BRITISH MEDICAL JOURNAL

LONDON SATURDAY MARCH 6 1937

NASOPHARYNGEAL SEPSIS IN 2,056 CASES OF MENTAL DISORDER THE IMPORTANCE OF CLOSED SEPSIS

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The observations on and treatment of 2,056 cases of mental disorder—mainly certified—by three ear, nose, and throat surgeons working separately during nine years, from 1927 to 1935 inclusive, in the Birmingham Mental Hospital are summarized in the following paragraphs.

Selection of Patients

The cases thus treated have been selected as follows. On admission all patients have had a routine investigation by the medical officer in charge of the case into the mental and physical states, including a preliminary examination for diseased conditions in the ear, nose, and throat. Patients in whom a history or mental or physical symptoms suggested such a condition were further investigated by the visiting rhinologist, employing special methods of examination when desirable. On these findings, and after consultation between the visiting and resident medical staffs, cases thought suitable on mental and physical grounds for further investigation and likely to tolerate the appropriate anaesthesia were selected.

Appropriate treatment was then given, although this stage of active investigation and treatment was not generally carried out until the mouth was free from sepsis. Tables showing the incidence of diseased conditions found and some of the treatment applied in the cases during the past nine years are presented below.

Analysis

Of these 2,056 cases of nasopharyngeal sepsis in mental disorder 1,019 were men and 1,037 women. In 180 cases, 102 male and seventy-eight female, the conditions found clinically did not warrant anything more than a thorough antiseptic irrigation of the cavities explored. In the remaining 1,876 cases, 917 male and 959 female, the following conditions were found and treated.

DISEASE OF THE LYMPHOID TISSUE OF WALDEYER'S RING

Adenoids were found in association with disease in neighbouring tissues in 129 instances, fifty-nine men and seventy women, and were removed. Disease of the tonsils was diagnosed in 1,336 instances out of the total of 2,056 cases—that is, in 618 men and 718 women—and they were removed by blunt dissection in 1,186 cases, 548 men and 638 women. In the other 150, which comprised seventy males and eighty females, tonsillectomy was not possible or expedient. In 175 instances, fifty-nine males and 116 females, the tonsils only were considered diseased, while in 559 men and 602 women—a total of 1,161 cases—a nasal sinus investigation was done at the same time as the tonsillectomy.

DISEASED CONDITIONS OF THE NASAL SINUSES

A general nasal sinus examination was carried out in 1,360 cases, 734 males and 626 females, and in 521 cases, 226 males and 295 females, the investigation was not carried further than antral exploration. In this way a total of 1,881 persons, 960 males and 921 females, were examined by the Watson-Williams technique of suction-exploration.

Clinically diseased conditions of the nasal sinuses were found in 1,425 cases, 743 males and 682 females. The sinuses alone were thought affected in a total of 607 cases, 338 males and 269 females, but in 818 cases, 405 men and 413 women, disease of the tonsils was diagnosed in association with the sinusitis.

DISEASED SINUSES IN INDIVIDUAL CASES

The number of diseased sinuses found in individual cases is set out in the following table:

Number of Sinuses Involved	Male	Female	Total
One sinus only	189	183	372
Two sinuses	205	192	397
Three sinuses	107	105	212
Four sinuses	129	104	233
Five sinuses	51	49	100
Six sinuses	62	49	111
Total	743	682	1,425

Anatomical Distribution of Sinus Disease.—The distribution of the sinus disease whether or not associated with tonsillar disease in these 1,425 cases is shown in the following table:

Affected Sinuses	Male	Female	Total
Antra alone, or with other sinuses	616	532	1,148
Ethmoids alone, or with other sinuses	420	392	812
Sphenoids alone, or with other sinuses... ..	299	274	573

INCIDENCE OF SINUS DISEASE

The following figures give an approximate percentage incidence of the anatomical distribution of the sinusitis in those 1,425 cases in which the clinical findings were positive: antra, 80 per cent.; ethmoids, 57 per cent.; sphenoids, 40 per cent.

Antra.—Here the figures of cases investigated by general nasal sinus examination and antral exploration are combined—namely, 1,881—and, of these, antral disease was present in 1,148 cases—that is, 61 per cent.

Ethmoids and Sphenoid Sinuses.—To show the corresponding incidence of disease in these sinuses only the figures of the general nasal sinus examination can be taken—namely, 1,360 cases. Ethmoidal disease was present in 812 cases—that is, 59.7 per cent.; the percentage incidence of the sphenoid disease was 42.1.

