Sphenoidal Sinus

Perhaps the most frequent situation of pain is over the occiput, and next in order the vertex and, occasionally, the region supplied by the supraorbital nerve. If the Vidian nerve becomes involved by hyperplastic inflammation of the outer wall of the sinus and neuritic changes reach Meckel's ganglion, the sphenopalatine ganglion syndrome may result—that is, neuralgic pains in the supraorbital, ocular, superior maxillary, mastoid, and occipital regions. In some cases they may extend to the shoulder-blade, the arm, and even to the finger-tips. Such symptoms may be accompanied by lachrymation and sneezing attacks. My own experience has confirmed this widespread nature of the symptoms. The diagnosis is usually easy, because an application of cocaine to the nasal mucous membrane behind and above the posterior end of the middle turbinal will temporarily cut short the pains, and sometimes they can be cured by injecting the ganglion with 5 per cent. phenol in 95 per cent. alcohol. It may be well to emphasize one very definite and not infrequent symptom of chronic inflammation in the sphenoidal sinus—namely, pain over the corresponding mastoid region—to which I drew attention so long ago as 1905 at the meeting of the British Medical Association in Leicester. It is, of course, a referred pain, the sensory impulses passing from the sphenopalatine ganglion by way of the Vidian and large superficial petrosal nerves to the geniculate ganglion of facial, and from thence to the facialis cutaneus branch of the posterior auricular nerve, which terminates about 5 cm. behind the mastoid.

SUMMARY AND CONCLUSION

In this brief introduction of the subject for discussion it has been my object to show: (1) that pain is a frequent symptom of chronic inflammation of the nasal accessory sinuses, and that it may take the form of a more or less generalized headache or be felt in so restricted a region that suspicion will fall on a particular sinus; and (2) that there may be a complete absence of pain when one, more, or all the usual air cells are in a state of chronic inflammation, even of the suppurative variety. These facts should prompt a question of even wider clinical significance—namely, if and when pain is *associated* with the chronic nasal sinus lesion, may it not sometimes be due to a cause entirely independent of local inflammation? The answer may be of far-reaching importance, because in the majority of such inflammations some form of surgical intervention will probably be required; and, if this is carried out in ignorance of a coexisting extraneous factor, the most skilful operation may be followed by prolonged convalescence or by complications productive of anxiety to all concerned. In other words, a preliminary overhaul of the patient should never be omitted, and at any rate, the heart, lungs, blood pressure, and the proper functioning of the kidneys and bowels should receive attention. A single example in illustration of my meaning will suffice. A healthy-looking patient was sent to me for chronic antral suppuration, associated with headache and occasional "neuritic pains in the limbs," all supposed to be due to absorption of toxins from the septic focus. Two days later she entered a nursing home for operation. In the meantime examination of the urine showed a high sugar content, and operation was deferred. The following day diabetic coma developed, and she died. (This was in pre-insulin days.) It is unnecessary to comment on what my feelings, and those of the relations, would have been had the fatal issue taken place immediately *after* the proposed operation.

Any surgeon who has had considerable experience of intranasal operations for the relief of septic conditions will

agree that secondary haemorrhage is by no means an infrequent complication, and that sometimes it is difficult to control because of the relative inaccessibility and the unhealthy nature of the tissue surrounding the source of bleeding. Many such accidents could be prevented, or their frequency minimized, by a little general care and preparation of the patient before operation. To my senior colleagues these observations may seem trite and almost discourteous, but that is because they graduated in days when the "nature of the soil" received greater consideration in the scheme of treatment than it seems to retain in these later years. It is for this reason that a word of warning may not be out of place to the younger members of our profession, and particularly to those who are beginning to concentrate their attention on diseases of the throat and upper air passages.

In these regions foci of infection are very common, their local manifestations are well known, and it is now common knowledge that the toxins derived from such sources may bring about pathological conditions in practically every region of the body. For the establishment of this truth Medicine is indebted to the pioneer work of William Hunter, which he commenced some forty years ago. Since then it has been so fruitful in its application to the practice of medicine and surgery that, in 1927, the then President of the Royal College of Surgeons—now Lord Moynihan—said (*British Medical Journal*, November 5th, 1927): "William Hunter's contribution to direct research is, in my judgement, the most significant of any conducted in the last generation." There can be no dissent that such a eulogium, and coming from such an authority, was timely and well-merited. On the other hand, those who are in touch with current medical practice will surely have had frequent occasion for questioning whether there is not a tendency to assume too readily that nearly all pathological lesions of obscure origin are the result of a focal infection. The net of "hidden sepsis" is very wide in its spread, and in proportion to the myopia of the fowler will be the number of birds which escape it. May it not be that the unlettered patient who said he had been told that his ailments were caused by a "sceptic" antrum (or tonsil) was possibly as near the truth as he by whom the diagnosis had been made?

