

DISEASES OF THE MAXILLARY ANTRUM, THEIR DIAGNOSIS AND TREATMENT.

BY EMIL MAYER, M.D., NEW YORK CITY.

Fellow of the American Laryngological Association; of the New York Academy of Medicine; of the American Medical Association; Adjunct attending Laryngologist to the Mount Sinai Hospital, etc.

The largest, most dependent from above downwards, most frequently affected, and, all things considered, most readily treated of all the accessory sinuses, is the maxillary sinus the antrum of Highmore.

There is abundant literature relating to this and other sinuses, and the presentation of this brief paper has its only excuse in its attempt to elucidate a few of the points in which differences of opinion have arisen and an attempt to clearly present the diagnosis and treatment of these affections as they are practiced at the present time.

While the antrum of Highmore is generally the largest of the sinuses, there are a number of anomalous conditions in which the antrum is very small and again in which the antrum encroaches so far up that its upper border reaches the floor of the orbit. The antrum of Highmore exists as such in foetal life although one observer maintains that it is not present until the fourth year of life.

As a general rule the antrum is one large cavity, but occasionally it is divided by septa reaching often to the upper wall of the antrum. These septa are usually very thin and readily broken down, but occasionally the bony wall that forms them is hard as adamant. The principal diseased condition of the antra are inflammatory and may be those of simple inflammation, conditions of serous exudate, of pus, and of all grades of degeneration of the mucous membrane.

ETIOLOGY.

Among the principal causes of diseased antra are, infection having as its origin an acute form of influenza, infection from neighboring inflammation and infectious conditions such as diphtheria, scarlet fever, etc.; extensions of purulent conditions from the alveoli; external injuries and constitutional disease.

While there are no reliable statistics on the subject it occurs more frequently in males, and by far the greater number are adults. Its occurrence in children is so rare that in an article on empyema of the

antrum in young children I was able to gather but ten cases altogether, of which mine was one, in the world's literature.

In fact so infrequent is the occurrence of this affection in young children that one writer attempted to prove that there was no antrum in early life and said that these diseased conditions were simply caries.

The symptoms in the acute cases are mainly those of pain directly over the antrum extending sometimes to the frontal region; this pain is of a persistent gnawing character, is constant and at times exceedingly severe. Unless relief is obtained a muco-purulent discharge appears on the same side without, as a rule, relieving the pain. There is no periodicity to the pains although there are times when there is a cessation which is soon followed by recurrence of the pain.

Another class of case gives a history of some form of acute rhinitis followed by a muco-purulent discharge; the discharge is on the side affected but it must be borne in mind that both antra may be simultaneously affected.

Diagnosis. In the case where the history is apparent and the symptoms clearly presented, the diagnosis is very easy. In the more chronic conditions however, the diagnosis is by no means easy and sometimes a rare degree of diagnostic skill is required, every means at our command being requisite to reach the desired end. In a suspected case of antrum disease the nose is first examined and if, as is very apt to exist, the nasal mucosa are swollen, an application of a solution of cocaine becomes necessary.

After a wait of a very few minutes the interior of the nose can be inspected and search is made for the presence of pus. A single drop of pus may be found hanging from the under surface of the middle turbinate, and this is the first clew. The patient is then directed to bend the body forward and the head downwards for a few seconds and then sit upright and pus will often be found at the site of the original drop.

At times, however, there is no evidence of pus. In such a suspected case, finding the interior of the nose normal, palpation over the external surface of the antrum with the index finger or thumb in the patient's mouth may elicit pain.

Trans-illumination in a fully darkened room may show a distinct area of darkness. This latter method is the most uncertain of all our methods and while it may be corroborative it is by no means a final or decisive test.

All the examinations made hitherto may still be negative and here the instruments devised by Hajek or preferably a much stronger one devised by Abraham of New York City comes in use. The instru-

ments mentioned are a trocarcanula which is placed in the floor of the nose about an inch from the external meatus and plunged through the nasal wall of the antrum into the cavity with a syringe attachment for aspiration. The contents of the antrum are thus ascertained. The writer has made a number of investigations with the fluoroscope in the hope that the X-Ray might help in diagnosing diseased conditions in the bone cavity. Thus far nothing tangible has presented as a result.

Treatment. For acute disease of the antrum, nothing is so valuable as the washing out of the antrum through the natural opening.

Some misunderstanding has arisen regarding statements made by myself in reference to the possibility of cleansing the antrum of Highmore through the natural opening.

If we bear in mind the position usually maintained by the patient in an upright posture and at the same time the position of the antrum, we will note that the floor of the antrum is on a line normally with the ala of the nose. The natural opening, however, lies directly under the middle turbinate and enters into the antrum in its upper portion.

