ORBITAL CELLULITIS

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ORBITAL CELLULITIS, THE INFLAMMATION SPREADING TO THE TEMPORAL REGION, THENCE TO THE NECK, OBSTRUCTING DEGLUTITION, EXTENDING TO THE BRAIN, AND PRODUCING DEATH. WITH REMARKS UPON THE SAME AND BRIEF REPORTS OF FIVE OTHER CASES.

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On February 2d I was called to see Carroll Jennings, aged 18 years. He was a deaf-mute, did chores for Mrs. Glover, and attended the school for the deaf. I found the upper eyelid swollen and oedematous, with the ocular and palpebral conjunctivæ injected. He told the folks he thought he had got something into the eye. Careful inspection of the cornea and parts exposed by separating the lids as much as possible failed to reveal any foreign body. To make sure there was no foreign body under the lid, I pressed out the oedema a little, so the lid

could be raised better — it was so thick from swelling that it could not be everted — and passed a shell cataract-spoon along the whole length of the retro-tarsal fold. The spoon brought out some particles of a foreign body. This was repeated until nothing came out. A drop of a two-per cent. solution of hydrobromate of homatropine was instilled, and also a drop of castor oil. I ordered an antiseptic collyrium to be applied freely over the eye on absorbent cotton. Dr. Pendleton had been called in, and ordered a saline cathartic and a fever mixture of nitre, acetate of ammonium, camphor water, and syrup of tolu. I was out of town twenty hours, and during my absence Dr. Pendleton said that the patient was completely unconscious at an early hour in the evening, and those in attendance said he remained so till early the following morning — a period of about ten hours. The pulse was high, 120 per minute, and the temperature 105°.

At the consultation on the afternoon of the 3d the temperature was 104°, and the pulse was full and hard at 100 per minute. One minim tinct. aconite, to be taken every hour, was prescribed. Ten grains of calomel were ordered, and two leeches were applied to the temple. At this time the inflammation of the oculo-orbital tissues had continued, and the swelling of the lid increased, and began to invade the tissues outside the orbit on the temporal side. The pupil of the eye responded to light and accommodation, and there did not appear to be any paralysis about the eye or body. On the 3d day of the attack his temperature was 104°, and his pulse was softer, at 110 per minute. The calomel had acted freely at 4 o'clock in the morning. He was removed, without accident or apparent fatigue, to the Maine Eye and Ear Infirmary, and appeared fairly comfortable in the evening. The temperature and pulse, however, remained about the same, and the inflammation and swelling about the eye had not abated, but had rather increased. On the 4th day of the attack the temperature in the morning was 103½°; pulse about 100 per minute. At noon the swelling about the orbit and forehead was such that it was decided to make an exploration to see if pus was not present deep in the orbit. The oculo-orbital tissue had become intensely

swollen, the eye was pushed forward and outward, and the chemotic conjunctiva projected from the palpebral aperture. Accordingly, a needle was passed into the orbit above the eye, at the upper and outer quadrant, down to near its apex. No pus was found. A Graefe cataract knife was then passed in, and a free incision was made, but no pus was reached. It was thought that the origin of the inflammation might have been in the frontal sinus. Accordingly an incision was made above the brow, and the frontal sinus was entered at the upper and inner angle of the orbit. No pus was found there. This wound was united with interrupted sutures, and a flaxseed poultice applied over both wounds. In the evening the temperature was 105½° and pulse 100, softer, so that aconite was discontinued, and he was given a sponge bath. He appeared better, and expressed himself so, notwithstanding the high temperature. On the 5th day of the attack the temperature was 103½° in the morning and 105½° at night. The pulse was about 100. The inflammation had extended further over the temporal region, and there was considerable swelling of the parts. He was ordered one grain of quinine every four hours, and one drachm of whisky every two hours; liquid diet, mostly milk. On the 6th day of his sickness the temperature was 103½° in the morning and 104½° in the evening. The pulse was from 100 to 110. The inflammation had extended down the left side of the head, and involved the neck, which had become swollen and hard, so that it was with great difficulty that he could swallow.

