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2

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BY

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Reprint from The Ophthalmic Record, March, 1902.

THE CLINICAL AND PATHOLOGICAL REPORT OF A CASE OF FOREIGN BODY RETAINED IN AN EYE FOR TWENTY-SIX YEARS.

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The entrance of a foreign body into the vitreous usually excites violent inflammation, by which the eye is destroyed. In exceptional cases, it happens that a foreign body is tolerated, so that it may be seen for years, either free or enveloped in an exudate, within the otherwise clear vitreous. The tolerance varies and the effects are uncertain; therefore, the presence of a foreign body in the vitreous is always a menace to the integrity of the eye. The absence of any signs of inflammation does not negative the prognosis; latent micro-organismal infection may become active at any period, or, slow degenerative changes may ensue, through the oxidation of the metallic foreign body, and the elimination of salts which act as irritants to the delicate tissues. These changes so reduce the reconstructive forces of the tissues that the organ is easily affected by a traumatism or profound systematic disturbance, such as is usually readily resisted by hitherto healthy eyes; it cannot withstand the onslaught and the eye is lost.

An interesting case in point, occurring at Wills' Hospital, in the service of my chief, Dr. Schwenk, is shown by the following history. In this we found that a man had received an injury to one of his eyes, with the probable retention of a foreign body, which had remained apparently inactive for twenty-six years, when, after an injury to the cornea, the eye failed to regain its usual health. After the positive location of the suspected foreign body, the eye was enucleated. The histologic study of the tissues shows that the immediate effects of the recent injury were unusually pronounced, owing to the degeneration of the retina and the choroid, brought about by the prolonged retention of the foreign body.

On 23d December, 1899, W. F. B., aged 35 years, a smith, ap-

plied at the Wills' Hospital for the relief of an inflamed right eye. He was assigned to my friend and chief, Dr. Schwenk, to whom I am indebted for the privilege of presenting this report. The man stated that seven weeks previous he had been struck on the right eye by a bolt-head, receiving injuries which were treated by his physician at one of the rolling-mill towns in the interior of this state. This course of treatment was unavailing, and because of pain and discomfort with accommodative strain in the fellow eye, without, however, a marked decrease in the visual acuity, he applied for treatment at this hospital.

In 1873, twenty-six years ago, in his boyhood, while standing near the forge, watching the sparks, the patient was struck in the right eye by a chip of flying metal. He always believed this had entered the globe, though a foreign body had never been located therein. After a while the inflammation subsided and the eye remained quiet until the receipt of this recent injury. The man declares that, in all these years, while the sight had been defective, he had had good peripheral vision and has been in no way incapacitated for work; and at no time had he experienced pain in either eye.

There was only light perception remaining in the right eye, while the vision of the left eye was equal to $\frac{5}{10}$. An erythematous rash was noticed over the upper portion of the face; this, the patient stated, was due to the solution he had been using in his eye. The condition of the injured eye was as follows: A slight edema of the lids accompanied marked congestion of the conjunctiva. At the summit of the cornea was a large abscess confined to the deeper planes. The anterior chamber was shallow and free from exudate, the pupil was pyriform; in the outer lower quadrant of the cornea was an old cicatrix in which the iris had became incarcerated. T + 1.

Under cocain anesthesia, with a von Graefe knife, the cornea was slowly bisected through the abscessed area at about three millimeters from the lower limbus, the tough slough extruding with the escape of the aqueous. The iris was apparently unchanged in its position. After the dressing of the wound, atropia was instilled repeatedly and ice compresses were applied constantly. The condition of the eye did not improve. From this lack of success, the possibility of there being an old foreign body in the eye, now became a certainty. Accordingly, on the 30th December, the patient was sent to the Pepper Clinical Laboratory to have the eye radiographed. The

negative demonstrated clearly the presence of a foreign substance in the posterior inferior quadrant of the vitreous body. By this time the cornea had become more extensively infiltrated, the anterior chamber lessened in depth, while the iris was greenish in tint and an exudate was filling in the pupillary space. Immediate enucleation was advised, and the patient readily consented. The globe was enucleated without accident under general anaesthesia. On 4th January, 1900, although the socket had become quite edematous, the patient, at his own request, was discharged from the house. The visual acuity of the remaining eye was: Sn., $\frac{5}{7}$, Acc. 0.50D. 22 — 38 cm. On 17th March, the socket appeared clean, when the glass eye shell was ordered. The left eye had remained free from all disturbing symptoms.

On section of the globe through the equatorial region, the vitreous was seen to be disorganized, yet not purulent; the clear fluid, escaping freely, caused the retina in the posterior half to collapse into the cavity, except at the lower outer quadrant. Here the membrane and the underlying choroid had become adherent to the sclera by reason of the organization of fibrin surrounding an apparently metallic body, embedded therein, measuring approximately four millimeters in its longest diameter. Lines of pigmentation radiated from the foreign mass, the pigment accumulating towards the periphery. At no place in this posterior section was the retina or the choroid the seat of purulent exudative processes. Surrounding the deeply cupped optic disk, was a clear glaucomatous halo of a radius of one millimeter; the vessels entered and emerged at the disk in straight lines.

