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Greeves, R. Affleck.
University College, London. Library Services

Publication/Creation

[London] : [publisher not identified], [1913]

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THE QUESTION OF EXCISION OF THE EYE IN CASES OF INJURY.

*Contribution to a Discussion in the Section of Ophthalmology
at the Annual Meeting of the British Medical Association, Brighton,
July, 1913.*

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WHEN an injured eye is seen immediately after injury the question of its removal will depend on whether the damage to the eye is so severe as to preclude any possibility of preserving useful vision.

The development of panophthalmitis, or suppuration in the eyeball, which is the result of the introduction of septic matter through a perforating wound and necessarily an early sequela of injury, is in the same way an indication for the removal of the eye or its contents; an eye in which panophthalmitis has developed will never serve any useful purpose, phthisis bulbi being the inevitable result.

The question of the advisability of removing an eye some time after it has been injured is usually a more difficult matter. All will admit as an axiom, I think, that a blind, unsightly, and painful eye must be removed in all cases, but it is a different matter when the injured eye retains a measure of useful vision, or even when, though blind, the eye is not so disfigured as not to be preferable to an artificial one. By far the most important consideration in most cases of this kind is the possibility of damage to the sound eye through the development of sympathetic ophthalmitis if the injured eye be preserved.

And although there are certain important danger signals, of which the appearance of keratitis punctata in the injured eye is probably the most serious, sympathetic ophthalmitis is unfortunately not diagnosable clinically until the uninjured eye has become affected by the disease, the causative agent and method of spread of which are still matters of conjecture.

Histologically, however, the inflammatory changes found both in exciting and sympathizing eyes, examined microscopically, have been shown to conform to a definite type. These appearances are different from those found in other forms of uveitis, and that they are typical is shown by the fact that Fuchs, by mere examination of the

sections of 200 eyes excised for injury, was able accurately to separate them into those which had given rise to sympathetic ophthalmitis and those which had not. In such eyes the whole uveal tract is found to be involved in the inflammation, the choroid being usually the seat of most inflammatory reaction. The choroidal infiltration begins in the outer parts of the choroid and is of a nodular character, the nodules being composed mainly of lymphocytes and epithelioid cells; in many cases giant cells are present too. Caseation never takes place, cicatrization being the final outcome of the inflammatory process. The ciliary body is always involved, which is what one would expect from the clinical manifestations, and, to a variable extent, the iris. There is usually well-marked plastic exudation in exciting eyes; but this is not so constant a feature in sympathizing eyes, and may not be a part of the true "sympathetic" process. Signs of inflammation in the optic nerve are inconstant.

These pathological appearances are of great interest and importance in that they tend to show that sympathetic ophthalmitis is a definite morbid entity, and essentially different from other forms of uveitis, and one can form an opinion from the examination of sections of eyes in which they are present as to what conditions are likely to give rise to sympathetic ophthalmitis. An important element is thus added to what is already known as to history and clinical appearances in these cases. With this in view I have looked up the records of all the cases at Moorfields during the past fifteen years in which these changes have been found in the excised eyes. In each case evidences of sympathetic inflammation developed in the uninjured eye either before or within a week of the enucleation of the injured one. The interval between the injury and the appearance of inflammation in the injured eye was never less than two weeks, and in the majority of cases not more than three months. In 1 case there was an interval of four years, and in 2 one of over twenty years. In the case where there was the four years' interval a history of a second recent injury, six months before the other eye became inflamed, was obtained; but no such evidence was forthcoming in the other 2, in both of which the exciting eye was blind, and in one of which it was shrunken.

It seems possible, however, that a comparatively slight injury to an unhealthy and blind eye might be sufficient to cause a perforating wound, or at least to open a channel by which infection could enter the eye and yet might pass unnoticed. Perhaps the long interval between the injury and the onset of sympathetic inflammation recorded in some of the cases may be explained in this way.

In none of the Moorfields cases can a perforating injury be excluded, and in practically all of them there is a record of incarceration of the iris, ciliary body, lens capsule, or a combination of these, in the wound. The accompanying prolapse of one or more of these structures which occurs in wounds of the so-called dangerous area is probably the essentially dangerous element, and not

the actual position of the wound. In two recent cases at Moorfields which developed sympathetic ophthalmitis the wound was strictly limited to the cornea, but in each case the iris was prolapsed and could not be freed. In a condition of this kind infection of the uveal tract can easily take place, and the delayed healing of the wound gives rise to a long period during which infection may occur; this may account for varying periods of onset.

