THE DIAGNOSIS AND TREATMENT OF MAXILLARY SINUSITIS.*

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I wish to ask your indulgence of this paper, only for the reason that I feel that I have been able in the course of my work to make some important, if not altogether new observations, in the diagnosis and treatment of maxillary sinusitis.

Infection of the nasal accessory sinuses, both acute and chronic, have become very important and far-reaching in their relationship to the every-day practice of medicine. The maxillary sinus on account of its peculiar anatomical construction and its close proximity to the teeth makes it the most frequent offender. The dental profession has been aroused from its lethargy and is now most active in the recognition of pathology in the antrum of Highmore.

Incidence of Infection. The incidence of infection has become very high during the last two years due in part to the great epidemic of influenza, and the two or three succeeding milder epidemics which predisposed to infection of the nasal accessory sinuses. A great many infections can be traced directly to the recent activity of the so-called exodontists and dentists in general in extracting teeth. They not only discover a great many old infected antra but they also cause new infections by opening the antrum in a great many cases without knowing it, thereby creating a direct communication with the mouth through which food and infectious organisms enter, while some out of curiosity probe into the antrum without first taking the necessary aseptic precautions. Another great cause for the increase in the recognition of infected nasal accessory sinuses is to be found in the education of the laity as to the desirability of a general physical examination. During the course of this examination the patient usually passes through the office of a nose and throat man who should not consider his work complete without at least a thorough transillumination of the sinuses confirmed by an X-ray picture. Then, too, there is the increasing knowledge of the medical and dental professions at large of the ever-present possibility of the existence of foci of infection and the great benefit to the patient by their prompt removal. This I believe to be the great incentive governing physicians and dentists in their desire to ferret out the underlying cause in working out a diagnosis in obscure cases

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of so-called rheumatism, organic heart disease, nephritis, neuritis, etc.

Diagnosis. The diagnosis of maxillary sinusitis is not always easy. It is very often in the obscure cases that we find the greatest amount of absorption of toxins taking place. It is very easy to diagnose a case which comes to us with one or both nostrils filled with pus and with one or both antra dark on transillumination which in turn is confirmed by the skiagraph. The class of cases which very often tax our ability in diagnosis is the one which comes to us in the terminal stage of infection, the acute infection having taken place years before, without recognition. At that time the mucous membrane is thoroughly infected and doubtless pus was present in large amount and made its escape through the ostium and the patient and his physician regarded it as a "cold" in the nose which would clear up in time. In a great many cases they do apparently clear up so far as the objective symptoms are concerned. The discharge ceases and the patient is as far as he can tell, free from his infection, but by this time a great change has taken place in the mucous membrane. It has become more or less degenerated and we have a varying quantity of granulation tissue which is constantly secreting a mucoid substance of changing consistency. What is still more important from the patient's standpoint in the way of sure and permanent relief is the fact, as pointed out by Dr. Beck before this academy a year or two ago, that we have the original infection still present, though in an attenuated or less virulent form in the mucous membrane, and sub-mucosa, and in the space between the mucous membrane and the periosteum. The patients are referred to the rhinologist by their physicians because they have made a most thorough examination and were unable to find any cause for their complaint. These cases require a most careful history as to previous nasal infection or discharge and especially of their dental work, because it is my belief that fully from 65 to 70 per cent of infections of the antrum can be traced to a root abscess. At the time of our rhinoscopic examination we are very often unable to detect any free pus in the nose, but there is present a heavy viscid mucous in the middle meatus which finds its way into the post-nasal space and can be seen in the form of a string or band on the posterior naso-pharyngeal wall. Upon transillumination we will get a slight diminution in the illumination on the affected side and the pupil of the corresponding side will be dark. This is at once suggestive of pathology within the antrum and should be confirmed by X-ray.