The cornea was quite opaque and exhibited the line of the recent paracentesis and the presence of the earlier cicatrix. The ciliary processes and iris were markedly congested and covered with exudate. Leading out towards the equator, the underlying choroid was infiltrated, while the retina from the ora serrata presented lines of pigmentation similar to those that were noticed in the examination of the posterior half of the globe.

The specimen was preserved in formol and alcohol; the posterior half was mounted in glycerin jelly in a museum cup, while the anterior half was embedded in celloidin for histologic study. The sections were stained with hematoxylin and eosin, and afterwards with carmin and potassium ferrocyanid, for the purpose of studying the probable infiltration of the tissues by the metallic salts which had permeated the tunics during the slow oxidation of the foreign body.

The anterior hemisphere was bisected in the vertical meridian; the stained sections are from the nasal portion and do not contain the line of the old cicatrix with the iridic synechia. The curve of the cornea is abruptly broken by the line of the recent incision; the upper lip of the wound has inclined inwards, the lower, outwards, the gap between being filled with prolapsed iris, exudated products and detritus. At the corneal limbus the vessels are distended and filled with leucocytes, and the tissues are markedly infiltrated with round cells. The epithelium is intact throughout. Near the seat of the abscess the corneal fibers are moderately separated. Extending from the surface of the incised edges into the lamellæ is a mass of round-celled infiltrate. Near the lower angle the fibers are separated and teased; here, beneath Bowman's membrane, is a cyst-like cavity filled with polymorphous leucocytes, the posterior wall being formed by a condensation of the corneal fibers; adjacent to this is a moderate area of infiltration. The posterior surface is wrinkled, yet the endothelium is adherent and not hyperplastic. Some of the sections show clumps of a granular exudate clinging to the endothelium; others show the iris in contact with the cornea.

The anterior chamber is shallow. The iris and the ciliary body, with its processes, are greatly infiltrated with round cells; in the region of the angles of the chambers numerous cells have wandered out, while a more marked exudation is seen about the ciliary processes. The vessels of the prolapsed iris are surcharged with leucocytes. The filtration angle is singularly free from pressure. The scleral vessels are turgid with leucocytes.

The knife has divided the crystalline lens. The cells of the capsule have undergone a rapid proliferation, the subcapsular cortex has become distended by huge vacuolations and is filled with a granular débris. The intermediate fibers are separated by a round-celled infiltrate, while the nucleus is densely sclerosed, except in its outer layers. In places the iris and capsule are in contact.

In the division of the globe, the relations of the tunics were disturbed by the forcible removal of the vitreous. Near the equator, in some of the sections, there is a large hemorrhagic extravasation between the choroid and the sclera. The choroid is degenerated, the capillaries being obliterated; the few remaining vessels have thickened walls and are filled with leucocytes. The round-celled infiltrate extends from the ciliary region into the choroid. The choroidal stroma pigment is greatly degenerated.

The structures of the retina are in places so condensed that the elemental layers are not differentiated; the granular layers are in many places in close contact and deeply pigmented,—the rods and cones being imbedded in masses of pigment; the ganglion cells are atrophied, while the supporting tissues and the fiber layer are sclerosed. Throughout the retina, especially around the vessel walls, there is much secondarily degenerated pigment, and in some portions the sheet is quite fibrous and contains many pigmented nuclei.

The examination of the sections stained with potassium ferrocyanid shows that the tissues had become infiltrated with iron salts dissolved from the foreign body, and are disposed in the following manner. The cornea and sclera are apparently free, but along the vascular channels in the iris, the ciliary processes, the choroid and the retina, there is an extensive blue discoloration. In the outer fibers of the lens nucleus the reaction is also present, while there is a bright bluish-green hue diffused throughout the nucleus.

For the many valuable suggestions offered to me during the preparation of the specimen for pathologic study, I am gratefully indebted to my friends, Dr. Edward A. Shumway, and the late lamented Dr. Thomas S. Kirkbride, Jr.

The study of the history of this case presents the following points of interest: A foreign body is said to have been lodged in the interior of an eye which remains quiet, after the subsidence of the acute inflammatory symptoms, for twenty-six years. During this long period of time the eye was said to have retained some visual power. A recent injury to the eye excited the development of a corneal abscess which failed to heal despite careful treatment. The course of this inflammatory attack was a more violent one than is ordinarily found in that following a primary injury. The suspected foreign body was localized by means of the Roentgen rays. After the enucleation of the eye, the foreign body was discovered to be lying in just the position so accurately defined by the radiograph. The study of the tissues demonstrates that there had been, antecedent to the second injury, a slowly progressive degeneration of the choroid and the retina, with an infiltration of the vascular structures by the metallic salts dissolved from the foreign body.

In conclusion, therefore, in this day of improved surgical methods, when called upon to treat an eye recently diseased, in which

there is any reason to suspect the retention of a foreign body, it is incumbent upon us to use all the means of accurate diagnosis at our command. When a foreign body is present it should be removed by such procedures as shall do the least damage to the tissues. Thus shall be avoided the dangers of the acute, or more remote, destruction of the globe, and the possible sympathetic affection of the other eye. In the event of failure to extract the foreign body, or of the refusal to permit enucleation, and although the primary symptoms may abate, an adverse prognosis should be given because of the degenerative changes produced in the delicate structures by the irritation caused by the presence of the retained foreign body.