These figures of the incidence of sinus disease in the cases examined by the Watson-Williams technique, based on clinical observation only, are of interest in view of the large number of cases, the great majority being direct admissions during a period of nine years, investigated by three rhinologists working quite independently of each other. They do not include those cases in which bacteriological examination of the wash-outs alone showed the presence of infection.

Closed Nasal Sepsis in Psychosis

In tuberculosis haemoptysis may first draw attention to the disease. Symptoms of general paralysis may be the first indication of syphilis. Mental depression following influenza may continue until an area of residual infection in the nasal sinuses is treated effectively, when the psychotic disturbance passes away. In some cases of nasal sinus disease mental symptoms may be among the first of the signs and symptoms directing the attention of the family or physician to the fact that the patient is ill. In some cases where nasal sinus disease is present an examination of the nasal passages may show only doubtful signs or none at all, the condition being one of closed sepsis. In such cases an inflamed sinus is unable to discharge its exudate owing to closure of its ostium, and as a result internal absorption and extension of inflammation takes place from the diseased membrane.

It is especially in dealing with cases of mental disorder arising from nasal sinus disease that these untoward conditions occur, for here may be shown the truth of the old clinical observation: "As the indications of toxæmia increase the discharge diminishes." Conversely there may be some truth in the assertions of those critics who aver that they have seen hundreds or even thousands of individuals with sufficient pus and sepsis in various parts of their organism to float the proverbial battleship; yet, while they may show symptoms of physical distress, not one of these folk was really insane. These are cases of open sepsis and little toxic absorption. If, however, the capacity to react in this way is reduced or drainage is prevented then complications arise, one of which is the acute mental disorder known as delirium, which sometimes precedes death. Should the patient survive then mental disorder and perhaps certifiable insanity may ensue, and continue, as the result of the persistence in an important site of a small area of "occult" sepsis, which acts as the primary portal of entrance of infection and is responsible for the obvious and dramatic collection of pus elsewhere.

The pathology of this condition is described by Pickworth in his book, *Chronic Nasal Sinusitis and its Relation to Mental Disorder*. An example of this pathology is as follows.

CASE I

A married woman, aged 30, with congenital polycystic renal disease, nephrolithiasis, and nasal sinusitis developed mental disorder, was certified insane, and admitted to a mental hospital, where the nephrolithiasis was found. It was noted that the intensity of the mental symptoms was increased or diminished by conditions which respectively prevented or permitted the free egress of the discharges from the pyonephrolithiasis.

Following removal of the calculus by operation she became delirious and feverish until a subphrenic abscess was opened and drained, when her mental state became normal and she

was discharged to her home. She continued well for about three months until, probably as a result of sea-bathing, she suffered a "chill," and again became depressed and was admitted to mental hospital, where once again albumin and pus were found in the urine.

On investigation it was seen that a multisinusitis which previously had been discharging pus on both sides of the nose was now not reacting on one side and only partly so on the other side. After intranasal drainage of these affected cavities there was definitely less pus in the urine, which later became free from pus and albumin. This was associated with further mental and general physical improvement. The patient said that she was now in a better physical state than she had ever been before in her life, and this was supported by the fact that her periods, previously irregular, had now become regular. Mentally she had recovered.

She has during the past seven years since discharge maintained that enhanced psycho-physical vitality in a self-supporting employment. In this case, therefore, the intensity of the psychosis and its type varied inversely with the degree of drainage.

Closed Sphenoidal Abscess in Mental Disorder

The association of a disordered mental state with sphenoidal sinus disease was first described by Jonathan Wright in 1902, when he published *A Case of Isolated, Unilateral, Latent Empyema of the Sphenoidal Sinus with Delirium and Mental Symptoms*. This work has become a classic in this branch of mental disorder. The author had the clinical acumen to conclude from symptoms only that a condition of disease existed in the posterior nasal sinuses and the courage to operate in order to relieve a fellow rhinologist, aged 57, from a condition of intolerable pain and pronounced mental symptoms, enabling him, as Wright has informed us later,

"to live for many years after the operation attending to a large practice and never failing to call me up on the telephone on his birthday and thank me that he was enjoying it. He was operated on for his sphenoidal trouble at a time when operative procedures on that cavity were uncommon, to say the least, and his delirium would have frustrated the present technique in many hands, and my crude method twenty-five years ago was entirely successful in its results."

