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## ABSCESS OF THE ORBIT AS THE RESULT OF SUPPURATING ETHMOIDITIS: OPERATION AND RADICAL CURE.\*

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In cases of purulent disease of the ethmoid sinuses the natural escape for the pus is into the nasal cavity, where it can be seen beneath the middle turbinated body, or between this structure and the septum; but according to Bosworth,<sup>1</sup> "this is by no means its invariable course, as is shown by the large number of cases in which the pus escapes through the *os planum* into the orbital cavity, giving rise to exophthalmos and orbital disease." The following case is a good example of abscess of the orbit connected with suppurating ethmoiditis, and illustrates certain important and interesting points in regard to the operative technic:

D. S. W., a grocer, aged 67, born in New Jersey, married, consulted me March 25, 1896, in the hope of obtaining relief from disease of the left orbit.

*History.*—In his early life the patient had been perfectly healthy. About his twenty-first year he was attacked in rapid succession with measles and scarlet fever. As the result of these diseases rhinitis developed, which terminated in the chronic atrophic variety of this affection. He also had inflammation of the middle ear and perforation of the left drum-head.

At the age of 65 the patient had a sunstroke and afterwards much violent headache; indeed, prior to his sunstroke he suffered from brow-ague which was attributed to malaria. For two years before he reported for treatment, and markedly during the preceding year, the headache was located chiefly over the left brow, and was often associated with a swelling at the inner angle of the orbit. For twelve months this swelling had been persistent,

and for three months there had been marked diplopia. The patient's habits had always been good. There was no history of venereal disease. His wife and children are healthy.

*Examination.*—The patient is a medium-sized man, with ruddy countenance, the flush on his face being particularly marked during the periods of severe headache. Physical examination failed to reveal the presence of any disease, save that situated in the orbit and in the rhinopharynx.

*Eyes.*—R. E. practically normal, with the exception of a small pterygium at the inner side. The refraction was a moderate compound hypermetropic astigmatism.

L. E. The eye was displaced downward, the center of the cornea, being 8 mm. below the level of the center of the cornea of the opposite side, while the face of the cornea was tipped slightly upwards and backwards. There was no direct forward protrusion of the bulbus. Upward movement of the eye was abolished; the other movements were preserved. There was ptosis from edema of the upper lid, which was most marked upon the inner side. An elastic swelling was situated at the upper and inner portion of the orbit, and pressure elicited marked tenderness, especially in the region of the supraorbital notch.

The ophthalmoscope revealed an oval optic disc, slightly grayish in color, and normal retinal vessels. There were no extravasations in the fundus. V. with +1.50 D. =  $\frac{6}{12}$ . The field of vision for form and for red was normal. There was vertical diplopia in all portions of the field of fixation.

*Rhino-pharynx and Adjacent Sinuses.*—Examination by Dr. Walter J. Freeman: "There was atrophy of the turbinates, which was more advanced on the left side. The fossæ were lined with thick,

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<sup>1</sup> DISEASES OF THE NOSE AND THROAT. New York: William Wood & Co., 1896, p. 264.



dry crusts, but no purulent discharge was seen anywhere. On the left side there was an opening into one of the anterior or middle ethmoid cells, about 3 mm. in diameter, and a smaller one on the right side in about the same position. These were probably the result of atrophy, as the patient asserted that no operation had been performed. There was no abnormal bulging of the walls, nor growth of any kind within the nose.

"Transillumination of the antrum of Highmore was good on the right side, but completely absent on the left. The frontal sinuses were shown to be clear on both sides by the same test."

In view of the history of the case, the character of the swelling and the presence of atrophic rhinitis, the patient was told that in all probability he was suffering from an abscess of the orbit connected with either the frontal or the ethmoid sinus, and exploration of the orbit was advised. The absence of fluid pus in the nose, moreover, indicated probable retention in some of the accessory sinuses, which would account for an accumulation of pus in the orbit. As the transillumination-test showed that the frontal sinuses were clear, the evidence strongly pointed to the ethmoid cells as the seat of the disease. Dr. Herman Knapp, of New York, who saw the patient in consultation April 2, 1896, agreed with the diagnosis and the propriety of operative measures.