HEADACHE AND PAIN IN INFLAMMATION OF NASAL SINUSES*

BY

WILFRED HARRIS, M.D., F.R.C.P.

In approaching this subject from the physician-neurologist point of view, one is at first impressed by the brilliance and rapidity of the cures of headaches and neuralgias that are so frequently wrought by skilful surgeons in sufferers of perhaps many years' standing. On second thoughts our more lasting impression is the difficulty in diagnosis and in the sorting out of those headaches and neuralgias which are amenable to surgery of the nasal accessory sinuses from those which are not, for truly the path of diagnosis is beset with many pitfalls. The periodicity of the pain, in frontal sinusitis especially, commencing at 9 or 10 a.m., and lasting to the late afternoon, may simulate a migraine or may even be mistaken for paroxysmal neuralgic tic by those unfamiliar with the latter disease. We are probably all well acquainted with cases of antral abscess, often bilateral, which have given rise to chronic headaches and ill health, perhaps for

* A paper read in a discussion at the Medical Society of London, March 27th.

years, until the cause was recognized. One such lady whom I saw had previously made two journeys to England from Trinidad, seeking medical advice without any relief. The cure of such cases by efficient drainage is often dramatic enough to inspire unbounded optimism, and indeed one well-known foreign rhinologist claims cures by his treatment of the sinuses for the pain of maladies as far apart as glaucoma, lumbago, uterine disease, corneal ulcers, and writer's cramp!

The difficulties that beset us may be illustrated by two cases of frontal cerebral abscess secondary to frontal sinus infection.

CASE I

During the recent influenza epidemic I saw a man of about 40, with a temperature of 101°, who for forty-eight hours had had continuous violent pain on the left side of his head from the eyebrow to the back of the head. There was marked tenderness of the cheek and supraorbital ridge, the eyelids were becoming oedematous, and transillumination showed the left frontal sinus and antrum partly opaque. The eye movements and optic disks were normal, but on removal of the patient to hospital next day for operation on the sinuses the eye had become proptosed and the lids were much more oedematous. The antrum only was opened, but very little exudation was found in it, though next day he was better and the lids less swollen. Two days later he became rapidly comatose and died. At the necropsy the left antrum was empty, but the left frontal sinus was full of thin muco-pus, and the orbital contents were normal. On slicing the brain a large spherical abscess, the size of a tangerine orange, lay in the frontal lobe close behind the infected frontal sinus, with thrombosis of the veins in its vicinity, one of which had ruptured extensively into the left lateral ventricle.

The treatment of the violent, periodic frontal neuralgia in frontal sinusitis is a problem that affects the general practitioner and the neurologist as well as the throat and nose surgeon. I understand that the safest method of giving relief is to cocaine the upper nasal mucous membrane at intervals, when drainage of the sinus through the frontal foramen may be resumed spontaneously, perhaps aided by a turbinectomy later. Mr. Robertson also informs me that the open operation on an infected frontal sinus is especially dangerous from the liability to acute osteomyelitis.

CASE II

Even more difficult to understand, and a trap for the unwary, was a case I saw about three years ago in the Hornsey Isolation Hospital with Dr. Prior. A young man was admitted for scarlet fever and given a dose of antiserum, the symptoms clearing at once except for a slight attack of otorrhoea on the left side. Within a week he began to have curious fits, in which he complained of the vision of the right eye failing; the right eyeball became partially fixed, the pupil dilating, while the left eye moved normally. He did not lose consciousness completely, but talked rather wildly, and in one attack which I witnessed his remarks were obviously cheeky and ill-mannered, quite unlike his real self. There was no proptosis, and after a few minutes the eye movements became normal again and the vision returned. The disks and fundi were normal, but a fortnight later papilloedema commenced. He was removed to St. Mary's Hospital; a decompression was done over the right frontal region, but nothing abnormal was discovered. He died shortly after, when to everyone's surprise a large, thick-walled abscess was found in the left frontal lobe, evidently secondary to infection from the left frontal sinus, which was full of pus. There had been no previous symptoms to suggest frontal sinus infection, and what the connexion was between the left frontal abscess and the fits, with fixation of the right eyeball and blurring of vision of the right eye, is still a mystery to me.

