

THE LOTHROP OPERATION FOR FRONTAL SINUITIS, WITH REPORT OF TWO CASES.*

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Recent literature has contained a number of splendid articles upon both the internal and external operations for disease of the frontal sinus. Anatomic study, accurate roentgenography, genius in devising and using improved instruments, and a critical study of the comparative merits, risks and untoward results of the different operations have resulted in marvelous achievements in both extra- and intra-nasal operations.

Although each of these operations has its respective indications, surgeons differ considerably in their choice in a given case, some being quite partial to the intranasal method, while others are as inclined to the extranasal. From a general survey of published opinions, there is, in my judgment, a progressive increase in the number of internal operations with a corresponding lessening of the external. Personally, I am in accord with this order of things.

Gleason¹ thus quotes from Stucky: "Within the past three years I have been especially impressed with how little intranasal surgery is necessary to relieve the most complicated and serious conditions in which the visual apparatus presents the most alarming symptoms, and I am finding fewer cases that require the radical external operation, even for the relief of suppurative pansinusitis." The same author in that article quotes Kuemmel¹ of Heidelberg as follows: "Unless there is some vital indication, too little is better than too much interference in chronic frontal or ethmoidal sinusitis." Gleason¹ then states: "There are doubtless a few cases of acute fulminating suppuration and some chronic cases where the Killian operation is justifiable or even imperative; but the fact remains that those who have done the fewest Killians or com-

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plete exenterations of the labyrinth by the nasal route have the least to regret in the number of dissatisfied patients. Except where the symptoms are most urgent, it is better to resort to less radical procedures, which in the majority of cases are adequate, and yield infinitely better results." Quoting from Watson-Williams²: "In 1911 I emphasized the complete efficacy of these intranasal methods in a considerable percentage, maintaining that they are more desirable methods of treatment than the external operation, even if not resulting in absolute cure—provided the symptoms are not such as to make more drastic operative treatment really necessary."

Although the recorded expressions upon the comparative merit of the two procedures seem to place a very high rating upon the intranasal method and cause the pendulum to swing away from the radical frontal sinus operation, it is admitted generally that a few cases at least require the external operation.

The external operation should be considered only after intranasal treatment, including the intranasal operation, has proven inefficient or in cases where, on account of anatomic obstacles or pathologic changes, nothing short of a radical operation would seem to guarantee the greatest safety and best result.

Anatomy.—Although writers have contributed much to this subject, I desire to emphasize a few points. The surgical anatomy of the floor of the frontal sinus, the anterior ethmoid cells, the cribriform plate, the middle turbinate and the lacrimal bone, all within exceedingly narrow confines, are worthy of the continued study of every rhinologist. There are, along the nasofrontal canal, severe arbitrary anatomic limitations from which the surgeon dare not vary without danger to the eye or brain. In this space, we may, indeed we must, go thus far and no farther. Removing too little is better than too much. However, unless adequate permanent drainage is established, the operation will be a failure. It is well to remember, as pointed out by Mosher,³ that the inner canthus of the eye is a valuable landmark. We have the following from Watson-Williams: "It is worthy of note that the cribriform plate does not extend forward beyond the tabula interna, and that the anterior border of the middle turbinal body is in

front of the anterior end of the cribriform. The middle turbinate forms the inner boundary of the anterior ethmoidal cells; the lacrimal bone, the outer. The width of the potential passage between the inner and outer boundaries varies with the development of the intervening cells, but in its narrowest part corresponding with the level of the inner canthus, the space measures seven to twelve millimeters in adults. Therefore, the width of an instrument intended to clear the space of obstructive cells should not exceed six millimeters, while in some patients it must be less." An injury to the lacrimal bone would be of less consequence than an injury to the cribriform plate; hence it is safer to keep laterally rather than medially if in doubt.

The adult frontal sinus, with its numerous ramifications, varies greatly in size, shape, and disposition. I shall omit a detailed description of the numerous variations, although I should like to call your attention to one feature of the Lothrop operation with relation to sinus variations, as follows: In case there is a sinus in the orbital or horizontal portion, but none in the vertical or frontal portion, this can be reached by the Lothrop operation. On the other hand, if a sinus is present in the vertical portion but absent in the orbital portion, the Lothrop operation likewise meets the requirements. In brief, a strong point in favor of the operation is its short direct entrance into the sinus at that point in its floor, where all the ramifications and subdivisions converge. Through a small opening just where the frontal, nasal and maxillary bones articulate, the different portions of the sinus are exposed. Besides the possibility of operating for a considerable distance upward and laterally into the frontal portion, one can operate posteriorly and laterally in the orbital portion. Moreover, and what is more worthy of note, the fact remains that the danger zone containing the anterior ethmoidal cells, the lacrimal bone and the anterior end of the cribriform plate can be visualized and operated from the closest and most natural approach—advantages worthy of consideration.