For the past twenty-four hours he had complained a good deal of his throat, had coughed, raised some stringy mucus, and said his throat was sore. Dr. Gordon was added to the consultation, and agreed with Dr. Pendleton and myself as to all the essential features of the case and the treatment. Twenty drops of the tinct. chloride iron were ordered to be given every four hours, in addition to the quinine and whisky, while the fever mixture was to be omitted. On the 7th day the temperature was 103½° in the morning, and the same in the evening. The pulse was recorded 100 per minute in the morning

and 90 in the evening. The swelling in the left orbit had subsided, the conjunctiva had retracted, the lids had relaxed, and there was some movement of the eye, and the pupil responded to light, as it had all along. There had, however, been but little or no discharge from the opening made into the apex of the orbit for drainage. The inflammation had extended, and there was swelling of the right cheek. The patient had a fairly comfortable day. On the 8th day the temperature was 103° in the morning, 100° at noon, and 103° in the evening. The tissues of the neck had become tense, and he was unable to swallow. Enemas were used, and most of them were retained. The tissues about the eye had assumed quite a normal appearance. There were two soft places above the temporal region on the forehead, indicative of the formation of pus. On the 10th day the temperature was 98°, and the pulse 80 per minute, dicrotic, and not regular. His general appearance was not as good as on the preceding day. On the 11th day the temperature was 103½° in the morning and 101½° at noon. The pulse was irregular, about 100 per minute. An incision was made into the two places on the forehead above the temporal region, and pus and broken-down tissue were pressed out. Dr. Pendleton ordered a poultice to be applied over the points of incision. Stimulants were ordered to be given more freely. Early in the afternoon the wounds began to bleed freely; and, upon being informed of the fact, Dr. Pendleton ordered the poultice to be discontinued, and had a compress applied; but, upon being informed later that the wounds were still bleeding, he immediately saw the case, and united the wounds with deep sutures and applied a compress. He also gave a hypodermic injection of morphia. The pulse at this time was estimated at about 200 per minute, and the respiration from 48 to 60. In the evening Dr. Sullivan and Mr. Clough could find no radial pulse, but estimated that the heart-beats were about 200 per minute and the respiration 48. Stimulants were given per rectum, as much as he could retain. He gradually sank, and died on the morning of the 13th at 2.30 o'clock, nearly twelve days from the beginning of the attack.

In reviewing this case there are several interesting points to be considered. Although the patient was deaf and dumb, and therefore could not express his feelings very well, yet there was no doubt about the diagnosis of inflammation of the cellular tissue of the orbit. He was of a kind, willing disposition, inclined to extenuate his sufferings, so that the amount of pain he suffered was difficult to ascertain, and on this account the diagnosis of the involvement of the periosteum was not so clear. Having made a positive diagnosis of inflammation of the tissues of the orbit, the next point to be considered was what was the cause. General inflammation of the tissues of the orbit in a previously healthy boy of eighteen years of age is not of common occurrence. It rarely exists as an independent affection, but generally can be traced to inflammation of tissues adjacent to this cavity.

The numerous openings, through which pass important vessels and nerves, place the orbit in direct communication with other parts, and readily show how inflammation may extend from them to it, and *vice versa*. Its close proximity to these cavities, which are not infrequently the seat of inflammation that may extend and break away the delicate natural boundaries between them and it, explain why orbital cellulitis is frequently dependent upon inflammation in these cavities. In the diagnosis of this affection these anatomical relations and the inflammation that may arise in them must be borne in mind if we are to make a correct diagnosis and adopt proper treatment. Careful examination convinced me that there was no inflammation in the antrum or the nose, and the opening made into the frontal sinus demonstrated that the inflammation did not have its origin there. We are left, then, to determine whether it had its origin in one of the fossæ connected with the orbit or the cranial cavity.

I think the history and preponderance of symptoms point to its origin either in the orbit or cranium, and our diagnosis narrows down to these two places. He had got his feet damp or wet, and had taken cold; had lost a schoolmate, and had wept a good deal; and also had got some foreign substance into his eye. He also had a quilt tied up with rope suspended

over his head, attached to one end of a lever, which was connected at the other end with an alarm clock. When the alarm went off in the morning it disengaged one end of the lever, and allowed the quilt tied up in the rope to fall and strike him on the face. As it fell four or five feet, it would produce quite an injury to a delicate organ like the eye if the rope should strike across it. As bearing upon the origin of the inflammation in the cranial cavity, he fell downstairs about two weeks previous to this time, striking upon the right side of his head. The fall produced so little temporary or permanent effect that it was not mentioned to me until the affection had assumed a more serious aspect, and I was searching for a cause.

