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THE PATHOLOGICAL CONDITIONS OF THE CRANIAL SINUSES.<sup>1</sup>

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I wish to present to this section of the Congress the results of an investigation into the condition of the various cranial sinuses found post-mortem, and to analyze the relationship between the disease producing the fatal issue and the pathological state of their interior.

With this object I solicited the help of Dr. Stacy, assistant pathologist to the Sydney Hospital. He examined 100 cases in all, noting the contents, and in some cases adding the bacteriological finding.

The cavities examined included the antra of Highmore, the frontal, ethmoidal, and sphenoidal sinuses, together with the lateral sinuses, middle ear, mastoid antrum, and cells.

At the outset I fully expected the results to agree with those found by other investigators in the old world. I was astonished to find a considerable variance, more especially relating to the ethmoidal and sphenoidal sinuses. So far as I am aware, this is the first time that such an examination has been conducted in the Southern hemisphere. It therefore adds a further interest to the question, inasmuch as the element of climate can be included when

<sup>1</sup> Read before the Sixth Intercolonial Medical Congress, 1902.

we compare the results with those found in the Northern hemisphere. The examinations cover a period of one year. During four months of that time an epidemic of influenza occurred, followed in a number of cases by a fatal form of pneumonia. This largely increased the mortality for that disease as compared with former years. Pneumonia accounts for 22 out of 100 deaths when we include the two forms of the disease, and in no less than 11 cases were one or other of the sinuses involved—viz., 50 per cent. The sphenoidal sinuses contained pus in 8 of those cases and in 3 cases clear fluid, so that we have here 50 per cent. of the cases dying of pneumonia implicating the sphenoidal sinus. This bears a relationship of about 23 per cent. to the total number of pus-infected cases. Of the whole number of cases dying of various diseases, 35 were found to contain pus in one or other cavities—i.e., 35 per cent. of the total number of cases contained pus. If we deduct the 22 cases which died from pneumonia, we have left only 13 cases whose cavities represent the result of a suppurative process.

The percentage of cases occurring in pneumonia was 45 per cent. We are thus justified in assuming that the pneumococcus and its associates are actively instrumental in producing disease of the accessory cavities of the nose. The proportion of cases is very large, and justifies the inclusion of suppuration of the tributary cavities of the nose as one of the complications of the disease. Pneumonia is a disease affecting the respiratory apparatus, and as these sinuses are practically invaginations of the first part of the respiratory area, we need not wonder at their participation in the same morbid process. They are air-laden, and present to the pneumococcus the same conditions for the manifestation of its activity as the air-cells themselves. How far suppuration in these cavities contributed to the fatal result, or whether they exercised any effect in this direction, is beyond the scope of this paper; suffice it to say that we should occasionally meet with disease in these sinuses in patients who have recovered from this disease; not, however, in the same proportion as those found post-mortem, as many will have recovered, especially those who have had it for the first time. No doubt the number occurring in hospital patients will be larger than among private patients, due to the better surroundings of the latter.

Lennox Browne refers to this subject in the following way :

“Acute sinusitis has been mentioned as a complication of pneumonia, but it is more probable that a pneumonia, as also a laryngitis or tracheo-bronchitis, is in such circumstances a consequence and not a cause of the nasal and nasal

accessory inflammation. It is, in fact, an example of a head cold descending to the chest, which is recognised by popular traditions as an omen of gravity. Another reason for believing that the sequence of events is as I suggest is that the rhinal discharge is the first to disappear, and that relief of the laryngeal tracheo-bronchial and pulmonary symptoms promptly follow suit, and in the order named. The pulmonary trouble may be produced in three ways: (1) By simple continuity of surface; (2) by surface chill of the body in the depressed condition characteristic of an acute nasal catarrh, wherein the patient is liable to somewhat profuse perspiration of the head and trunk; (3) if a bacterial origin be advanced as essential by simple conveyance of bacteria through the respiratory passages, and the setting up of infectious foci in the lower respiratory tract and tissues."