The presence of partitions in a sinus does not hinder the course of healing to any great extent because, as pointed out by Shambaugh,⁴ they are partial and usually extend downward from the upper margin. "These partition plates are placed

so as to interfere very little, if any, with drainage through the natural opening of the sinus, but their presence may interfere materially with the thorough exenteration of pathologic conditions within the sinus, even when performing the external operation. J. Parsons Schaeffer⁵ has observed as many even as four frontal sinuses on one side, each with an independent communication with the cavum nasi."

The illustrations presented are copied from the works of Lothrop and Loeb.

Pathology.—The mucous membrane in chronic frontal sinusitis is thickened with connective tissue proliferation. There is edema and pus production, with consequent polypoid formation and sometimes necrosis of bone, although, except in syphilis, this is very rare. The conservative method of treatment is efficient in the great majority of these conditions except in caries, which is extremely infrequent.

Custom differs regarding curetting of the sinuses. Some operators systematically curette every sinus as thoroughly as if necrosis or malignancy existed. I believe such procedures should be limited to hypertrophy, polypi, and exuberant granulations. In the majority of cases the mucous membrane does not reach such an advanced degree of degeneration. Moderate changes return to normal if merely drained and ventilated. On the other hand, too much curetting retards recovery and impairs results. In my opinion that the amount of curetting should be tempered by the degree of pathologic alteration is sound, then the Lothrop operation is much to be preferred to the Killian for all but the rarest of cases.

Radiography.—The skiagram is an invaluable method of obtaining knowledge along many lines. By its use we may detect variations in the size, shape and type of the sinus. By its use, too, we may determine the septal subdivisions and pathologic changes which should be regarded in choosing the method of operation. If the frontal portion of the sinus has a deep space between the outer and inner plates, a Killian operation will leave great cosmetic deformity.

Choice of Operation.—The operation of choice should be one that permits of thorough work; establishes adequate drainage through the floor of the frontal sinus; affords the best vision, the least distance and the most direct route to the site

of greatest difficulty and danger; one that permits healing in the shortest time and minimizes untoward after-effects.

The extranasal operation should not be chosen unless the surgeon is convinced it possesses advantages which guarantee better results than other methods.

The Operation.—In describing the operation, I cannot do better than quote Dr. H. A. Lothrop,⁶ the author, in his own language. "Preliminary intranasal treatment, including removal of the anterior end of the middle turbinate and breaking up some of the neighboring ethmoidal cells, is advisable because this may effect a cure. The patient should be etherized. The eyebrow should not be shaved. A single curved one-inch incision is made in the inner portion of the eyebrow, limited externally by the supraorbital notch. The bone is bared of periosteum over the area indicated in Figure 1. The sinus is entered with the chisel and enlarged by the rongeur forceps so as to make an oval opening about three-fourths of an inch long. The region is then explored with the probe, and pus, granulations and polypi are gently removed, if present, after which this curved probe is to be passed through the ostium into the nose and left in situ as a guide. Small curved curettes are then passed down from above, just in front of the probe, and the walls of the cells on the floor of the sinus are broken up. On account of the proximity of the anterior end of the cribriform plate to the ostium frontale, the posterior angle of the sinus should be constantly avoided. The operation is to be completed by means of burr drills. The rasps should be used first and may be passed from above and below through the enlarged ostium, cutting forward and laterally. The burrs and rasps are to be used alternately at the discretion of the operator, gradually reaming out all the dense bone of the floor of the sinus toward the base of the nose. This bone includes the nasal crest and spine of the frontal bone, the thick ends of the nasal bones, and the nasal process of the superior maxilla. The interfrontal septum should be perforated and then burred away so that the other sinus may be explored. Then the perpendicular plate of the ethmoid should be removed, as shown in Figures 3 and 8. Through this same opening in the anterior sinus wall and also through both sides of the nose, both of which are now accessible, the

dense bone under the opposite sinus is burred or rasped away until, finally, there remains only a thin shell of bone around the whole circumference of the floor of the sinus in front, as shown in Figures 3 and 8. In all instances, even when only one sinus is affected, experience has shown the wisdom of using the combined floor of both sides. Finally, determine that sufficient bone has been removed from the perpendicular plate and that the cells opposite the lacrimal bone, the agger nasi cells, and other neighboring ethmoidal cells have been broken up. The skin incision is closed."

