AMAUROSIS
CONSEQUENT ON
ACUTE "ABSCESS" OF THE ANTRUM, PRODUCED BY A
CARIOUS TOOTH.

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THE particulars of the case I am about to detail are so important and so very exceptional, that I have thought I might venture to call the attention of the Royal Medical and Chirurgical Society to a single instance of disease, whose very singularity does not allow this communication to assume that general and extended character which is customary in papers read before the meetings of the Society.

I have only succeeded in discovering one recorded case at all analogous to that which is the subject of this memoir, in which abscess of the antrum occasioned by a carious tooth resulted, among other inflammatory mischief, in the destruction, as an organ of vision, of the eye of the affected side.

There is, of course, nothing unusual in the development of so-called "abscess" of the antrum from a carious tooth; such cases are of frequent occurrence, and the cause specified is by far the commonest in producing suppuration within the maxillary sinus. Moreover, occasionally, though rarely, the eyes become subject to chronic congestion from wide-spread inflammation produced by dental caries in the front of the

upper jaw. But the combination, from such a cause, of the severe symptoms which constituted the case I am now about to relate is, as far as I am aware, almost without precedent.

Eliza Foley, æt. 24, a domestic servant, had been in perfectly good health up to the 25th of April, 1860, when, without any new or special cause, she was attacked with violent pain about the remains of the first right upper molar tooth, the crown of which had been lost by caries. Enormous swelling of the side of the face came on rapidly; infiltration of the lower lid, which nearly closed the eye; protrusion of the malar bone, and a thrusting over of the nose to the opposite side. The patient describes as fearful the pain of the whole of that side of the face and the eyeball, which latter became protruded. A few hours after the occurrence of these symptoms she observed that she was quite blind in the right eye, which had hitherto been perfect in its functions. About twenty-four hours after the supervention of this great and extended swelling, matter pointed just below the inner canthus, and the general practitioner who was attending the patient evacuated it by means of a lancet-puncture. This orifice closed at once, and after the lapse of another twenty-four hours a fresh pointing of matter was observed below the outer canthus, which was evacuated in the same way. No further treatment was adopted, and the patient remained in great suffering for two or three weeks, the blindness of the right eye continuing, and the swelling and protrusion of the cheek being only mitigated by occasional discharges from the two orifices which had been punctured, sometimes at the inner, sometimes at the outer, canthus, and sometimes also by a flowing of purulent matter from the nose; but this latter did not occur till many days after the distension had been relieved by the bursting of the antrum at the corners of the eye.

At this juncture the girl was sent to Guy's Hospital, and was admitted on the 23rd of May under the care of Mr. Cock, at whose suggestion I was consulted.

The patient presented herself to me with her face covered up in a handkerchief, upon the removal of which she exhibited the most horrible disfigurement. The left side of the face was natural. The right was enormously swollen over the whole cheek, but especially about the region of the malar bone, which was protruded and tilted forwards; the lids were œdematous and closed, while from the orifice just below the outer canthus and in the lower lid streamed a profuse discharge of grumous pus. The surface here was livid-red or purplish, and the surrounding skin polished and glistening. So remarkable was the patient's appearance, that I had a water-colour drawing made of her at the time, and before any surgical interference had taken place. Upon examining the mouth I found that the second right upper bicuspid had been recently removed, and that the fangs of the first molar, whose crown had been destroyed by caries, and a carious dens sapientiæ, remained. The hard palate on the right side was full and convex into the mouth.

I determined to remove the stumps and the carious wisdom tooth. Upon applying the elevator to the former they were very readily extracted. The pressure of the instrument caused pus to pour from the orifice near the corner of the eye, and more from the right nostril, while the withdrawal of the molar fangs opened the floor of the antrum and led to an abundant purulent discharge into the mouth. The performance of this operation conveyed to my touch a perception that the whole maxilla was implicated; there was a general boggiess and a soft yielding of the entire bone; and further, the hæmorrhage which followed the extraction of the stumps, and which was rather considerable, led to blood-discharge from the cheek-fistula and nose, as well as from the tooth-socket. Upon examining the extracted fangs of the molar tooth, the two outer ones were found naked of periosteum at their extremities, having been free and bathed in pus within the antrum.