Yet Wright operated—and it was an operation of no minor magnitude—without any classic signs of disease in the nasal sinuses or nose to support his diagnosis. He even says that "the presence of pus in the nose is not necessary to a diagnosis of sphenoidal disease." The patient had already seen a very distinguished confrere, who had assured him he had no nasal trouble, but advised him to go away for his health. He had been seen by other specialists who were unable to make a definite diagnosis. On Wright's own examination he found

"the nasal mucosa, except for some congestion, was healthy and clean, and there was no especial obstruction to be seen either anteriorly or posteriorly. The middle turbinated bones, while apparently normal, left a very narrow slit in the nose, through which inspection of the ethmoidal or sphenoidal region was very unsatisfactory. Posteriorly a good view of the region was obtained in the rhinoscopic mirror, but nothing especially significant could be noted. Transillumination of the frontal and maxillary sinus gave bright spots over these regions. I was, however, more convinced that the patient had pus under pressure in the left sphenoidal sinus, and perhaps in the posterior ethmoidal cells. This I advanced to the patient as a tentative diagnosis." Later, just after the patient "had spat a foul-smelling cheesy mass from his nasopharynx, I immediately examined his nose and nasopharynx again, but I could discover no sign of pus following the extrusion of the mass, nor indeed any other abnormality. From the fact that no pus had followed the semi-solid mass I was inclined to think the trouble in the sinus might be a malignant growth."

Nevertheless Wright did not deviate from his original diagnosis and "as the patient's condition showed no improvement it was decided to make an effort to explore the sinus." Now what symptoms did Wright describe on which to base his diagnosis of nasal sinus suppuration with occlusion of the ostium?

There was a history of influenza accompanied by severe coryza and left head pain, which latter continued to recur in attacks of increasing severity and duration; there had been severe attacks of sneezing but no nasal discharge. On examination

"his speech was low and his manner dazed. He said he was desperate. The pain in his head was unendurable. In speaking he would raise his left hand to the vertex of the head toward the occiput and bring it down to his left eye and below, which gesture, often repeated, localized the pain better than he could describe it."

There was great hyperaesthesia of the scalp, the breath smelt foul, the temperature was subnormal, the pulse slow, there was some doubtful proptosis of the left eye, but the retinae, apart from slight congestion in the left eye, were normal, as was the vision. Blood and urine were normal. Mentally in the early stages he had been somewhat forgetful, irritable, and emotional, but later he was unable to carry out his work properly, and later still he became delirious. It is submitted that the due recognition of such signs and symptoms as indications of nasal sinus disease would lead to better agreement between workers on this subject.

Closed Antral Disease and Mental Disorder

In the next case there were no signs in the nose suggestive of sinus disease, and the usual deductions from the findings on transillumination of the antra were reversed by the suction-exploration technique of Watson-Williams. Therefore the indications for treatment based solely on the orthodox criteria of sinus disease would have been *nil*, and it is obvious that the resulting inactivity would have been ineffectual in curing the disease or alleviating the symptom-state which arose from it.

CASE II

A housewife, married and aged 46, was admitted to a mental hospital on January 7, 1930; she was discharged on August 7, 1930. An investigation into the family history failed to disclose any evidence of "insane heredity" in three generations. The patient came of what appeared to be a very healthy and long-lived family. She was the mother of six children, all alive and well, and those over school age were all at work.

History.—The onset of the present illness was gradual, beginning about three months before admission. She complained of not being well, but repeated medical examination failed to detect any bodily disease and found incipient nervous breakdown. She became more depressed and slept poorly. Finally she wandered away from home and attempted to cut her throat on January 1; was then admitted to the mental hospital. Her weight was 5 st. 13 lb., height 4 ft. 11½ in. Her general health was poor. No abnormality was found in the chest or abdomen; the blood pressure was 136/88 mm. Hg. The fauces were injected, the tongue moist and clean; she was edentulous. Her headache was frontal and vertical. The face was asymmetrical, the left half flatter than the right. There was left-sided ptosis, and the left angle of the mouth drooped. Both pupils reacted to light and accommodation, though at times the left pupil was one and a quarter times larger than the right. No other neurological signs were detected, except a coarse tremor of the hands. Gynaecological examination and an investigation of the urine were satisfactory; the blood Wassermann reaction was nega-

tive. The Widal test was positive to 7 Oxford units to *B. dysenteriae* Y; no abnormal organisms were found in the faeces.