There might have been a latent affection of the ears connected with the temporal bone, which was set into activity by the fall; but in the absence of any condition externally pointing to it, or of any symptom that would indicate that it existed, it must be excluded. The fall, too, was two weeks previous to his sickness, during which time he had enjoyed his usual good health. I think we must exclude this as a cause producing the inflammation. We are left, therefore, to decide whether the inflammation originated *de novo* in the cranial cavity and extended to the orbit, or whether it was primary in the orbit. We had a clear history of two of the most common causes of this affection, namely, idiopathic and traumatic. The cold he took, the weeping, and the foreign body under the lid, with the probable injury from his arrangement to wake him, were sufficient to localize the inflammation in the region of the orbit. There was first redness of the oculo-palpebral conjunctiva common to a cold and excessive weeping — just the condition to give rise to inflammation from the addition of a foreign body or an injury. This inflammation, once started, extended rapidly to the subconjunctival tissue, thence to the connective tissue of the orbit and lids, producing great swelling of them, with but little secretion. There was pain, which was increased by pressure upon the eyeball backward, immobility of the eyeball, and high fever — a group of symptoms and conditions that form a true picture of the first stage of orbital cellulitis. The only diseases with which orbital cellu-

litis is likely to be confounded are periostitis of the orbit and new growths.

Periostitis of the orbit does not develop as rapidly as orbital cellulitis. Pain here, as elsewhere, is a prominent symptom of inflammation of the periosteum. There is usually much less swelling, and the finger can be passed around the margin of the orbit, thereby increasing the pain. This is an important diagnostic symptom of periostitis. In new growths the development is still less rapid, and there is usually functional disturbance previous to the occurrence of inflammation. The eye is rarely pushed directly forward in new growths. There are cases, however, as in the diagnosis of other diseases, where it is extremely difficult to make out the exact condition. This is well illustrated in a case cited by Dr. Harlan. The emperor sent Jaeger to Milan to see Marshall Redetzy, who had been suffering three months with exophthalmus and its accompanying symptoms. He reported that the patient, who declined any operative interference, was affected with scirrhus of the soft parts of the orbit, which would soon end his life. Not long afterward, under homœopathic treatment, there was a copious discharge of pus, and the eye returned to its normal position.

Having determined that the affection was cellulitis and primarily in the orbit, it behooves us to account for other conditions that existed. The loss of consciousness on the night of the second day of the attack may be accounted for in the rapid development of the inflammation in the orbit producing enormous swelling of the parts, and consequently great pain. We see loss of consciousness produced by severe pains in other parts of the body, like that from the passage of gall-stones. But here in the orbit we have not only all the conditions for the development of great pain when general inflammation exists, but we have the structures involved in close contiguity and continuity with the brain — the seat of all consciousness — and hence in violent inflammation of them we should expect to have disturbances of the function of this organ.

If we examine the relationships, we find that the optic nerve and retina are early outgrowths of the brain, which is de-

veloped from the epiblast. They are, therefore, genetically closely related, and this intimate relationship is continued through the lymph space which Schwalbe has shown to exist between the arachnoidal space and the lymph spaces which surround the sheath of the optic nerve and pass over into Tenon's capsule. We have in the eye and its surroundings all the different tissues of the body represented. Its fibro-vascular tissue is developed in common with those of the brain from the mesoblast, and, therefore, they are genetically closely related. The blood supply is through the ophthalmic artery, which is a branch of the internal carotid. This in its course lies along the inner wall of the cavernous sinus, into which the ophthalmic vein that returns the blood from the eye and orbit empties. This sinus is of large size, extending from the anterior lacerated foramen to the apex of the petrous portion of the temporal bone. It communicates freely with its fellow, and with all the other sinuses of the dura mater. This brief review of the embryological, anatomical, and physiological relationship of the tissues of the orbit and those of the brain serve to recall how profoundly the latter may be affected by rapid and extensive inflammation of the former, without that inflammation extending and involving those tissues. It also serves to recall how readily inflammation of the orbit may extend and directly involve the tissues of the brain, and, for this reason, why orbital cellulitis is considered a serious affection.