NERVE SUPPLY OF THE SINUSES

The mucous membrane of the nasal accessory sinuses, sphenoidal and ethmoidal, frontal and antral, has its sensory supply from the fifth trigeminal nerve, that of the

frontal being derived entirely from the inner portion of the Gasserian ganglion, or ophthalmic division, through the supraorbital branch. The ophthalmic division also supplies sensation to a portion of the ethmoidal cells by means of the naso-ciliary or anterior ethmoidal nerve, which leaves the orbit on its inner side by the anterior ethmoidal foramen. The rest of the ethmoidal cells and the sphenoidal sinus are supplied from Meckel's ganglion through the superior maxillary nerve. This ganglion has an attachment to the Vidian nerve, the so-called motor root of the ganglion, which is made up of the great superficial petrosal and the great deep petrosal nerves, the former being a branch from the geniculate ganglion on the facial nerve and the latter a sympathetic trunk from the tympanic plexus. The great superficial petrosal is usually called the motor root of Meckel's ganglion, but it is more than doubtful if it carries any motor fibres from the facial, while it undoubtedly carries gustatory afferent impulses from the palate by way of the posterior palatal nerves and Meckel's ganglion to the geniculate ganglion and the pars intermedia Wrisbergi. Indeed, the geniculate ganglion, by its two afferent roots, the chorda tympani and the great superficial petrosal, supplies the upper and lower anterior portions of the buccal cavity with gustatory sensation, the posterior portion being supplied by the glossopharyngeal.

The maxillary antra, of course, receive their sensory supply through the alveolar branches of the superior maxillary or second division of the fifth. The four nasal accessory sinuses, therefore, receive their main, if not exclusive, sensory supply from the trigeminal nerve, but through the Vidian nerve to Meckel's ganglion come connexions to the facial and the sympathetic. Whether painful impressions as well as gustatory are conveyed along the great superficial petrosal from Meckel's ganglion to the geniculate is entirely speculative, but a possible connexion through synapses is there established with the sensory supply of facial branches to the posterior wall of the auditory meatus, the tympanum, and mastoid region, and the area liable to be affected in otic or geniculate neuralgia. The great superficial petrosal nerve is in close relation to the wall of the sphenoidal sinus, and it is this relation which may explain the pain that is sometimes complained of behind the ear in cases of acute infection of the sphenoidal sinus, a symptom observed by Mr. Tilley in 1905. I have seen in acute mastoid suppuration hyperaesthesia and referred pain over an area above the pinna, deep in the ear, and behind the pinna and at the back of the mandible. According to Sluder, pain may be referred here from irritation of Meckel's ganglion, and he even asserts that the pain may spread to the back of the head, neck, shoulder, and arm down to the fingers.

LOCAL AND REFERRED PAIN

It is well known that referred pain may radiate far beyond the territory of the actual nerve trunk affected by disease. Thus an aching molar tooth may cause referred pain upwards or downwards to the upper or lower jaw, and to the ear; and, if unrelieved, the pain may spread into the neck and down the arm to the fingers of the same side. I have watched the pain of antral abscess, at first local over the cheek, gradually involve the whole trigeminal area on that side, and then spread into the neck and down the arm to the hand and fingers. Just as in the case of dental referred pain, so the pain of antral abscess may be referred upwards to the frontal region on the same side, rather than to the cheek. The wide spreading of referred pain on the same side seems to depend on two factors: first, the intensity of the stimulus of the diseased focus, especially the degree of tension within the infected sinus; and, secondly, the type of nervous temperament of the individual. I have

little doubt that in highly strung neurotic individuals referred pain spreads more widely and readily. What is, however, a very important point to remember is that such referred pain does not spread across the middle line. If such crossing to the opposite side were possible, it would surely be seen in the violent pains of severe dental neuralgia, in trigeminal tic, in herpes zoster, and in post-herpetic neuralgia. When, therefore, general headache is complained of in sinus inflammation, it may be assumed that either general toxæmia is present or else that there is bilateral involvement of the sinuses, which is not an uncommon occurrence.

In addition to pain, local or referred, definite tenderness on pressure is frequently present in frontal or antral sinusitis. Tenderness on pressure on the inner floor of the frontal sinus, under the supraciliary ridge, may, however, be present in "vacuum headache," and is known as Ewing's sign. This dull form of headache, which is increased by much use of the eyes, is due to obstruction of the frontal duct connecting the sinus to the nose, with consequent absorption of oxygen.

A theory that has often been put forward—that sensory painful impressions may be carried centrally along sympathetic fibres, usually in an attempt to explain the persistence of pain continuing after section of the sensory trigeminal root—is probably founded on fallacy. Such cases are most probably to be explained by the persistence of a few uncut fibre bundles, or else that the pain is of central origin, either organic or functional. The balance of modern physiological evidence is against the conduction of sensory painful stimuli along sympathetic nerve trunks. Facial psychalgias are unfortunately fairly common; they are very frequently mistaken for, and treated as, cases of tic douloureux. True tic douloureux may undoubtedly have its origin from an infected antrum, no doubt through an infective neuritis of nerve filaments in the neighbouring maxilla. I have seen probably a dozen such cases of paroxysmal tic of the second division which dated from an infected antrum. Two common forms of pain in the face which may be mistaken for that of chronic sinusitis are (1) migrainous neuralgia, and (2) chronic neurosis of the jaw.