It is noteworthy that although many eyes with retained foreign bodies have been enucleated at Moorfields during the past fifteen years, not one showed the typical appearances of sympathetic inflammation, nor did any give rise to sympathetic inflammation in the other eye. Intervals of from a few days to forty years between the entry of the body and the enucleation of the eye are represented, as well as various kinds of foreign body; of these, pieces of iron and steel are the most numerous, and in the case with the longest interval the body was a piece of glass. It would seem that retained foreign bodies are not dangerous *per se* from a sympathetic point of view, apart from the nature of the wound caused by the body in entering the eye, or by operative measures undertaken for its removal.

Leaving sympathetic ophthalmitis out of the question for the moment, the behaviour of an eye into which a foreign body has entered depends partly on whether the body is contaminated with organisms, and partly on the chemical nature of the body itself, as well as on the situation in which it lies. If septic, a panophthalmitis may be set up, rendering early removal of the eye or its contents necessary, or if the organisms are not sufficiently virulent for this, a less severe inflammation may be caused, which may eventually quiet down. Again, if the body is soluble in the intraocular fluids, chemically irritating substances resulting from its solution may set up inflammation; iron and steel are less irritating in this way than copper or brass. Particles of metal may become encapsulated, the eye quieting down, but siderosis bulbi takes place, and the sight of the eye is inevitably lost through degeneration first of the ganglion cells and nerve fibres, and eventually of the whole retina. Degeneration of the retina occurs quite early, and detachment is common.

Eyes with retained foreign bodies are often subject to intermittent attacks of pain, so that the eye becomes a nuisance, and sympathetic irritation may be set up in the other eye, a condition which renders removal of the exciting eye necessary. So that although they are probably not dangerous in the sense of causing sympathetic ophthalmitis, it not infrequently happens that it is advisable to enucleate these eyes with retained foreign bodies for other reasons. The lens is said to be more tolerant of foreign bodies than other parts of the eye; while foreign substances situated in the neighbourhood of the ciliary body are specially liable to give rise to persistent inflammatory trouble.

It is well-known that eyes in which panophthalmitis has taken place are not liable to give rise to sympathetic

ophthalmitis, and various theories have been advanced to account for this fact. The same statement applies to eyes with perforating ulcers, and whatever the cause may be it is probably the same in both cases. The possibility of sympathetic inflammation as a sequela of a perforating ulcer cannot, however, be excluded; one of the recent cases at Moorfields was of this nature. In this case sympathetic inflammation in the sound eye followed five months after the perforation of a hypopyon ulcer, no operative measures of any kind having been undertaken. The exciting eye, being staphylocomatous and blind, was excised; it showed the histological changes typical of sympathetic ophthalmitis.

Although the shrunken eyes, often containing bony choroids, which result from panophthalmitis, are not usually dangerous from the point of view of sympathetic inflammation, and when quiet are quite innocuous, they ought to be excised if fresh inflammation and pain should occur. An eye in this condition is liable to give rise in the other eye to the condition known as sympathetic irritation, by which term a train of symptoms, including photophobia, lacrymation, and fatigue of accommodation, is understood. This condition, although an absolute indication for removal of the exciting eye, is most likely a nerve reflex, and in no way connected with true sympathetic inflammation, which is not preceded by such prodromal symptoms. Enucleation of the exciting eye is a cure for the condition, and the excised eyes do not show the appearance typical of sympathetic inflammation. The cases at Moorfields in which eyes have been excised for sympathetic irritation only, bear out this view, and Fuchs's series of cases points to the same conclusion.

Old shrunken eyes, on the other hand, have occasionally, if rarely, given rise to true sympathetic inflammation, but as I have mentioned before, the question of infection through a fresh injury comes in here.

In all cases where sympathetic inflammation has occurred a long time after injury there has been a recrudescence of inflammation in the injured eye to begin with, and in view of this the safest course is to excise an injured eye which, after a quiet period, shows signs of fresh inflammation. The presence of keratitis punctata is, of course, a specially serious sign.