

SEROUS DISEASE OF THE MAXILLARY ANTRUM WITH A REPORT OF TWO CASES.*

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In the critical study accorded diseases of the nasal accessory sinuses, empyema has been the center of interest because suppuration in the maxillary, frontal or other sinuses is found not only to underlie offensive nasal affections but to constitute a center whence septic material is absorbed and infection spread to neighboring organs. Less attention, especially in this country, has been given the muco-serous accumulations; indeed, the frequency of so-called "serous disease" of the antrum has been disclosed only of late by a systematic resort to exploratory puncture in the search for empyema and by assiduous post-mortem inspection of the nasal accessory sinuses. The clinical picture of acute rhinitis associated with acute inflammation of the maxillary or frontal sinus is not unusual. The pain and sensations of heat and distension are observed to be momentarily relieved by the occasional escape of mucus or muco-serum through the narrowed osteum into the middle meatus. This can be none other than an acute catarrhal sinusitis with excess of secretion, which condition has been verified at autopsies in influenza cases by Weichselbaum¹, who found muco-serum which was not cystic retained in the antrum, and in diphtheria and pneumonia cases by Wertheim.²

Acute sinusitis may terminate in spontaneous recovery, in acute suppuration and then recovery, in chronic suppuration and probably in chronic catarrhal sinusitis. The existence of the latter with retention of muco-serum is also verified by autopsy.³ Whether it follows acute sinusitis or originates *de novo* is not material. Whether it can result in the retention of a serous liquid, as in so-called "serous disease" which is not cystic, is still a subject of discussion. Granting tentatively the affirmative, chronic catarrhal sinusitis may then result in the following formations as products of the inflammation:

1. Polyps.

* Presented at the annual meeting of the American Laryngological Society, New Haven, May 27 to 29, 1901.

2. Cysts.
3. Osteophytes.
4. Hydrops inflammatorius or serous collection. Polyps, cysts and osteophytes may also exist in conjunction with suppurative sinusitis.

Only large accumulations are described in the older literature, those sufficient to cause pronounced pressure symptoms, external deformity, and through erosion of the bone the appearance of a fluctuating crepitating tumor with perhaps a fistulous opening. The term *mucocele*, while likewise applied to serous collections, is more particularly used when the contained material is mucoid, soft, semi-solid, varying to a thinner consistency, and the lining membrane the site of a low-grade cell proliferation, with edema, polyps and cysts. When, as may be the case with any sinus, but particularly with the antrum, the distended sinus contained a thin serous fluid, it was known as *hydrops antri*. Giralde⁴, Virchow⁵ and Wernher⁶ early objected to the latter term as applying a false notion of the real pathological condition, maintaining that the fluid was not free in the sinus, but was contained in a cyst. Berger⁷ also likens it to a specimen shown in conjunction with magitot of a dentary cyst which had filled the sinus. Cysts when not dentigerous are ascribed⁸ to dilatation of a follicle or degeneration of a polyp.

Several modern authors, however (Browne, Kyle, Shurley, Schech), while recognizing a greater frequency of cysts are disposed to retain the term "hydrops" or its equivalent as a continued recognition of a non-cystic serous exudation either inflammatory with closure of the osteum, passive as in kidney disease, or from venous obstruction. Cases by Delie, Dmochowski⁹ and Krebs are cited in which there was no cyst wall and no "rest" or sinus angle unfilled.

Thus the matter stood until, in consequence of the systematic resort to exploratory puncture, smaller, often insensible, accumulations of muco-serum and serum are found to be relatively frequent. Noltinius¹⁰ in 1895 reported the stately number of thirty-seven cases of "serous disease" ("Seroser Erkrankung") of the maxillary sinus. He believed the fluid to be free in the antrum, therefore a muco-serous or so-called serous inflammation. The treatment was by simple drainage. Korner¹¹ in 1896 reported seven similar cases and confirmed Noltinius' views. Halasz¹² in 1898 reported five cases. Dmochowski¹³ in 1895, in a prize essay, based on numerous anatomical sections, records two which particularly bear on this point. The first (Case I) was devoid of symptoms during life, but at autopsy had in the right antrum 3 c.c. of muco-serous