The edema, not only of the upper lid but of the entire brow as well, rapidly increased, and the swelling previously described daily became more evident. The diagnosis of abscess was now unquestioned and the patient was again urged to submit to operative interference. Consent having been obtained, on April 11, 1896, at the Polyclinic Hospital, assisted by Drs. H. R. Wharton, C. A. Veasey, and Walter J. Freeman, I made an incision through the brow from the inner to the outer angle and opened the orbit. Immediately there were evacuated several ounces of thick, greenish-yellow pus, which had been contained in a pocket at its upper and inner part. The inner two-thirds of the supraorbital margin and a portion of the roof of the orbit were found denuded of periosteal covering, a carious process having already begun in the orbital margin. The pulley of the superior oblique

was recognized and found loosely adherent to a fragment of carious bone, which was detached. All diseased portions having been carefully removed with chisel and curet, especially the necrotic area in and around the ethmoid foramina, attention was directed to a small cavity at the upper and inner portion of the orbit, which for the moment was supposed to be the frontal sinus, exposed through absorption of its orbital wall. Further investigation, however, proved that this observation was inaccurate and that the frontal sinus was intact, and, as was subsequently shown, did not participate in the disease, which was confined to the ethmoid sinuses.

The floor of the orbit was now perforated at a point corresponding to the junction of the lachrymal bone, orbital process of the superior maxillary, and the *os planum* of the ethmoid. Through this perforation a probe was passed, to which was attached a fenestrated drainage-tube. The probe was gradually insinuated into the upper portion of the nasal cavity and brought out, together with the drainage-tube, through the left anterior naris.

As transillumination had revealed opacity in the upper part of the maxillary sinus of the left side, it was deemed advisable to tap this cavity through the canine fossa, in order to ascertain whether or not there was a collection of pus. This operation was, at my request, performed by Dr. Freeman, with negative results.

The wound above the orbit was closed with interrupted sutures and a full antiseptic dressing was applied. The subsequent treatment consisted in frequent spraying of the nose with Dobell's solution, hydrogen dioxid and other mild antiseptics according to the circumstances, and washing out the drainage-tube three or four times a day with a solution of mercuric chlorid (1 to 8000). For a few days there was a good deal of swelling of the lid, but perhaps not more than was present before the operation. The vision of the eye was good, the headache was materially relieved, and the temperature at no time rose higher than 101.4° F.

On April 26, the eye had assumed a well-nigh normal condition. The drainage-tube was removed and for it was substituted a drain of iodoform-gauze. Two days later violent headache began, fol-



lowed by enormous swelling of the upper lid and subnormal temperature. Both the swelling and the headache were greatly relieved by the evacuation of a large quantity of inspissated matter, which apparently came from the anterior ethmoid cells. The gauze drain was replaced by a new drainage-tube.

As the edema did not entirely subside, and as there was much brawniness of the upper lid, indicating deep-seated orbital disease, and furthermore, as there was a distinct sense of fluctuation at the outer side of the orbit, the temporal side of the old incision was opened and a large quantity of pus, which had accumulated in a pocket on the outer side of the orbital cavity, was evacuated. Some more carious bone was discovered and curetted away, and an additional drainage-tube, passing across the orbit from one angle of the wound to the other, was inserted.

From now on the recovery was practically uninterrupted, the treatment consisting, as before, of daily irrigation through the drainage-tubes and constant attention to the naso-pharyngeal disease.

On May 23, or ten days after the second operation, the drainage-tubes were replaced by silkworm-gut. On June 2 all drainage was removed, and on June 11 the patient was discharged from the hospital, with the wound healed in all portions, except at the inner angle, where a small sinus remained, about two inches in depth, leading apparently to the ethmoid cells.

This sinus continued to discharge a drop or two of pus for about six weeks, when, under the influence of gentle packing, it gradually closed. For a time some edema of the upper lid and the brow remained. This gradually subsided, and the diplopia, which was typical of that caused by paralysis of the superior oblique—all of the classic symptoms of this palsy being present—slowly disappeared. At the present time, more than a year after the operation, it is difficult to develop diplopia, even with the aid of a red glass. There are no ophthalmoscopic changes, and the function of the eye is perfect in all respects. The lid and eye possess normal movements, the growth of the eyebrow has covered the scar, the patient has been entirely free from headache, the atrophic rhinitis has greatly improved, and there is no purulent discharge

within the nasal fossæ, showing that the cure is radical.