Fränkel is strongly of opinion that the pulmonary mischief is primary, and he speaks of a pneumonic form of antral suppuration due to the *Diplococcus lanceolatus* which he has found not only in the antral, but also in the frontal and ethmoidal sinuses. Personally, I can hardly believe that the order of events is as Lennox Browne puts it, because pneumonia is frequently met with without any preceding head cold. We know that its invasion is usually sudden and not gradual, although it cannot be denied that a fair proportion of the cases succeed a cold in the head, which may have lasted a few days, or even longer, before the inception of the pneumonia.

Hitherto influenza has been regarded as the chief causative factor of sinus suppuration, to which has been added some of the infectious fevers, such as scarlet fever, typhoid, small-pox, and measles. Hajek states in his "Nebenhohlen der Nase" that the pneumococcus is present in the antrum of Highmore in conditions of health; that being so, it is easy to see how it can be called into activity.

If I may be allowed to digress here from the strict title of my paper, in discussing the etiology of these cases I should like to include the clinical aspect of some cases which have come under my own notice, with the view of raising the question of whether they are ever the primary factor in producing disease of the lungs. I have assumed that those cases found post-mortem were acute; however, some must have been more or less chronic in their nature, as shown by the existence of polypoid tissue as part of their contents. If they exist before the pneumonia, do they contribute either as an exciting or predisposing factor in the production of the pneumonia? Of this I am sure, at any rate, that suppurating disease of the upper respiratory tract is now and again the cause of serious disease of the lungs. One case impressed itself upon me four years ago, in which a patient of mine, a lady, aged thirty-two, suffered

from a suppurating sinus of the right tonsil. With her finger she was able to express sometimes half a teaspoonful of the pus from the tonsil. She deferred treatment for a time, became ill with pneumonia, which was complicated with peritonitis, albumen in the urine, and pain in the humerus, the latter was in all probability due to a septic osteo-myelitis, and she succumbed in the course of a week.

Some of you may have encountered cases in which the predominant symptoms pointed to bronchitis or bronchiectasis, and where the patients were treated with expectorants for years without benefit.

Three cases of this nature occur to me. The first was a young man, aged twenty-eight, who applied to me at the Sydney Hospital on account of obstruction of the nose, due to polypi. His frontal sinuses and antra of Highmore contained pus, and after these were cured he still continued to expectorate about 2 ounces of pus daily, which was subsequently found to be due to bronchiectasis. I have no doubt that in this case the sequence of events was extension downwards of the morbid process from the diseased sinuses. The next two cases had unavailingly been treated for bronchitis, and were regarded as incurable. This is a disease which I regard as a *rara avis*, and the existence of which is difficult to conceive in the balmy climate of Sydney, unless as a sequence of some suppurating process higher up. These cases both showed rapid improvement after the antra had been opened and irrigated. The cough in these cases is quite characteristic, and when once heard is easily recognised again. It is loose, and requires no effort to unburden the bronchi of their contents.

Friedrich's excellent manual on "Rhinology, Laryngology, and Otology in General Medicine," page 28, says :

"That diseases of the lungs may owe their origin to direct extension of the disease of the upper air-passages to the trachea and bronchi. Chronic bronchitis is the most frequent of the various sequelæ, and proves very obstinate, especially in cases of chronic suppuration in the tributary cavities of the nose, where the pus trickles down from the naso-pharynx into the deep air-passages, and sets up a chronic irritation. The question of the relation between chronic catarrh of the upper and the deep air-passages has not received the attention it deserves. It is barely mentioned in the most general terms in connection with bronchitis, and the possibility of emphysema, bronchiectasis, or fetid bronchitis being due to such causes is usually ignored."

To further illustrate this subject I may cite two cases of gangrene of the lung (included in the post-mortem records) in which the ethmoidal and sphenoidal sinuses were peculiarly involved, as

they contained dark-coloured fluid, foul smelling, together with a profound alteration in the lining membrane, the colour indicating necrosis. It is open to question whether this followed, preceded, or occurred simultaneously with the lung affection. It evidently partook of the same character as regards odour as the gangrene itself. The fluid furnished a variety of germs—viz., streptococci, staphylococci, and diplococci resembling pneumococci.