The condition of the eye of this patient constituted the most important and the most distressing of the symptoms. The sight was utterly gone; the globe prominent, rather less so

than at first, and slightly everted; there was extreme conjunctivitis both of the eye and eyelids; films of inspissated mucus covered the front of the eye; but the cornea, aqueous humour and chamber, and the iris, were nearly healthy. There was general deep inflammation of the fibrous textures of the eye. The pupil was large and rigidly fixed; it did not move in co-ordination with that of the other eye under any circumstances.

On the 7th of June, ten days after the previous report, some abatement of the inflammatory symptoms was said to have followed the extraction of the teeth; there was still very abundant discharge through the orifice on the cheek, through the nose, and into the mouth, the relative amount that escaped from the two former being determined by the position of the head; if laid on the right side, the chief flow was from the orifice in the cheek; if on the left, from the nose. The passing of a probe through the upper aperture distinctly indicated the presence of dead bone, which I had long suspected to exist.

On the following day a considerable sequestrum was removed, consisting of part of the floor of the orbit and the cheek surface of the maxilla, involving the infra-orbital foramen, and also a long, thin plate of bone from the outer wall of the nose. The bone was removed by a crescentic cut from the orifice below the outer canthus to the scar of one that had existed below the inner canthus.

The removal of this dead bone was followed by an immediate and complete cessation of all inflammatory symptoms: the integument about the eye paled down to a normal colour, and the general inflammation of the eyeball rapidly disappeared, but the eye remained sightless and the pupil still rigidly fixed.

It is unnecessary to detail the frequent reports which followed this date. The discharge continued, and was fetid, and nothing remarkable occurred till the 12th of July (five weeks after the removal of the dead bone and the cessation of the general inflammation), when, for the first time, I noticed that the pupil of the implicated eye moved in

accordance with that of the seeing eye, though vision had not returned. A small flake of bone came away at this time through the orifice made in the removal of the large sequestrum, and this aperture had now assumed a definite shape : it was oval, about the size of a horse-bean, with clean edges deeply adherent to the subjacent bone, and continuous with the mucous lining of the antrum.

I had the patient's portrait taken at this time, as contrasted with her condition during the acute stage of the case, and the artist well succeeded in portraying the vacant, meaningless stare of the sightless eyeball. During the remaining five months of the year nothing of importance occurred in the patient's condition beyond the exfoliation of six small flakes of bone (three in September and three in November), and the gradual diminution and ultimate cessation of the discharge. The affected eye remained totally blind, but the left eye had never in any way sympathised with its damaged fellow.

On the 3rd of January, 1861, the patient was discharged and was taken into the hospital as a night-nurse, so that she has continued still under observation up to the present time. The loss of vision in the affected eye has remained permanent, and the necrosis of bone below the orbit has produced a persistent opening into the antrum. Neither of the eyes has exhibited any inflammatory or textural change; the movements of the two pupils are co-ordinate; the axis of the blind eye has remained slightly everted.

On several occasions I have examined the blind eye with the ophthalmoscope; the humours are all perfectly transparent, and the retina healthy. The only abnormal appearance which this method of examination has displayed has been extreme *anæmia of the optic nerve* at its abutment on the retina. Instead of exhibiting the ordinary yellowish-pink disc, it has presented a white, circular area, characteristic of anæmia of the optic nerve, so constantly associated with suspension of the function of vision dependent upon causes external to the globe.

In making these examinations I have recently availed

myself of the assistance of my accomplished colleague, Dr. Bader, whose long-continued and extended investigations with the ophthalmoscope give great weight to his observations. The illustrations in Plate VIII, exhibiting the terminations of the optic nerves in the two eyes, were executed with the help of his horizontal ophthalmoscope, and they show in a striking manner the comparative complexion of the functional and functionless nerves. I would only remark that the outline of the optic nerve in the left—the seeing eye—a little departs from the circular form, being somewhat oval, a circumstance by no means uncommon, and probably a congenital condition.