Examination of the ear, nose, and throat gave the following results: anterior nasal spaces, clear; posterior nasal spaces, slight enlargement at the posterior end of the right middle turbinate and enlargement of the right lateral pharyngeal band; tonsils, normal; ears, drums normal; nasal sinuses on transillumination: frontal sinuses, fair; antra, right dull and left clear.

Mental State.—Mentally she was depressed, her emotional control was poor, and orientation defective; recent memory was poor. She realized she was ill, and told a long, wandering, semi-coherent story of "funny turns" and "queer sensations," but was unable to explain what she meant by these terms. She was troubled by a constant buzzing noise in the right ear, but also stated that she heard her children crying and her husband abusing her. During January and February she had amenorrhoea, and was given aloes and iron. The mental state continued as already described with variations in intensity, probably dependent on menstrual irregularities. At one time "the devil" did not bother her as much as formerly, but a month after admission she stated that all her former ideas had come back again, and she was agitated, distressed, and depressed as before. Ultra-violet light and colon irrigations were being given. This treatment continued until the middle of March without any amelioration of the mental state. The lack of response was indicative of the presence of closed sepsis.

Treatment.—A bilateral antral investigation using the Watson-Williams technique now showed: right antrum, clear; left antrum, pus. The cavities were thoroughly irrigated with antiseptic solution but not drained. This was followed by a pyrexial reaction, reaching to 102° F. for three days, and by the return of menstruation during March. Although in some degree better, she was still unstable and had mental and physical exacerbations in relation to amenorrhoea, which recurred during April and May. Both antra therefore were drained intranasally at the end of May, and the menses returned during the second week in June, but on this occasion without pyrexia and without exacerbation of mental symptoms; in fact there was physical and mental improvement.

She was now able to describe the subjective aspect of the development and character of her illness. There had been five sensory disturbances troubling her during the illness: vertical headache; giddiness; bilateral buzzing tinnitus aurium, worse on the right; cacosmia; and cogeusia. All these had ceased, and only a mild premenstrual frontal headache remained. Life was now worth living. Physically the facial colour, mobility, and tone had much improved and the left facial weakness had passed away. The blood pressure was 164/100 mm. Hg, and her weight was 7 st. 2 lb.

Objectively she had now recovered. She was discharged on August 7, 1930. Seen later her pupils were found to be equal and reacting equally to light and accommodation. During the six years since discharge she has kept well and stood the anxiety of a mental breakdown of her son, visiting him regularly whilst he was in a mental hospital and reporting sensibly on his week-end leaves of absence from hospital. The son, aged 20, made a substantial recovery from a state of adolescent psychosis, of a year's duration before admission, following removal of dental and tonsillar sepsis and of three impacted and unerupted wisdom teeth. Since discharge he has kept well.

Other Illustrative Cases

In the following extracts from three further cases of mental disorder and sinusitis it is sought to show that it is by no means uncommon for closed sinus sepsis to occur in cases of mental disorder in which the indications in the nose or on transillumination of the sinuses are atypical. Other examples of atypical findings are furnished by cases recorded in the annual reports of the Board of Control (Parts II) from 1928 to 1935. The lack or even reversal of the classical signs of sinusitis on

examination of the nasal spaces and transillumination in cases of mental disorder is apt to discourage beginners in these investigations, and it is well that they should realize the problems which confront them.

On the other hand critics cannot in these cases bring the complaint against the Watson-Williams suction-exploration technique that it is not reliable because it can aspirate pus from the nasal passages through the ostia into the sinuses when the sinuses are free from exudate. The careful surgeon should always take care to remove any such pus if present in the nasal passages with tampons of gauze before proceeding to insert the cannulae. In these cases of closed sinusitis, however, where there is no pus visible in the nasal passages it can hardly be asserted that pus found on suction-exploration of the sinuses has come from those nasal passages.

CASE III

In a case of acute puerperal insanity on rhinological examination crusting was found on the anterior end of the right middle turbinate. On Watson-Williams suction-exploration the membrane of the right sphenoidal sinus was found thickened and there was muco-pus in the left antrum.

CASE IV

This was a case of psychosis due to ill-health gradually developing during several years after childbirth. On rhinological examination we found: ears, drums retracted; nose, both inferior turbinates enlarged; throat, pus in both tonsils and a retained abscess in right tonsil. On Watson-Williams suction-exploration muco-pus was found in both antra.

CASE V

In this case routine rhinological examination was impossible owing to the suicidal condition of the patient rendering her absolutely non-cooperative. She was therefore examined under an anaesthetic, when sufficient indication was found to warrant a nasal sinus examination by the Watson-Williams suction-exploration technique. This showed the presence of pus in the right sphenoidal sinus.