From the condition of the patient as described by Dr. Pendleton and the attendants, I have no doubt that his unconsciousness during the night of the second day of the attack was due not only to the great pain incident to the inflammation of the orbit, but that this latter had extended, and directly involved the tissues of the brain. Had psychical disturbances followed this attack of unconsciousness, it would have been conclusive evidence that the primary inflammation was intra-cranial. Although deaf and dumb, he had been taught to express his thoughts orally, and had quite a command of language, so that when the person addressing him was in the right position he always answered intelligently. His uninflamed eye, too, revealed a clear mental condition. In looking over published

cases, I fail to find anywhere the temperature was recorded as high as it was in this case. Indeed, it is not mentioned in a large majority of the published cases. The constant high temperature and condition of the orbit led us to anticipate the formation of pus, and justified us in performing the operation on the fourth day. The extension of the inflammation over the forehead and temporal region (at two points of which pus was finally formed) down the neck, involving the other side up nearly to the other eye, and interfering with deglutition to such an extent that the patient was unable to swallow, is certainly a very rare complication, as I find no similar case recorded. It may account for the constant high temperature.

The subnormal temperature on the tenth indicated a subsidence of the inflammation, which, however, recurred on the eleventh day. It clearly pointed to intra-cranial inflammation, and he undoubtedly died from the effects of meningitis, although no *post-mortem* was obtained.

In looking over my case-books, I find that nearly three thousand cases were recorded before this affection occurred, and I find only six among over twelve thousand recorded cases. The first case occurred in April, 1884, in Mr. H. H. B., aged 46, upon whom I had performed tenotomy of the left internal rectus, with advancement of the left external rectus. The patient was an overworked lawyer, who had an attack of diarrhœa, which he had contracted in the army. He made a good recovery, although the treatment was somewhat prolonged.

The second case was in November, 1885. This was a young man, T. J. P., aged 19, who went a-fishing with slippers on, got wet, and took a severe cold. He had pain over the right eye. He saw a physician, who advised him to apply a poultice, and to return the next morning. The pain continued and the lid swelled, and he continued the use of the poultice several days without seeing the physician. When I saw him suppuration had been established under the use of the poultice, but the eye broke down, and its contents ran out.

The third case was a lady, Mrs. D——, aged 71, who consulted me with Dr. Sullivan in October, 1888. She had had a

decayed tooth, with considerable suppuration, which she had removed. Very soon after, accompanied with severe pain, the tissues of the orbit began to swell. The pain and swelling continued with great severity. The eye was pushed forward, and when I saw the case several incisions had been made, with a view to let out pus, but none escaped. As symptoms pointed unmistakably to suppurative inflammation of the antrum of Highmore, I removed a decayed bicuspid tooth and opened the antrum at this point, letting out considerable pus.

As the eye had been blind thirty years and was very hard, I removed it, and found the orbit had become involved through the infra-orbital canal, the bone around which was in a carious condition. Her recovery was tedious and unsatisfactory.

The fourth case was seen in consultation with Dr. Wallace of Rochester, N. H., in January, 1889. It was a child, aged two and a half years, who, without apparent cause other than a cold, had marked swelling of the lids of the left eye, with proptosis. As far as could be ascertained, the inflammation seemed to be primary in the orbit. It was not in a proper state for making an incision, and I advised waiting. In two days Dr. Wallace made an incision, evacuating pus, and the case made a good recovery.

The fifth case is the one here related in full.

The sixth case was seen in April, 1892. This occurred in a girl, aged 10 years, who had had purulent inflammation in this eye about a year before this time, and sustained a loss of the cornea to Decemet's membrane at the scleral-corneal margin, leaving the eye irritable and with poor vision. She had recently had the measles, and the eye became irritable and painful, for which leeches had been applied by her family physician, Dr. Morgan of Dover, N. H. The eye grew worse, and when seen the lids were intensely swollen, with the eye bulging outward. The temperature was 102°, and she was in a decidedly critical condition. As but little hope was given that the child would live, Dr. Ring was called in consultation, and on the following day Dr. Gordon was called. The temperature kept high for several days. The swelling remained about the same as when first seen, and at no time was it

thought advisable to make an incision, and the inflammation subsided without suppuration. The eye became totally blind, shrunken, and irritable, and was removed in June last.