Migrainous Neuralgia

A not infrequent form of recurrent neuralgia affecting the region of the eyes and forehead, and sometimes even spreading down into both upper and lower jaws, should not be difficult to distinguish from the pain and headache due to the various forms of sinusitis. Usually, the irregular periodicity (like migraine) every few weeks, perhaps accompanied by nausea, and lasting for twenty-four to forty-eight hours, is sufficiently suggestive of its association with migraine; and, indeed, not only may a history of migraine be present in near relations, but, frequently, typical hemicranial attacks with vomiting and teichopsia have been recurrent since childhood, the type of pain changing in later years into the more anterior neuralgia to which I have given the name "migrainous neuralgia."

Chronic Neurosis of the Jaw

This is one of the atypical neuralgias, a complaint almost limited to women of reproductive age, and is, in my opinion, mainly psychalgic in origin. The distinguishing feature of this affection is that the pain is constant, mainly affecting the cheek and maxillary region on one side only. This pain is unaffected by the movements of eating or handling the face, as is usual in paroxysmal neuralgic tic; and though the intensity of the pain varies, it is always present during waking hours. As a rule sleep is not interfered with by it. Sometimes flushing and even slight swelling of the cheek are complained of, which symptoms will especially suggest a local cause

to the unwary practitioner; before the advice of a neurologist is sought the teeth, eyes, throat, and accessory sinuses have almost invariably been thoroughly examined and treated. Perhaps wholesale extractions of the teeth have been done, as well as removals of portions of turbinal bones, antrotomies, slicing of the nasal septum, and the fitting of glasses—all, however, in vain. I, too, have to confess that, until I learnt by experience that alcohol injection was useless in these cases (even if total anaesthesia of a nerve trunk or even of the whole ganglion was produced), I did not realize that this form of atypical neuralgia of the face was a neurosis, psychical in origin, and therefore not amenable to operative intervention. Indeed, I would go further and deprecate strongly all local treatment of a destructive nature, as being apt to diminish the chances of successful suggestive treatment. Some of these cases have, I am sure, been mistaken for instances of the "nasal ganglion neurosis" of Sluder. I do not believe that slight swelling and flushing of the cheeks in these patients are necessarily evidence of any local disease or infection, for they may be due to reflex vasomotor disturbance secondary to a psychalgia or to pain of central origin. Similar flushing and swelling are undoubtedly often met with in paroxysmal neuralgic trigeminal tic, in which there is no local disease beyond a possible chronic septic neuritis of peripheral nerve filaments in the jaw. Many of these cases of chronic neurosis of the jaw can be traced to some nervous shock. It is important to recognize their psychical origin, for all forms of operative treatment—dental extractions, antrotomies, or nerve injections—tend to fix the pain, though usually there is a temporary relief for a day or two. Soon, however, the complaints of pain are the same or worse than before, and once the risky line of operative treatment has been embarked on, there is excuse for more and more extensive surgery, injections, Gasserian operation, and then perhaps, suicide, as I have seen.

CASE III

A happier ending resulted for a strong, healthy girl of 26, a mistress of physical training at a girls' school, whom I saw last year for violent facial neuralgia. Some six months before I saw her she had changed her situation and taken up her duties at another school. Formerly in perfect health, at the end of her first term at the new school she was attacked by severe pain around the right eye and cheek, on and off for a quarter of an hour at a time. She went home for the holidays for four weeks, the pain disappearing almost at once. A few days after her return to school the pain began again as previously, getting worse and worse daily and keeping her awake. During the week before I saw her the pain had become bilateral—in both cheeks and temples, the back of the head, both ears, and under the jaw, worse on the right side. The pain would come on after any exertion, after her classes, or after tennis, making her cry with the pain. There were no physical signs in the sinuses or the teeth, but cross-examination disclosed the fact that she was unhappy at her new school, where she disliked the head mistress intensely, and felt in a continual state of irritation and resentment against her interference. The only remedy was for her immediately to leave the school; this was done, and the neuralgic pain disappeared at once, with no return up to the present.

The frequency of cranial, and especially facial, psychalgias may, I think, be explained by the natural reference of one's "ego" or individual personality to the region of the eyes and face, which more than any other part of the body express the emotions, the eyes in particular establishing contact between the individual and the world around. I have noticed amongst the blind St. Dunstan's men, who are especially liable to neurasthenia, that their neurasthenic headaches are always referred to the cranium, and I have yet to see a case of facial psychalgia among them.