The exposure of the diseased area in a case of this character is a matter of ordinary operative interference and requires no comment, but much interest centers in the proper method of drainage after the orbital abscess has been evacuated and the diseased tissue of the sinus as thoroughly as possible removed. The experience derived from this case, and from others that have been reported, proves the value of drainage of the diseased area through the nose; precisely as in operations on the frontal sinus, the best results follow the plan that establishes by means of drainage a communication between the sinus and the nose. It would seem, however, that when the orbital disease has become extensive and the infiltration of purulent material widely disseminated through the soft tissues, an additional drain is advisable in the manner in which it was applied at the second operation. Were I to meet with another example of this affection, presenting like clinical characteristics, I would establish nasal drainage and also drainage from the outer side of the orbit at the same time. There seems no doubt that the main abscess, which was primarily evacuated, had existed for a sufficient length of time to be walled off from the deeper tissues of the orbit, and by pressure to have caused an indentation of the inner orbital wall, which gave the impression of an open frontal sinus. The pressure having been relieved, areas of purulent infiltration existing further towards the apex of the orbit spread forward as time wore on and occasioned the second abscess, which was later evacuated and drained. The drainage-tubes placed in the manner related afforded the opportunity of constantly irrigating all of the diseased tissues with antiseptic fluids, which flowed freely through their fenestrations. Thus not only the original focus of suppuration in the ethmoid, but the secondary foci in the orbit were continually disinfected, with the happy result of producing what may certainly be described as a radical cure; for, as Dr. Freeman has pointed out, the absence of fluid pus in the nose shows that the disease has been entirely cured, and not merely that the old original passage into the nose has been re-established, as is usually the case. Touching this question



of drainage, reference may be made to a case reported by Adelheim<sup>2</sup> of mucocele of the ethmoid cells, which underwent suppuration after accidental infection from the nose, thoroughly cured by an operation that opened the inner wall of the orbit, leading into the ethmoid cells, which were scraped out and the cavity drained by a T-formed tube, one part of which was brought out through the nose. Although it is not definitely stated, it is evident that the other portion of the tube came through the orbital opening.

A second interesting and gratifying fact is the rapidity with which the tissues regained their normal functions. In less than three months after the operation everything was solidly healed, even the small sinus which persisted and which led to the ethmoid sinuses having closed.

In a case of extensive orbital involvement as the result of ethmoid disease, such as I have detailed, there is of course only one way to attack the affection: that is, in the manner already described, by an operation through the orbit. It is, however, also pertinent to urge, in the words of Gruening,<sup>3</sup> "surgical procedures from the orbit in cases of uncomplicated empyema of the ethmoidal cells." In fact, as this surgeon states, "it seems advisable to substitute more frequently the orbital for the intra-nasal operation, even in the earlier stages of purulent ethmoiditis, the evident advantages of this operation being the possibility of direct inspection and exploration of the ethmoid spaces, the greater facility of removing

granulations, polypi and carious bone, and the improved chances of securing drainage through the nose by perforating the floor of the ethmoid body."

It is unnecessary in the present communication to elaborate the ophthalmologic symptoms in general ethmoid disease. Those interested may consult with profit a paper on this subject by Dr. Thomas R. Pooley.<sup>4</sup> To one class of cases, however, I would like to call attention, namely, those of fistula of the orbit above the internal canthal ligament due to disease of the ethmoid. These have been described by Gruening,<sup>5</sup> and he has effected a cure by forcing, with a strong probe, an opening through the base into the nasal cavity, thus facilitating drainage through the nose. In a recent case of this kind under my care, and by my request also examined by Dr. Walter J. Freeman, the sinus is in exactly this position, or perhaps a little lower down, and through it a probe may be passed either into the anterior frontal cells, or else directly into the ethmoid, and from the latter situation into the nasal cavity. Cases of this character have sometimes been mistaken for instances of lachrymal disease, and, in fact, they present some of the characteristics of the so-called pre-lachrymal abscess. The evident treatment, however, is the one recommended by Gruening, or perhaps a more formal operation, in which the diseased area is exposed through a curved incision, the carious bone removed, and both external and intranasal drainage established.

<sup>2</sup> *Archives of Ophthalmology*, New York, 1897, XXVI, pp. 142-143.

<sup>3</sup> NEW YORK EYE AND EAR INFIRMARY REPORTS, 1895, III, Part I, p. 21.

<sup>4</sup> *The American Journal of Ophthalmology*, St. Louis, 1897, XIV, pp. 100-106.