It has been my experience that the X-ray findings have been consistent and with but one exception have confirmed the transillumination. In this case the skiagraph was taken first and showed definitely pathology in the right maxillary sinus. The history in this case was positive and the infection was of long standing and the patient had been operated upon four times but the Freer-Jackson transilluminator failed to indicate the slightest shadow. Both pupils transilluminated perfectly. There was a thick mucoid discharge in the nose and symptoms of anemia and general malaise. This case was especially interesting to me because the X-ray findings were positive and those of the transilluminator were negative. I think the explanation is to be found in the fact that the X-ray is far more sensitive to the diseased mucosa and sub-mucosa, while these structures offer little resistance to the passage of the light of the transilluminator. I have laid considerable stress upon this class of cases because they are not infrequent and are highly pathological in character and are the ones that are most likely to go undiagnosed. The various other methods of diagnosis are familiar to us all and need not be mentioned here. However, in passing, I wish to condemn the promiscuous use of the trocar and irrigation as a diagnostic routine.

This procedure is not without danger to the patient as reported by Redair Gording of Christiania, Norway, in his excellent article entitled "Serious Complications in the Puncture of the Maxillary Sinus," in which he reviews nine cases found in the literature with a fatal issue in four, and seven cases collected by himself with two fatalities.

I cannot see why we should subject our patients to this added risk when the findings are of so little value. If we have an antrum full of pus we know it positively by other means of diagnosis, and since the puncture and irrigation can only confirm what we already know, why should we use it? On the other hand, if the antrum is without pus but filled with diseased mucous membrane and masses of granulating tissue our irrigation will be returned practically clear and we have gained nothing. The puncture and irrigation to my mind is devoid of any curative value whatever. The X-ray must then necessarily be our sheet anchor in the diagnosis of these obscure cases of maxillary sinusitis. It is necessary to have the services of a good radiologist and we must learn to read and study the skiagraph with him in order to arrive at an intelligent and scientific conclusion.

Advantages of the Caldwell-Luc Operation. Both of these operators described independently a similar procedure. Caldwell in

New York in 1893, and Luc in France in 1897. After ten years' experience and observation of the various surgical procedures for the radical cure of maxillary sinusitis, I have been led to conclude that the Caldwell-Luc operation offers the greatest advantages. I need not burden you with the technique of this operation, but suffice it to say that it gives us a direct approach to the antrum through the canine fossa. The bone here is thin and can easily be drilled through with a Hartmann drill and the opening enlarged sufficiently to give us an excellent view of the interior of the antrum and all of its ramifications. This exposure to my mind is most important. Most of us at one time or another have attempted to work through too small an opening. I have heard the Caldwell-Luc operation unfavorably criticised in comparison with the Denker operation. I think you will agree with me that the Denker is rather radical in character and the destruction of bone unwarranted. Some have said that unless you did a Denker operation you were likely to leave pathological tissue in the angle of the sinus just behind its anterior wall. In doing the Caldwell-Luc operation I have not found the slightest difficulty, with a small and properly curved curette in cleaning out this angle. The ostium can be thoroughly inspected and the orifice curetted free from any polypi or granulations that are almost always present in varying amounts. In doing this operation every vestige of pathology should be removed from the sinus. There is one location in particular where I have seldom failed to find a large amount of granulating tissue and that is that portion of the sinus corresponding to the concave inner surface of the maxilar bone. The opening into the inferior nasal fossa can be made as large as it is deemed necessary, by carefully chiseling away the thin bone without perforating the nasal mucosa and without injury to the inferior turbinate.

Take plenty of time to perform the operation. Be thorough and accurate in every detail. Unless you do this you will surely have to operate many of these cases a second or third time. Do not subject your patients to the possibility of a subsequent operation in order to save a few minutes on the operating table. It behooves all of us as rhinologists to be conservative whenever possible in our nasal surgery. Lo! the thousands, yea, the millions of turbinates that have been sacrificed in years gone by. You will find that it is rarely if ever necessary to remove any of the turbinates if your nasal opening is low down and on a level if possible with the floor of the antrum and of the nasal fossa, and with its long diameter antero-posteriorly.