It stands to reason, therefore, that drainage through this opening would only affect such portions of the cavity as lie above the opening and hence the statement made that given copious pus discharge from the antrum of Highmore, drainage through the natural openings becomes impossible and that irrigation alone cannot be of lasting benefit. In acute cases, however, thick pus has not formed and the cleansing may be done through the natural opening.

It is all important that washing out of the cavity should be with a steady stream and a copious supply of fluid.

A solution of $\frac{1}{2}$ of 1% Lysol has acted best in my hands and I have been able to irrigate freely, keeping a constant control on the pressure required, alternating or following the irrigation as the case may be by forcing air through the same tube that is used for washing purposes.

This has been done by the use of a very ingenuous device originated by Dr. S. Yankauer of New York City, my assistant at the New York Eye and Ear Infirmary. The wash bottle is placed alongside the patient and when the tube has been introduced in the natural opening the simple turning of a cock is all that is required.

The apparatus which I presented before the section on Laryngology of the New York Academy of Medicine is thus described. (Fig. 1.)

The apparatus consists of a bottle having a metal cap which carries a pressure gauge, and inlet and an outlet tube. The inlet

tube fits the cut-off of the compressed air outfit and is closed by a stop-cock. The outflow tube reaches to the bottom of the bottle and has a two-way stop-cock, to close the tube and to change its contents from fluid to air. The latter is used to empty and dry the sinus after irrigation.

The bottle, which holds one quart, is filled with a pint or less of fluid, and compressed air let in until the gauge registers 20 pounds. The in-let stop-cock is closed and the apparatus disconnected. The strength of the stream can be regulated by the stop-cock at the out-flow tube. As the pressure actually used at the extremity of the canula is less than 5 pounds, the bottle will empty itself with a practically constant flow.

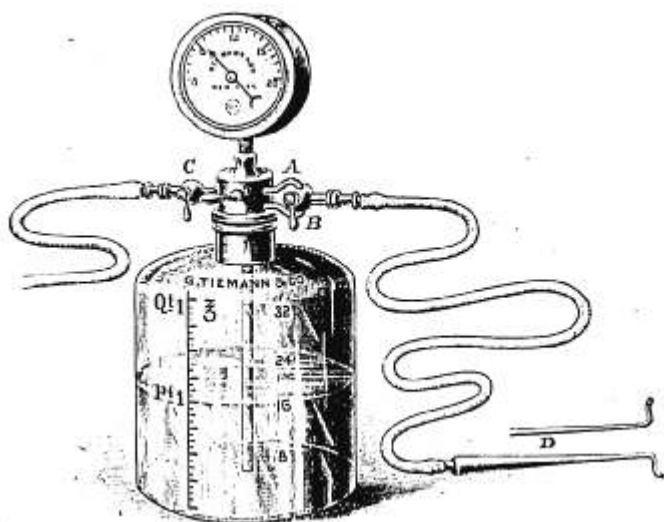


Fig. No. 1.

If a larger quantity of fluid is to be used, the cut-off is attached to the inlet tube, the cut-off and stop-cock left open, and the pressure adjusted by means of the regulator of the compressed air outfit.

By means of this apparatus the pressure used to irrigate each accessory cavity can be measured. The strength of the stream can be varied from a mere dripping to a powerful jet, and it is always under absolute and immediate control.

To irrigate the antrum, Messrs. Tiemann & Company have made for me two virgin silver tubes which taper towards the distal end. The proximal end is fitted with a round extremity and grooved, thus enabling the rubber tubing to fit snugly.

The distal end has a double curve which may be likened to the double curved needles used in cleft palate operations and are so curved as to be useful for the right or left antrum. This bending is readily done as the material is malleable but on account of the danger of breaking from much bending I prefer to have two tubes already bent, one for each antrum.

A small amount of cocaine renders the nose less susceptible to irritation and the introduction of the tube is thereby facilitated.

The orifice being directly under the middle turbinate the tube must be well introduced to that bone before the opening is sought. When so introduced the tip of the tube enters readily into the opening, which fact may be ascertained by its being hooked in and self retaining.

All air is first expelled from the tubing and canula before the introduction into the cavity. The fluid is then turned on, the patient having a pus basin to catch the flow. If not too much pressure is exerted a pint of fluid can be used readily at a time for irrigation.

The irrigation is continued as many times as may be necessary until the fluid returns clear; then air is forced into the cavity. The temperature of the fluid used is about 90 degrees Fahrenheit. Sometimes a single washing is sufficient to relieve all symptoms of acute disease of the antrum and again repeated washings may become necessary. Very frequently the middle turbinate, really a large ethmoid cell, is much distended and encroaches on the septum. The indications are for its prompt removal and the scissors presented by Holmes of Cincinnati are of great value for this purpose.