In the preparation of this paper reference has been made to the following articles:

1. "On the Pathology of Inflammation of the Orbital Cellular Tissue." Am. Journal, No. 141, page 112, by Dr. Chas. S. Bull.

2. "Inflammation of the Cellular and Fatty Tissues of the Orbit, Terminating in Absorption." Presse Med., Vol. 30, page 78, by De Smet.

3. "Exophthalmus from Retro-bulbar Suppuration, Spontaneous Cure." A. O., Vol. 8, page 371, by Hirschberg.

4. "A Case of Inflammation of the Retro-bulbar Cellular Tissue in Primary, Acute, Purulent Inflammation of the Middle Ear and Diphtheritis." A. O., Vol. 8, page 10, by Knapp.

5. "Contributions to the Etiology and Treatment of Orbital Cellulitis." A. O., Vol. 13, page 17, by Dr. Herman Pagenstacher.

6. "Observations of Orbital Abscess, and its Connection with Erysipelas and Thrombo-phlebitis, and its Complications, Especially Thrombosis of the Sinus, Cerebral Abscess, and Abscesses in the Temporal Region." A. F. O., Vol. 26, page 212, by Leber.

7. "Case of Orbital Cellulitis." St. Thomas's Hospital Reports, Vol. 2, 1882, by Nettleship.

8. "Abscess of the Orbit." New York Med. Record, 1882, page 550, by Lippincott.

9. "Cellulitis of the Orbit." New York Med. Journal, March, 1884, by Pooley.

10. "Case of Primary Orbital Cellulitis; Death on the Seventh Day; Post-mortem Examination." Ophth. Rev., Vol. 3, page 147, by Griffith Hill.

11. "Case of Orbital Phlegmone in Thrombo-phlebitis of the Orbital Vein, after Extraction of a Carious Molar Tooth, ending in Recovery, with Preservation of Sight, as well as of the Globe." A. F. O., Vol. 30, page 157, by A. Vossius.

12. "Cellulitis and Periostitis of the Orbit as Sequels of other Morbid Conditions, with Cases." Trans. Oregon State Med. Society, 1884, by F. B. Eaton.

13. "Two Cases of Orbital Abscess." Trans. Am. Ophth. Society, 1884, by J. A. Lippincott. Dr. Theobald, in discussing this paper, reports a case of orbital cellulitis resulting in abscess, which was evidently primary.

14. "Orbital Cellulitis." Lancet, Vol. 2, No. 17, 1885, by A. Critchett.

15. "Abscess de l'orbite consecutif a un coryzu aigu." Ann. des mal de l'oreille et du larynx, 1885, page 85, by Hartmann.

16. "Acute Idiopathic Abscess of the Left Orbit." British Med. Journal, 1888, page 124, by J. Culling.

17. "Two Cases of Orbital Cellulitis, with Necrosis of the Horizontal Plate of the Frontal Bone, Accompanied with Cerebral Abscess." London Oph. Hosp. Rep., Vol. 12, page 281, by E. T. Collins and C. H. Walker.

18. "Acute Cellulitis of Orbit; Fatal Result." Trans. Oph. Society of United Kingdom, Vol. 10, page 51, by Simeon Snell.

19. "Etude sur les absces des sinus frontaux considerés principalement dans leur complications orbitairs, leur diagnostic et leur traite." Arch. d'Oph., Vol. 11, by A. Guillemain.

20. "A Case of Orbital Cellulitis." Trans. of the Oph. Society of the United Kingdom, Vol. 6, page 155, by A. Critchett.

The articles upon "Orbital Cellulitis" in the following text-books on ophthalmology: Stellwag, Wells, Noyes, DeWecker, Schweigger, Meyer, Swanzy, Berry, Green, Juler, Schmidt-Rimpler, Nettleship, and Harlan's article in the "Reference Handbook."