoma has practically died out in England, but is still a serious matter in Ireland.

There are certain games or sports which tend to the dissemination of trachoma if a single player of a team is infected. One is Rugby football, and the other is wrestling. It is not generally known that nearly all professional wrestlers have trachoma.

Sporadic cases of trachoma do occur in England. I have under observation at the present time two medical practitioners with the disease, neither of whom has ever been out of England, and neither of whom has ever seen a case of trachoma, as far as his knowledge goes.

It is perhaps superfluous to remark that a patient may have well-marked and highly infective trachoma without showing any obvious sign of the disease until the upper lids are everted.

Within the last few days a boy from one of the great public schools of England was brought to see me. He had been living with his parents in British territory abroad, and had attended a school for British boys where there had been a small epidemic of what was called "pink-eye." He complained of wateriness of the eyes and of so much disability that his parents took him to two different ophthalmic surgeons for opinion. Neither of them everted the boy's upper lids and so did not recognize the condition. The parents, being unsatisfied, took him to another ophthalmic colleague, who, on everting the lids, at once recognized the condition, but asked me to confirm his diagnosis of trachoma, which I did.

Trachoma may be a very mild disease causing little inconvenience. I have under my care at the present time a medical man with undoubted trachoma who suffers not at all. I have carried out mechanical treatment or grattage under local anaesthesia without causing any pain, and under mild treatment, which he applied himself, is gradually improving from stage IIa to stage III.

In some parts of Northern India trachoma is practically universal, but progresses to a quiescent stage which produces little disability. Soldiers recruited for the Indian Army from these parts serve efficiently throughout their colour service and have not proved a danger to the British troops brigaded with them. (Annual Report of the Public Health Commissioner with the Government of India, 1931, Vol II, p. 36.)

The freedom from complications is due to the cleanly habits of a people who have abundant water for ablutions, a temperate climate and sanitary habitations.

It must therefore be remembered that trachoma is not necessarily a devastating disease.

I need only indicate the principles of prophylaxis which I have described fully elsewhere (*The Epidemiology of Trachoma*, *Brit. Jl. of Ophthalm.*, July, 1931, p. 393). They include personal prophylaxis, familial prophylaxis, school prophylaxis, prophylaxis in the Army and Navy, national prophylaxis and international prophylaxis.

Personal prophylaxis means the advice which should be given to anyone who is about to take up residence in a trachomatous country. Advice given should include a warning not to rub the eyelids with the fingers, and to wash the face and eyelashes at least twice a day.

Prophylaxis in the family.—A trachomatous mother is a grave danger to her newly-born child, and when possible some form of treatment, even if only antiseptic lotion or drops, should be applied. The use of handkerchiefs, towels and bed-linen which have been in contact with trachomatous persons is dangerous. Friends or servants with trachoma may readily infect a child whom they handle. In the heavily trachomatized countries where every member of the family and all the neighbours are trachomatous it can only be by a miracle that an infant escapes contagion. This is certainly true of the mass of the population. However, in the higher social grades in Egypt it is being found possible at the present time to bring up children without infecting them with trachoma. But here the housing, water supply and sanitation are good, while the mother and nurse have stage IV of cicatrized, non-contagious trachoma, or, if believed to be infective, undergo treatment by an ophthalmic surgeon.

School prophylaxis.—There are several reasons why it is advisable, where possible, to undertake a system of prophylaxis in schools. First a convenient gathering of young individuals is ready to hand; secondly, it is only by practical demonstration that an appreciation of the benefits of prophylaxis and treatment can be instilled; and thirdly, because efficient treatment carried out in the school will render the individual non-infective for any member of his family who happens to be non-trachomatous.

In Egypt I instituted an elaborate system of treatment and prophylaxis carried out by salaried ophthalmic surgeons whom I had trained. During the last year in which I was responsible for Egyptian ophthalmology (1923), out of 6,820 pupils there were at the beginning of the school year 31 per cent. with the more contagious stages of trachoma, I and II, while at the end of the school year this had been reduced to 12.2 per cent. This may be considered a fair result considering the difficulty experienced in many cases of changing by treatment stage I into stage III of partial cicatrization.