Case 1.—S. F., age thirty-seven years, an Italian coal miner, consulted me November 13, 1916, having been referred by his physician, Dr. Herbert A. Black. Previous health, good. He stated that ten days previous to the consultation he was hit in the right eye with a piece of coal. No evidence of any injury could be found. On examination I found an olive-sized swelling just above the right eyeball and a little to the left of center, causing some fullness. On examining the nasal cavity, the anterior end of the middle turbinate appeared large and soft, and the mucous membrane was grayish in appearance. There was considerable grayish, rather thin discharge.

X-ray report by Dr. Crum Epler was as follows: "Right frontal sinus medium sized and diseased throughout; left seems to be normal. Right maxillary sinus is hazy and believed to be infiltrated and diseased. Ethmoidal cells diseased; the sphenoids seem to be normal."

The Lothrop operation was decided upon. Exposing the sinus, I found an unusual amount of soft, semisolid material, very vascular and appearing to pack the cavity more than polypi or pyogenic tissue usually does. A tumor was suspected, although, up to this time, I had assumed that I was dealing with an ordinary polypoid change. A free opening was made into the nose, the areas cleaned as much as possible, and some necrosed bone removed in the upper central lacrimal region. A moderate amount of similar material was removed from the maxillary sinus. The wound was closed without packing and healed by primary intention in two weeks; the external swelling disappeared.

The pathologist's report by Dr. Maynard was as follows: "Gross—Soft, irregular shaped masses; gray or grayish pink.

Microscopic—Growth shows loosely connected round cells, size varying; stroma fibrinous; very vascular with many hemorrhagic areas; many mitotic figures and occasional giant cell. Diagnosis—Sarcoma of nasal mucosa.”

After about three weeks, the nose began to rapidly refill with the growth. Orbital swelling developed after five weeks. Vision, which was normal up to this time, began to diminish; diplopia due to exophthalmus appeared, and total blindness developed about six weeks after operation. The patient died February 27, 1917. See photograph, page —.

It seems to me the Lothrop operation offered, even in this case, all that operative intervention could accomplish, and that for any nonmalignant condition, at least, it permits of maximum eradication of diseased tissue with minimum surgical interference.

Case 2.—December 20, 1915, G. P., an auto mechanic, consulted me in regard to pain over the left frontal sinus. Age twenty-two years, American, married. General health, splendid. He gave a history of pain and tenderness over left eye and in left maxillary sinus on three occasions since 1907. In that year, 1907, he suffered great pain and tenderness over left eye. He was confined to bed for two weeks with fever, loss of appetite, sleep, and strength, in spite of a specialist's service. After failing to be relieved by tentative treatments he had an operation upon his nose and maxillary sinus. Following this, he received treatments including irrigations of the maxillary sinus. In 1909 he was operated upon again by another rhinologist who also opened the antrum. In 1912 the third operation was performed and seemed to be, so far as he could tell, the same identical operation as the two preceding. On December 27, 1915, he consulted me. He was again suffering intense pain over left eye; there was increased lachrimation, and considerable swelling and edema of the upper lid. Intranasal examination revealed absence of a portion of the anterior end of the middle turbinate, together with portions of the anterior ethmoid cells. There were bands of scar tissue and an occlusion of the infundibular space. Considering the cicatricial nature of the field, there was considerable redness, although adrenalin and cocain failed to shrink the parts to any extent. The pain increased, and the swelling gradually closed

the lids. After five days of fruitless intranasal treatment I advised his physician to have a Lothrop operation, inasmuch as three days previous intranasal operations had failed.

On exposing the mucous membrane of the sinus, it was found to be slightly thickened, fairly smooth and of a dull grayish red color. On opening the mucous membrane a retention abscess was found to fill the sinus. There were no polypi and no granulations. The opposite sinus was opened and found normal. A large part of the septum of the frontal was removed and the floor upon both sides was opened widely into the nose. Recovery was prompt. No disfigurement. I recently examined the patient and found no difficulty in getting into the sinus.

SUMMARY.

1. More intranasal and fewer extranasal operations are being performed.
2. The external operation should not be chosen until the internal has been found inefficient.
3. It is strange that the most essential, the most difficult and the most dangerous work is confined to the narrowest part of the nose. It is well to remember that this is on a plane with the inner canthus.
4. The Lothrop operation offers the closest and most direct exposure of this zone, hence the best visualization.
5. The amount of curetting should be tempered by the degree of pathology.
6. The operation of choice should be one that permits thorough work, guarantees drainage, permits healing in the shortest time and minimizes untoward after-effects.

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