<sup>5</sup> NEW YORK EYE AND EAR INFIRMARY REPORTS, January, 1896.

## DISCUSSION.

DR. W. J. FREEMAN said that the reported case is especially interesting to rhinologists because of its probable origin in the ethmoid cells. Orbital abscess may occur without any direct connection with or infection from the ethmoid cells and an examination of this patient showed absolutely no sign of purulent ethmoiditis at the time he was first examined. There evidently had been in the past, trouble with the ethmoid cells, as was shown by perforation in the middle turbinals, where the cells had evidently enlarged and discharged by an abnormal opening into the fossæ. There had been spontan-

eous cure of the disease in a number of ethmoid cells, and probably also in the left superior maxillary sinus at the same time, the disease lingering in the cells near the orbit and finally rupturing into it. At the present time the lining of the superior maxillary sinus on the left is probably very thick, for the test by transmitted light shows it to be perfectly opaque. Chronic suppurative ethmoiditis is much more uncommon than many are willing to admit, and Dr. Freeman's experience is fully borne out by Bosworth's report in his new book in which he confesses seeing only five or six cases



yearly. On examining most of the cases referred to him in which the attending physician suspects ethmoiditis, the pus really comes from the antrum of Highmore.

The present condition of Dr. de Schweinitz' patient is excellent, although there is some crusting from an old atrophic rhinitis; this also, however, has certainly been greatly benefited by the operation.

DR. S. D. RISLEY said that the accurate, almost normal, movements of the eye in the case reported are quite remarkable under the circumstances. The case presents many points of great interest to both the rhinologist and the ophthalmic surgeon. Unfortunately one cannot have any very extended ophthalmologic experience without having met similar cases of suppurative disease of the orbit. Many of them are certainly obscure in their origin. Dr. Risley admitted that he may have overlooked in some of the cases that have fallen under his observation a possible origin in disease of the ethmoid cells or the upper nasal passages. It is not always easy to account for the occurrence of suppuration in the orbit. There is of course no difficulty in diagnosis in cases in which injury has been inflicted upon the orbital ridge by blows or falls, followed in turn by periostitis with suppuration, and by necrosis of the orbital wall. The first point in interest, therefore, is the possibility of a more frequent origin of suppurative disease of the orbit in disease of the nasal passages than has been generally recognized. The technic of the operation in the case reported seems to have been perfect, as the results show. It is quite remarkable that the function of the superior oblique should have been so perfectly preserved. The report illustrates another point of great importance, viz.: the difficulty of differential diagnosis between suppurative disease of the orbit and malignant growths, dermoid cysts and affections of the lachrymal gland. Dr. Risley related a case of apparent extension of disease from the maxillary antrum to the orbit, and which ended in the death of the patient. The antrum was opened, revealing extensive necrosis of

its walls, including the inferior orbital plate, which was removed. A large quantity of offensive pus was discharged from both the antrum and the orbit. The conjunctiva was involved, so that a collyrium instilled into the conjunctiva flowed freely through the antrum into the nose and throat. In another case occurring in a lad who presented himself with marked swelling of the left upper eyelid and periorbital tissues, there was exophthalmos, the eye being pressed also downward and inward. Orbital abscess was diagnosed, a free incision made and a large quantity of pus evacuated. The wound and abscess-cavity healed, apparently from the bottom, and the periorbital swelling and edema of the lids disappeared. In a week the boy returned with a recurrence of pain and swelling. The wound had reopened and was discharging freely. The relapse proved to be due to the presence of a sequestrum of necrosed bone occupying the outer aspect of the superior orbital ridge, which was removed through the fistulous opening without difficulty and fortunately did not involve the roof of the orbit. The exophthalmos disappeared and the mobility of the globe was perfect. Necrosis of the bony walls is a frequent cause of delayed resolution in cases of orbital abscess. Another fortunate outcome in the case presented is the preservation of the function of the eye. In two instances Dr. Risley has witnessed complete blindness from atrophy of the optic nerve as a sequel to abscess of the orbit. This possibility, therefore, should be considered in giving a prognosis under similar conditions.

DR. C. H. THOMAS said that promptness in operating is the point urged between the lines of the paper all the way through. Ophthalmic surgeons will doubtless be more prompt to operate after this report than otherwise they would have been. It would be interesting to know the means by which the function of the superior oblique has been restored following its reported detachment at the pulley.