I have referred elsewhere (*Trachoma in the British Colonial*

Empire, *Brit. Jl. of Ophthal.*, November, 1934; also *La Revue du Trachome*, October, 1934), to the admirable directions laid down in Canada for the guidance of medical men, not ophthalmic specialists, who supervise treatment in the Indian residential schools. Some simple treatment such as is there described has a great value in teaching the pupils something about the care of the eyes, information which they often pass on to the older members of their family. As has been previously stated, day schools are not an important breeding ground for trachoma.

Prophylaxis in the Army and Navy need not be discussed here.

National prophylaxis.—The spread of trachoma is favoured by poverty, dirt, bad housing conditions, absence of sanitation and defective or absent water supply. If these can be improved the plague of flies will be diminished. The provision of clinics and hospitals for the treatment of eye diseases is of great educative value, for if the head of the family has trichiasis-entropion as the result of trachomatous cicatrization, and can get no operative relief, he is not likely to bother much if his child has a slight conjunctival discharge caused by trachoma.

International prophylaxis.—Typically this is carried out at the ports of entry into Canada and into the United States of America. Here all immigrants undergo a stringent examination by skilled medical officers which includes eversion of the eyelids. All cases of active trachoma are refused admission.

The Objects of the International Organization against Trachoma

At the XIIIth International Congress of Ophthalmology held at Amsterdam in 1929, it was officially proposed by the President, Professor van der Hoeve, and seconded by the Honorary Secretary, Dr. Marx, that an International Organization against Trachoma should be formed for the study of all matters relating to the disease.

Professor de Grosz became the President and Dr. Wibaut the Secretary General. The first plenary meeting was held at Geneva in 1930 and was attended by 64 delegates from 32 ophthalmological societies of various countries. A meeting of the Executive Committee was held in Paris in 1931 when arrangements were made for important discussions at the XIVth International Congress of Ophthalmology at Madrid in 1933. These duly took place and were of great interest. In 1934 a joint meeting with the International Association for the Prevention of Blindness was arranged by Professor de Lapersonne, the President of the Association, when various communications of interest were made.

My object in enumerating the activities of our Organization is to attract your attention to the zeal with which Professor de

Grosz and Dr. Wibaut have carried out their honorary functions. Professor de Grosz, who has been the main-spring of the Organization, and Dr. Wibaut have travelled on its behalf to Geneva, twice to Paris, to Madrid and to London. We owe them our sincere thanks.

The aims of the International Organization against Trachoma were enunciated by Professor de Grosz. They were and still are our creed. They include the encouragement of collaboration among the different organizations which are fighting trachoma, the study of the geographical incidence of the disease, its gravity and its sequelae, and also the organization of meetings to elucidate the aetiology, the therapeutics and the prophylaxis of the disease.

In my opinion our most important function is the arrangement of periodical scientific meetings where the various problems connected with trachoma may be discussed, not only by members of the Executive Committee, but also by others who have special experience of the disease or have devoted their energies towards the elucidation of its aetiology.

Since trachoma in some European countries is a rare disease, as is the case in England, little interest is taken in communications about the disease. The International Organization against Trachoma provides a society of initiates where any matter of scientific or therapeutic interest connected with trachoma may be discussed, and to which correspondence may be addressed.

There is no doubt that the importance of trachoma as a world-wide disease has been realised to a greater extent than was previously the case owing to the activities of the Organization against Trachoma, though general interest in the disease had already been awakened by the publication of "*La Revue Internationale du Trachome*," under the auspices of Morax.

Although the programme of the XVth International Congress of Ophthalmology contains no provision for communications on trachoma I hope that special and adequate sessions will be arranged for this by the Executive Committee. This is especially the case since the meeting place is to be in Egypt, one of the classical homes of trachoma.

The funds of the International Organization against Trachoma are derived from subscriptions from various Ophthalmological Societies. They have been used sparingly for the administrative needs of the Organization. Fortunately there is still a small balance, but it is insufficient to endow any form of research.

In my opinion our object should be to retain our present organization, to remain closely in touch with the Executive Committee of the International Congress of Ophthalmology, and with our sister-association, the International Association for the Prevention of Blindness.