fluid which contained epithelial cells and lymph corpuscles and clouded with acetic acid. The mucous membrane was much hypertrophied, yellowish and edematous. When incised a similar fluid escaped. Microscopically the membrane showed epithelium in good condition, the fibers were pushed apart and the meshes contained collections of small cells. Glands numerous, but degenerated. No cysts. The osteum maxillare was patent. Other sinuses and mucous membranes unaffected. The case is interpreted as one of chronic catarrhal sinusitis. In the other case (Case II) there had been no symptoms during life indicative of antrum disease, but at autopsy the osteum maxillare was found completely closed and the sinus distended by a transparent yellowish fluid which did not cloud on the addition of acetic acid and contained only fibrin. The mucous lining was thin, shiny, devoid of epithelium except in spots. Glands few and degenerated, blood vessels numerous. In one angle of the sinus grew a cystic polypus the size of a hazelnut. Dmochowski regards this case as an instance of "hydrops inflammatorius" and not as a large cyst and remarks that a cystic polypus growing within a cyst has not yet been observed. He explains the development as follows: The chronic catarrhal secretion, in consequence of closure of the osteum, distends the sinus, the mucous membrane and glands atrophy from pressure and the original mucous morphological elements disappear by fatty degeneration, there remaining in the fluid only fibrin which also finally disappears. He regards the process as analogous to hydrops processus vermiformis. Killian¹⁴ in "Heyman's Handbuch," and Hajek,¹⁵ while regarding cystic formations as more numerous, accept as possible the free accumulation in the antrum of muco-serous and serous fluids. Out of 400 autopsies Wertheim¹⁶ found free serous fluid in the sinuses in 48, in the antrum in 14. Of 48, six showed inflammatory changes in the mucosa.

Alexander¹⁷, on the other hand, maintains that these conditions concern always cysts, which opinion is based upon an anatomical specimen in which a clump of small cysts formed a bolster-like mass at about the center of the nasal wall of the antrum, and upon clinical cases in which, after curetting, remnants of cysts were identified. In two cases (Cases III and IV), with pus in the middle meatus, aspiration yielded serum, arguing in favor of cyst in a suppurating sinus. In another case (Case VI), on opening the antrum, there was found the collapsed wall of a large cyst within which grew a small cyst. He regards this as a refutation of Dmochowski's position that a cyst cannot grow within a cyst. Hajek¹⁸ also reports cysts yielding serum by aspiration from suppurating antra.

My own cases afford opportunity for study only from a clinical standpoint, yet they present features of interest which may tend toward a clearer understanding of the subject. The first is one of acute sinusitis with retained muco-serous secretion, and is serviceable for comparison of the fluid with that of the second case, one of chronic serous disease.

Case I.—G. S. I. Recurrent nasal polypi, polypoid transformation of the middle turbinated bodies. Septum deflected toward the left. No purulent discharge nor shadow on transillumination at this time. Resection of middle turbinated bodies and removal of all tangible polyps. Much benefit. Some months afterwards, in November, 1897, he returned suffering from an acute influenzal cold, with pain and edema through the left cheek, conjunctiva congested and temperature elevated. Transillumination gave diminished clearness of the left side. Aspiration by Schmidt's needle in the middle meatus yielded a syringe-ful, 4 c.c., of a clear straw-colored muco-serous fluid. This coagulated in part spontaneously, and, on being centrifuged, gave a residuum of one-eighth bulk, which microscopically showed a fibrous-like mass with a few epithelial and lymph cells. No cholesterin crystals. The supernatant liquid wholly coagulated on boiling. The urgent symptoms abated, but a few days later pus appeared in the middle meatus and an exploratory puncture yielded ordinary pus. Suppuration persisting, eventually an opening was made in the anterior wall. Palpation with the little finger disclosed nothing. Sinus moderately curetted. Complete recovery. Four years later the patient writes: "Discharge ceased and opening healed immediately after drainage tube was removed by you. No further discharge. Nose in good condition, plenty of breathing room, very little mucus discharge.

Semon¹⁹ describes a similar case in his own person, believing the muco-serum to have been free in the antrum, but others have interpreted his case as a cyst which had undergone sudden enlargement, and ruptured at the periods when he felt a free discharge and relief. In Case I the large amount of albumin and the lymph corpuscles would indicate a mucus rather than a cystic secretion and the fibrin indicates an inflammatory origin of the fluid. The question arises whether transformation from a muco-serous fluid to pus might not have been due to infection by the exploratory puncture, but in view of the fact that the puncture was made aseptically and that the many punctures to be recorded in Case II had no such effect, the suppuration must be ascribed to other causes inherent in the case.

Case II.—Mrs. C. S., aged sixty-two years, has had polyps removed from time to time. Examination October 23, 1900. Bilateral

multiple nasal polypi and consequent mouth-breathing, which is her sole complaint. No pain, sense of distension, purulent discharge or asthma. After the removal of several polyps it was seen that both middle turbinated bodies were greatly enlarged and in a state of polypoid transformation.

October 30.—The transillumination test shows the infraorbital crescent on each side diminished, but not in complete shadow, brighter on the right than on the left side. No pus in the middle meatus. Aspiration of the left maxillary sinus through the nasal wall in the middle meatus yielded a syringe-ful, 4 c.c., of a viscid transparent fluid, which was submitted for bacteriological examination.

November 13.—In order to free the upper part of the nostril of an impacted mass of polypoid tissue, to remove obstruction from the osteum maxillare and expose polyps attached to the borders of the hiatus, resection of the left middle turbinated body was made by the author's method, described before this association in 1891 in a paper entitled "The Radical Treatment of Nasal Polypus."

January 8.—Repuncture of the left antrum was now entirely negative, both on aspiration and irrigation. Improved clearness by transillumination. At the same sitting aspiration of the right maxillary sinus yielded a syringe-ful of similar fluid; this preceding any operating on that side except the snaring of a few polyps several weeks ago.