The case I have just described is not absolutely unique; one in the most important particulars analogous to it occurred some years since in the practice of Mr. George Pollock, of St. George's Hospital, to whom I am indebted for the following summary:

A gentleman, æt. about 35, was attacked with intense, deep-seated inflammation of the superior maxillary region and orbit, more especially the latter, involving the eye in universal congestion of its tissues. The globe was protruded, the sight completely gone, and the pupil dilated and fixed under all circumstances. Upon examination Mr. Pollock found that there was much tenderness on pressure, extending downwards from the inner edge of the lower margin of the orbit towards the jaw on the affected side, and upon scrutinising the condition of the mouth, some carious teeth were found, which, for want of any other evident cause, he considered might be the origin of the existing mischief. He therefore directed that any of them which could possibly be implicated should be removed. This was done by Mr. Vasey, the Surgeon-Dentist of St. George's Hospital, who informs me that he had extracted the fangs of the first pre-molar and the first true molar teeth, and that the latter exhibited indications of great irritation about its roots. The removal of the teeth was followed by

the immediate and complete subsidence of all the inflammatory symptoms, and in about ten days all heat, redness, and apparent ophthalmic inflammation, had vanished.

The eye was sightless. At first the pupil remained as it had been during the inflammatory action, fixed and dilated; but it subsequently resumed its contractile function in co-ordination with that of the seeing eye.

I learn from Mr. Pollock that there was no "abscess" of the antrum, but there was sufficient evidence that active inflammation pervaded the whole soft structures connected with the maxillary bone.

The eye has remained to the present time (after a lapse of three or four years) perfectly natural to external appearance, though entirely blind, and its suspended function has given rise to no textural change in itself, or, by sympathy, in its fellow: the latter has been tried severely, as the patient, not long after his recovery, was exposed to great bodily exertion and physical hardship in a naval expedition.

The only published case with which I am acquainted, resembling those here described, is recorded by Dr. Brück, in Casper's 'Wochenschrift'¹ for 1851, and an abstract of it is given in the 'Annales d'Oculistique'² for 1856. This case, however, was much more chronic, and the loss of vision less permanent than in the others.

The patient was a healthy man, æt. 45. He had suffered for many years from chronic inflammation of the mucous membrane of the nose and maxillary sinus on the left side, with frequent acute attacks of great severity. On the occasion of the acute attacks the inflammation involved the whole maxillary bone on the affected side, the teeth, the tongue and throat, and extended up the scalp, which be-

¹ "Wiederholte Entzündungen des Antrum Highmori und Amaurose," &c. Mitgetheilt vom Dr. A. Th. Brück. In Casper's 'Wochenschrift für die gesammte heilkunde,' Berlin, März, 1851.

² "Amaurose coïncidant avec une inflammation de l'antre d'Highmore." In 'Annales d'Oculistique,' p. 90, tome xxxvi, Bruxelles, 1856.

came intensely sensitive. There was great injection of the eyelids, the globe protruded, and there was much and severe toothache. After a few days, matter, previously pent up in the antrum, burst through the left nostril, and the patient recovered from the acute symptoms, which, however, again and again recurred.

The interesting point of this case is the relation of the affection of the eye to that of the antrum. The former appears to have followed and been dependent upon the latter. On the occasion of the acute attacks the globe was protruded, as Dr. Brück says, by the vaulting of the roof of the maxillary sinus from its distending contents, and all the structures within the orbit appear to have shared the inflammation. In an early stage of the case *vision was entirely lost and the axis of the eye diverged*.

Under treatment, the symptoms of the antral affection gradually disappeared, and with their disappearance the sight of the affected eye returned.

The function of the right eye never suffered, either intrinsically or by sympathy with its fellow, and the sight was only imperfect in calculating perspective. The general meaning of this case is sufficiently obvious, though some of its details are deficient. The fixedness or mobility of the pupil in relation to that of the other eye is not given, nor is the condition of the teeth distinctly defined, though dental caries is implied from the repeated allusions to toothache on the affected side.

Remarks.—When we consider the degree of inflammation which often attends alveolar abscess from carious teeth, it seems strange, rather than otherwise, that neighbouring parts do not suffer more often deeply and destructively. The examples I have mentioned are among the rare instances of these exceptional results.