The removal of the middle turbinate establishes a free drain at the natural orifice and this alone is often followed by amelioration of all symptoms to a marked degree. We are also enabled to irrigate more readily when this has been done. For the more chronic conditions irrigation is a slow and tedious process and something of a radical nature becomes necessary. Intra-nasally the wall of the antra may be broken down by the use of the electro-trephine with the burr directed downward and outward beneath the middle turbinate or upward and outward on a line with the inferior. The radical mode of procedure, however, consists in operating through the canine fossa. The complete operation is known as the Caldwell-Luc operation and consists of opening the canine fossa and then breaking down the nasal wall making through drainage. Another operation is the opening of the canine fossa and inserting a rubber tube for drainage. Still another form is the extraction of a tooth and extension of the cavity of the alveolus into the antrum.

The modes of operation are so well known that I shall not detail them here. I may, however, call attention to a device for the retraction of the cheek which I have found very useful in operating and subsequent dressing. (Fig. 2.) It is shaped like a perineal retractor and its long handle enables the patient to keep the cheek well retracted in the subsequent dressings or in operating when held by an assistant. (See accompanying illustration.)

That the diagnosis of disease of the antrum of Highmore is not always easy of accomplishment is evidenced by the brief history of three cases here presented.

In all of these cases the patients had consulted competent rhinologists—one of them indeed had traveled to the principal European cities in the hope of obtaining relief.

In none of them was the diagnosis of antrum disease made, until made by myself, and all recovered promptly after operation.

Case I. Male, aged 55, referred to me by a neurologist whom he had consulted after having been treated for many weeks for neural-



Fig. No. 2.

gia. The neurologist suspected antrum disease which I promptly confirmed. Operation the next day through the canine fossa, discharge of muco pus, prompt cessation of pain, wound closed in one month, no recurrence.

Case II. Female, aged 40, severe facial pains lasting for three years in which time she consulted prominent physicians in this country and Germany. By the advice of her family physician, she consulted the neurologist who had referred case No. 1 to me. I was asked to see the case in consultation with both gentlemen. I found much tenderness over the antrum, a distinctly dark spot in transillumination, no pus in the nose, but a fistulous opening above the first incisor through which pus was streaming and had been pouring all the time. I was able to elicit the fact that when pus flowed freely from this fistulous opening the pains diminished, while when it was closed the pains became unbearable. A very fine probe entered the fistulous opening, curved along the right and touched the bony covering of the antrum on that left side. My diagnosis was suppuration in the antrum of Highmore whose occasional outlet was through this fistulous opening.

This was concurred in by the gentlemen present and the following day, in their presence, under gas and ether anæsthesia, I operated.

Portions of the antrum wall were eroded and a free flow of pus followed the opening. The patient made a good recovery from the operation, a drainage tube was subsequently inserted, and two months later the wound was allowed to close. From the time of operation there have been no pains, although five years have elapsed and I have had occasion to see the patient from time to time.

Case III. Female, aged 32, of neurotic temperament was referred to me by her physician whom she had consulted the day previous. Her previous history is interesting from the fact that she had been suffering from severe facial pain for over two years and had been treated by her physician in the southwestern part of this country. She had gone to Sanitaria with only temporary benefit. She had consulted a distinguished rhinologist in Chicago and the eventual diagnosis in each case was that she was malingering. The result of all this were strained relations at home and much unhappiness, the patient making many brave efforts to appear well, but always eventually compelled to yield to her sufferings. An examination led to the diagnosis of disease of the antrum of Highmore, based on the following conditions:

Tenderness on pressure over the left antrum most markedly acute about its center. A dark spot showed on trans-illumination. On the following day, under ether anæsthesia and in the presence of her own physician who had accompanied her from her home and of the neurologist who referred her to me and with the assistance of the house staff at the New York Eye and Ear Infirmary I operated in that institution on the left antrum.

The operation was performed by the route of the canine fossa, and as soon as the periosteum was pushed back the exterior surface of the bone over the antrum was found to be carious from above downwards being about 1-16 of an inch in width and fully 1 inch in length. The carious edges were then removed, the antrum washed out and the cavity packed. In one week she left the Infirmary to enter a sanitarium to be treated for her wretched nervous condition. From this institution she was discharged as cured in due time and there has been no recurrence.

The following conclusions may be reached as a result of the study of these affections.

First. The diagnosis is readily made when all classical symptoms are present.

Second. The absence of pus in the nose does not exclude antral disease.

Third. Pain, long lasting, directly over the antrum should be an added factor in the diagnosis.

Fourth. Trans-illumination test is corroborative.

Fifth. The washing out by means of the natural opening is difficult of accomplishment because of the lack of proper drainage and is applicable to the acute conditions only.

Sixth. Irrigation by means of a properly made wash bottle whose force can be readily controlled is of very great help in the treatment.

25 East 77th street, New York.