January 22.—The first puncture of the right antrum yielded two syringe-fuls, 8 c.c., of a clear, straw-colored, viscid fluid, which was submitted for both chemical and bacteriological examination. Aspiration through the inferior meatus yielded an additional half-syringe-ful of identical fluid, now blood-stained from previous punctures. Irrigation produced a counterflow through the osteum maxillare, but only under heavy pressure. It was thought that a few drops of the serous fluid could be discerned in the washings, but not showing like pus, it was difficult to tell.

January 29.—A second aspiration of the right antrum yielded a syringe-ful of very bloody fluid, probably made sanious by the leakage of blood into the sinus during snaring of polyps from the middle meatus three days ago or else by the puncture made a week ago.

February 5.—A third aspiration of the right antrum again yielded a clear serous fluid. A resection was now made of the degenerated right middle turbinated body with a large polypoid mass and polyp-buds attached.

February 25.—The fourth puncture test of the right antrum yielded only a few drops of a clear fluid mixed with numerous air bubbles.

March 19.—Aspiration and irrigation of both antra were now entirely negative. There was no discharge and no discomfort. It would seem that natural drainage of the maxillary sinuses had been restored by removal of obstruction from the nasal surfaces.

CHEMICAL REPORT.

The fluid had a slightly reddish tinge from the presence of a small amount of blood. On standing the corpuscles separated, leaving a thin colorless supernatant liquid. Chemical tests showed the presence of serum albumin as well as what appeared to be a trace of mucin, the amount of the latter substance, however, being too small for positive identification. The proportion of the serum albumin was not large, certainly not over one-fourth per cent.

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FIRST BACTERIOLOGICAL REPORT.

On December 11th we received a fluid removed by aspiration from the left antrum of Highmore. Direct cover-glass smear preparations show no bacteria, but two culture tubes contained good large colonies of *bacillus coli communis*.

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SECOND BACTERIOLOGICAL REPORT.

Specimens stained for bacteria show very few isolated bacteria, cocci and single bacilli. Cultures: Smear inoculations were made on inclined agar, Löffler's blood serum and human blood serum. Some of the tubes remained sterile, in others a few scattered colonies appeared, cultivations from which resulted in the separation of four species, *micrococcus cereus albus*, *bacillus subtilis*, Friedlander's pneumonia bacillus and a small bacillus with the name not determined. (Here follow identification characteristics.) The cultures indicate that there was not a specific bacterium present. The species separated were not actively negative because they did not grow promptly. Pathogenous: A guinea pig was inoculated subcutaneously with 5 c.c. of the fluid, with negative result. Microscopic examination: Only a very few epithelial cells and red blood corpuscles are visible.

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It is, of course, impossible to specify the exact condition within these sinuses. On the assumption of cysts, the clinical phenomena are more difficult to explain than in most other cases. The "serous disease" was bilateral, and if cystic they must have well filled the cavity on each side for the fluid was withdrawn from the left side at the level of the middle meatus and on the right side by repeated punctures at different locations in both the middle and inferior meatus. There were no signs about the gums pointing to dentigerous cysts. There was no distension. On the left side, if a cyst, it must have failed to refill after a single aspiration. On the right side, if a cyst, the irrigation counterflow through the hiatus and the

mixture of air bubbles with the fluid on the sixth aspiration are inexplicable. The fluid was, strictly speaking, muco-serous, but not the product of an acutely active inflammation, for it contained but a trace of mucin, few cellular elements and little or no fibrin. It resembled a cystic fluid except that it did not contain cholesterol crystals. It was so largely serous as to fall within the meaning of the terms "serous disease" and hydroph inflammatorius.

The diagnosis of a serous accumulation, without distension or deformity, must be based upon aspiration. The transillumination test is indecisive, although in both my cases the light transmission was distinctly impaired, while not constituting a distinct shadow. This, together with nasal polypus, degeneration of the middle turbinated body, ill-defined browache or sense of fullness in the cheek should suggest an exploratory puncture. To distinguish a free serous collection from a cyst may be quite impossible without a wide opening of the sinus and even then and at autopsy it has sometimes been impossible to determine the point. On transillumination a fully developed cyst is said to permit or even enhance translucency.²⁰ Lambert Lack²¹ reports perfect translucency when the antrum was distended by a mass of polypi without pus or other fluid. Muco-serous collections impair the translucency, but I judge the impairment would vary with the degree of thickening of the mucosa and intensity of the light.

The treatment is in part suggested by the success in Case II. Obstruction to the ostium maxillare should be remedied and to this end enlarged middle turbinated bodies should be resected and polyps removed. Nolténius drained the antrum by a large trocar opening in the inferior meatus. If cystic or if recovery has not ensued by suitable nasal treatment an opening in the anterior wall of the sinus sufficiently large for palpation and then curetting would seem to promise a cure and perhaps forestall what would ultimately become an empyema.

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