That tooth disease, and consequent diffused inflammation among neighbouring fibrous structures, led to the eye symptoms in the first two cases I have mentioned is beyond question, and the same train of cause and consequence was,

in all probability, in operation in the last. In this third example, however, the particulars are not given with critical accuracy, and inference must fill up deficiencies of detail. The manner in which the consequences of tooth inflammation may wander to a remote region is shown in those instances where a tooth in the front of the mouth may give rise to an alveolar abscess, which will point far back in the palate. The pus in such an instance burrows among the cancelli which separate the two (nasal and palatal) layers of compact bone constituting the hard palate; and the occasional, though rare, development of osseous septa which traverse the cavity of the antrum would, by connecting the floor with the roof of the maxillary sinus, thus form a course, which might bring the inflammatory products of a suppurating periodontal membrane to the immediate region of the eye, instead of the soft palate. General and diffused inflammation of the whole maxilla, brought about by the same cause, would, however, render such an explanation unnecessary.

Neither in my own case nor in Mr. Pollock's was the loss of vision dependent upon damage done to the structures of the eye itself: when the inflammation of the globe subsided, which it did rapidly upon the removal of its exciting cause, the humours at once exhibited a perfect transparency. In my case, moreover, when the eye was examined with the ophthalmoscope, the retina itself presented no textural change which would account for the loss of vision. Again, in neither case were there any *cerebral* symptoms during any stage of the disease, so that the blindness cannot have depended on disease of the brain. These negative reasons, and all the positive circumstances of the cases, tend to show that the mischief occurred to the nerves themselves, whose functions were damaged, in their course external to the cranium and before they reached the globe. The stretching of the nerves by the protrusion of the eye may have had some temporary share in the suspension of their function; but, were this the only influence bearing on them, the blindness would probably have been

partial, and perhaps transient, as the mechanical protrusion of the globe, by tumours not involving the optic nerve, does not necessarily entail blindness; and where that does occur, the restoration of the eyeball to a tolerably natural position is usually accompanied by a return of sight.

In the case of Eliza Foley, the loss of bone from the floor of the orbit does not explain the suspension of vision, as the sequestrum came from the front of the eye-socket, and could not in any way have entangled the nerves of the eye. In all the three cases which I have given, the pathological condition (as far as the ophthalmic complications are concerned) appears to have been a *plastic inflammation*, involving the fibrous tissues which surround the nerves passing from the cranial cavity to the eye. Whether the inflammatory products had simply enclosed the nerves, and affected only their fibrous coverings—thus, as it were, strangling by pressure the softer nervous elements—or whether the plastic exudation had been intrinsic in the nerves themselves, can only be matter of speculation in the absence of anatomical observation. It is an interesting fact, both in Mr. Pollock's case and my own, that the different nerves entering the orbit have been differently affected; the optic nerve was hopelessly implicated from the first, blindness was complete and final; the third nerve was involved in the early stage of the disease, as evidenced by the temporary fixedness of the pupil, which afterwards recovered its contractile function; while the eversion of the axis of the globe showed that the sixth nerve (*abducens oculi*) had escaped injury or had suffered less than the third.

As regards the anæmia of the optic nerve, is its bloodlessness the result of mechanical obstruction to the circulation, or does it simply depend upon, and is it secondary to, suspended function? A circumferential plastic exudation encasing the nerve might possibly strangle by pressure the circulation within it, or an interstitial deposit of lymph between the fibrillæ might effect that consequence more readily and completely. Then, on the other hand, it is well known

that a suspension of the function of sight by causes external to the globe itself, even so remote as disease of the brain, will entail complete anæmia of the optic nerve. The precise relation, therefore, in this case, of the sightlessness of the eye and the anatomical condition in question must remain matter of doubt, but the condition itself is very pronounced and striking.

DESCRIPTION OF PLATE VIII.

Peripheral terminations of the optic nerves in the retinae of the
two eyes.

R. That of the blind eye, with anæmic optic nerve.

L. That of the left eye; optic nerve normal in colour, but irregular
(oval) in outline.