Doubtless all of us have seen cases in which the middle turbinate together with the ethmoid labyrinth had been removed, where a really widely destructive operation had been done for the cure of what seemed to be an ethmoiditis, which later proved to be an error in diagnosis and what really was a maxillary sinusitis. I have seen case after case, of what to the casual observer seemed to be an ethmoiditis, clear up immediately following a radical operation upon the maxillary sinus. I think you will agree with me when I state that the order in point of frequency of infections of the nasal accessory sinuses is as follows: First, maxillary; second, frontal; third, ethmoid, and fourth, sphenoid. I shall feel that I have been justified in presenting this paper if for no other reason than to impress upon your minds the importance of eliminating all possibility of an infected maxillary or frontal sinus, before you sacrifice the middle turbinate and the anterior and posterior ethmoid cells. In doing an operation upon a sinus nothing has been destroyed, nothing has been removed that has a physiological function to perform. The nose has a definite function to perform and when its structures are removed they cannot be replaced. Thorough ventilation and complete gravity drainage are great factors in the satisfactory surgical treatment of infected antra. The normal ostium is one of those freaks of nature wrought in the process of evolution which was in its proper relationship to the floor of the antrum when we walked on all fours but became malposed when we assumed the upright position.

Post-Operative Treatment. The after-treatment of the radical maxillary sinus operation consists of the immediate after-treatment and the treatment during convalescence. It is my practice to close the canine fossa opening by suturing the mucous membrane with catgut, and as a rule this operative wound needs no further attention except ordinary mouth cleanliness. I remove the packing through the nostril in from thirty-six to forty-eight hours. In putting in the packing a little care not to pack too tightly and to start the folds at the bottom of the sinus so that the layers come forward to the nasal opening will facilitate removal and be least uncomfortable for the patient. Edema of the face and soft tissues about the eye on the operated side varies in different patients and with the pathology present in the sinus. I have never seen it of serious consequence, though it occasionally is very annoying to the patient. The edema lasts from one to three weeks and cold applications are the only treatment necessary. There seems to be some difference of opinion as to the advisability of irrigating the sinus subsequent

to operation. It is my practice never to do so unless there is special indication, such as unusually profuse and foul discharge. In thirty-seven cases, irrigation was used only twice. In the first case there was a marked and prolonged reaction in the cheek lasting about ten days, when the sinus was irrigated to determine whether or not any pus had accumulated from the periostitis. The irrigation was returned clear and was not used again. The second case was a virulent staphylococcic empyema where the dentist some months previous had forced the root of a tooth up into the sinus. There was a small area of necrosis of the alveolar process from which came a foul discharge through the nasal opening. This case was irrigated every day or two for four or five irrigations when the odor disappeared and the discharge ceased. I do not believe in waterlogging the lining of the sinus. Another objection to repeated irrigation is the ever-present possibility of reinfection. In most cases the only local treatment after the removal of the packing is the daily cleansing of the nostril and inspection of the nasal opening into the sinus to insure its patency. The mucous or muco-serous discharge which is rather profuse for a few days gradually lessens and the nostril is dry in about ten days.

It has been my good fortune not to have had the serious ocular and brain complications of abscess mentioned by some authors, nor have I had bony necrosis of the sinus walls. The end results of a properly performed maxillary sinus operation are most gratifying when one notes the immediate improvement of the local point of infection and the general condition of the patient. Within a few weeks the patient loses the pasty, sickly, septic appearance, energy is much improved, weight gained, and color and appetite back to normal.

CONCLUSIONS.

1. That the incidence of infection is, for the reasons stated, greater than supposed, and that physicians and dentists generally are recognizing the existence of latent infected antra more and more each day.

2. That many infected antra go undiagnosed because of the absence of subjective symptoms. That the trocar and irrigation is very limited as an aid in diagnosis, is not without danger, is without curative value and is misleading.

3. That the Caldwell-Luc operation offers the most perfect permanent result if carefully done, with the minimum sacrifice of normal structures.

4. That post-operative irrigation should be used only when definitely indicated and not as a routine.

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