Twenty-three cases of the total number contained pus in one or several cavities, while eighteen cases contained fluid other than pus. Polypoid tissue was found in the ethmoidal and sphenoidal sinuses in two or three cases, and in one case the frontal sinus contained a polypus. We know from histology that apart from the antrum the mucous membrane lining the sinuses is almost devoid of glands, and yet in several cases a viscid gelatinous fluid was present. This could hardly be regarded as the result of a catarrhal process. The number of cases containing watery fluid is instructive as showing that catarrhal processes in the sinuses are less rare than was at one time imagined. I opened the antra in a case of atrophic rhinitis; pus was found on one side and a clear watery fluid on the other, without any cyst wall. Anderson, in the *Lancet* of 1892, p. 474, mentions a case of nasal hydrops with the symptoms which we generally regard as due to the escape of cerebro-spinal fluid, and which was caused by a polypus in the antrum.

In Harke's cases, quoted in Grünwald's "Nasal Suppuration," of thirty-seven autopsies on people dying of typhoid, pneumonia, influenza, erysipelas, and meningitis, suppuration was found no less than thirty-two times, thirty-one times in the accessory cavities. This, of course, is a much larger proportion than has been found in these cases, possibly the result of climatic influence.

The sphenoidal cavities were involved in not less than twenty-nine cases, nineteen of which contained pus. When we consider the infrequency of the diagnosis of sphenoidal suppuration, it is evident that a large proportion escape recognition at the hands of the specialist. I feel disposed to think that frequently the condition recognised as Tornwald's disease is merely a clinical simulation, and that the real disease is in the sphenoidal sinus, and the pus we see in the region of the bursa of Tornwald is merely the pus which has trickled down from above and obtained for a time a resting-place there. This supposition is strengthened when we reflect on the results attending our efforts at cure.

How frequently do we fail in the local application of treatment to the bursa by means of caustics and antiseptics to cure or even modify the condition. By the way, there is a condition sometimes

seen after the removal of an adenoid somewhat resembling Tornwald's disease, and evidently caused by the removal of the growth, as in the cases I have seen there was no morbid secretion present prior to its removal. This may possibly be due to infection of the sphenoidal sinus.

Dr. Stewart mentions in the *Lancet*, February 19, 1892, that suppuration of the frontal and sphenoidal sinuses were very rare. Such a statement is not supported by the findings in this series of post-mortems.

Next in numerical importance comes the ethmoidal sinuses; they are involved in thirteen cases, eight containing pus and the others variously coloured fluid. Polypoid tissue was found in one or two cases.

Rosenberg says the age in sphenoidal diseases ranges from nineteen to thirty-five. In these cases it ranges from three to seventy-five.

Very little remains to be said of the frontal sinuses, as they were only eight times concerned in a departure from the normal state. Price Brown regards this as belonging to the domain of the oculist. The cases which find their way thither are the closed empyema, and even these should undoubtedly be placed under the care of the throat specialist, as they require treatment demanding intranasal interference.

Only four cases of suppuration were found in the antrum, this paucity being due to the fact that a number of the earlier cases were left unopened. All the other sinuses were systematically opened in all the cases.

## THE BACTERIOLOGY OF THE SINUSES.

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THIS is very far from being exact, the chief reason being that cultures made from the contents of the sinuses are almost invariably overgrown, partly by saprophytic organisms, and partly by other organisms, which grow more luxuriantly than the more important ones we are seeking. Bacilli of the *Proteus* group (saprophytic) give most trouble in this respect. In films made direct from the contents of the sinuses we frequently have difficulty in distinguishing pneumococci from staphylococci which have assumed a diplococcal arrangement. In one or two cases the pus from a sinus of a patient affected with tubercular disease of the lungs, etc., was