Closed Sinus Disease at Necropsy

In two cases of mental disorder closed sinus disease was only discovered at necropsy. In the first of these cases while there was some crusting of the left anterior nasal space, which might have corresponded to the greenish-yellow pus found in the left antrum, there was no free pus visible on removal of the crusts. On the right side the anterior nasal spaces were clear, but there was pus in the antrum at necropsy.

CASE VI

The patient was a male, aged 58, with a history of recurrent nasal sepsis and "hallucinations and delusions" suggestive of some disturbance in the ear, nose, or throat. The blood Wassermann reaction was negative and there was no evidence of syphilis. On ear, nose, and throat examination anterior rhinoscopy showed crusting of the anterior nasal space on the left side; the right side was clear; nothing was seen on posterior rhinoscopy; on transillumination the antra were dim, the frontal sinuses fair; the tonsils were fibrotic, adherent, and septic; the ears were normal; in the mouth there was gross pyorrhoea with many carious teeth and roots, especially in left maxilla and right mandible. Sudden death occurred three weeks after admission and before any operative intervention had taken place. At necropsy the frontal and sphenoidal sinuses were clear, but the left antrum contained much greenish-yellow pus, and in the right antrum there was pus on the medial wall; the tonsils contained pus. Well-marked atheroma was present in the aorta on the semilunar cusps and extending down on to the mitral valve and around the coronary arteries. A patch of atheroma was situated within and completely occluding the left coronary artery for half an inch. The right artery was fairly patent.

In the second case, as a result of clear nasal spaces and satisfactory transillumination findings, the sinuses were not investigated, although the septic tonsils were removed. At necropsy some years afterwards a multisinusitis was found, which was probably present on admission and the cause of the old herpes ophthalmicus.

CASE VII

A single female, aged 58 on admission to the mental hospital on April 27, 1931. A sister was in a mental hospital and an aunt had died there. The present illness was described by another and very capable sister as being gradual in onset, beginning with depression, then delusions of persecution, and finally auditory hallucinations appeared during the six weeks before admission. The patient became increasingly secretive, went for long walks to get away from the "voices," and insisted there was "something working inside her."

On admission she had the scarring of an old herpes ophthalmicus on the right temple. The cardiovascular system appeared normal; the blood pressure was 134/86 mm. Hg. The thyroid was uniformly enlarged. The pulmonary and abdominal viscera seemed normal. The right pupil was slightly larger than the left; both were slightly irregular but reacted to light and accommodation. The urine was normal; the blood Wassermann was negative. She complained of frontal headaches and a bitter taste in the mouth in the morning although she was edentulous. She was self-centred, hallucinated, and deluded. She said that she had a jumping sensation inside her and that people could hear this and consequently men shouted after her.

There was liquid pus in both tonsils. The ears were normal. The post-nasal spaces were not seen; the anterior nasal spaces were clear. On transillumination the antra and frontal sinuses were fair. There appeared to be no indication on this examination for any active treatment beyond the removal of septic tonsils, and this was carried out.

Neither then nor subsequently was any discharge from the nasal passages or other objective evidence seen which might have suggested the presence of sinus disease, and the patient was unable to assist in any way. After the operation a course of non-specific therapy was given, and in the following years there was some evidences of physical and mental amelioration. The sensory disturbances persisted, but the confusion diminished so that she was able to recognize that the "voices" she formerly complained of were really noises in her own head. There was now no active complaint of these, nor of a variable cacosmia and headache, though they continued to occur. The goitre, formerly quite prominent, disappeared. She was able to go out on week-end leave, and even for a month on trial during the winter of 1934-5. In 1935 she became more debilitated, but during this time there was never any evidence of nasal discharge. She died suddenly in June, 1936, aged 63.

At necropsy both sphenoids and both ethmoids contained pus, and the right antrum contained yellowish pus, while the left antrum contained clear mucus. Both frontal sinuses were moist. The stomach walls were much atrophied. The left coronary artery was atheromatous for the length of an inch about half an inch from its mouth.

I wish to acknowledge my indebtedness to my colleagues of the visiting, resident, and research staffs of the Birmingham mental hospital for their observations on and treatment of the cases on which this communication is based.

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According to investigations made by Professor G. Modena, the number of insane under treatment in Italy in 1935 was 110,793, of whom 60,988 were males and 49,805 females. On January 1, 1935, the insane numbered 83,541, and on January 1, 1936, 85,403.