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COBB (F.C.)

EMPYEMA OF THE FRONTAL
SINUS.

By FREDERIC C. COBB, M.D.
OF BOSTON.

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EMPYEMA OF THE FRONTAL SINUS.

THE subject of this paper is empyema of the frontal sinus. I shall not trouble you with any history of the disease, but will begin at once with the symptoms. One of the most important of these is headache, which varies in character in various cases, and even in the same case. Ordinarily the headache begins in the morning and lasts for three or four hours, ceasing about noon. It may, however, in some cases come on in the afternoon and last in the same spasmodic way for two or three hours, and then cease. Theoretically, the cessation of the headache should be accompanied by a free discharge of pus from the nose; but practically this is not always observed. The headache is evidently the result of pressure caused by pus in the frontal sinus, and its appearance in the morning is perhaps due to the fact that during the recumbent position the ostium of the sinus is not subjected to the same pressure that it is in the erect position, hence the collection of pus becomes greater in the morning.

The degree of pain varies in intensity, according to the pressure of fluid within the sinus, from a feeling of weight or pressure over the forehead to a dull pain, or even an intense pain. The character of the pain is described as beating or pulsating, but may be simply a dull ache or an acute neuralgia. Nor is it unusual to have frontal sinusitis without any pain, the whole question depending upon the pressure in the sinus.

And an even more variable symptom is tenderness over the sinus, which may be felt on pressing the upper wall of the orbit, taking care to avoid the supraorbital nerve.

The second symptom of importance is discharge from the nostrils. From the frontal sinus the discharge is not ordinarily very profuse. It may be yellow or greenish yellow, and alternate between very thick and quite thin. An odor disagreeable to the patient's perception, but not always so to the family or physician, is at times present, and a tendency to crusting or scabbing is very noticeable.

The amount of the discharge is subject to variations, depending upon the clearness of the nasal frontal duct, and when the pain, such as I have said is caused by the stoppage of the duct, is most severe the discharge should be less, and vice versa. It is here to be observed that the discharge resulting from the frontal sinus may flow either anteriorly or into the nasal pharynx, and this depends upon the position of the head or on various conditions within the nostril. It will be seen at once that this fact makes an estimate of the amount of discharge very uncertain.

A third symptom is stoppage of the nose. This is also a somewhat uncertain symptom, and is usually caused by irritation of the pus discharge. This irritation results in an hypertrophy of the turbinated tissue, over which the pus passes, or in polypoid formation, producing an increase in the thickness of the normal tissues. From the pus discharge results also an eczema of the edge of the nostril in many cases, which if unilateral is always significant of sinus disease.

We have mentioned in dealing with the symptoms of frontal disease some that are characteristic of lesions of this particular sinus, but others which, while occurring in this disease, might nevertheless at times be due to other neighboring sinuses. When the anatomical preparations are inspected it will be seen how great are the difficulties in diagnosis. The antrum, anterior ethmoidal cells and the frontal sinus open into a common infundibulum or canal, the opening of which is covered by the middle turbinate

bone. Pus appearing under this middle turbinate can come from any one of these cavities. Even after ablation of the anterior end of the middle turbinate it is usually impossible by watching the discharge to ascertain from which sinus it comes, because some of the anterior ethmoid cells are so high up as to be out of sight intra-nasally. For our diagnosis of the origin of the suppuration we must therefore depend upon our ability to ascertain which of the cavities contains pus. Even when this is ascertained our difficulties are not yet over, for in the last few years it has been proved that the antrum may contain pus in quantity and nevertheless may not originate it, but simply serve as a reservoir for other cavities. This may seem too natural to require comment, and yet many antra have been operated again and again by every radical operation known to surgery, and with constant disappointment, owing to failure to recognize this fact. If this is true of the antrum it may also be true of some of the other sinuses, that pus existing in a cavity does not necessarily mean pus originating from that cavity. The means at hand of ascertaining whether or not the frontal sinus contains pus are as follows :

Externally, pain or pressure over the floor of the frontal sinus or its walls. This of course only applies to acute conditions in the sinus. It is important in this test not to press upon the supra-orbital nerve, but rather on the outer portion of the orbit.

Examination of the nose may show pus under the middle turbinate. If so, it probably comes from the frontal, ethmoid or antrum. If no pus is seen the following methods may be used. Logan Turner advocates causing a vacuum with a Politzer bag, allowing the patient to swallow at the same time, thus producing a vacuum and drawing the pus down into the nostril. Or, if possible, a catheter may be passed into the sinus and air can be blown in by a Politzer bag, displacing the pus in the sinus which at once appears

in the region of the middle turbinate. Transillumination of the antrum gives us further information. If both antra are bright we can feel sure the suppuration is in ethmoid or frontal. If the antrum on the affected side be dark it probably contains pus, and if a trocar be introduced through the lower meatus and the pus washed out it will reappear in a short space of time if it comes from the sinuses above the antrum; whereas if it originates in the antrum, it will take a considerable time to fill the antrum again.

Transillumination of the frontal will in some cases show disease there, but often fails to do so, as the light passes through the skin. An opening in the skin may be made under the eyebrow and a small opening into the sinus trephined; in case pus is found to be present, the opening can be enlarged and the sinus cleared of pus and granulations. A small opening in the locality leaves only a slight scar.

Treatment.

Hajek recommends intra-nasal removal of obstruction in the fronto-nasal duct, and states that he believes this to be a procedure of great value. It goes without saying that polypi and swelling of the middle turbinate should be removed, and the middle turbinate or its anterior end, to afford free drainage. My experience however is that this procedure seldom cures chronic cases, although it may afford relief. So far as I know, most surgeons have abandoned it in favor of the more radical external opening.

Radical operations are as follows:

1. Method of Nebinger-Praun. The incision goes from the naso frontal suture at the edge of the orbit to a point over the supra-orbital notch. The anterior bony wall is chiseled away, then a vertical cut four to six centimetres long is made, following the frontal vein. After opening, the contents of the sinus is wiped out and the mucous

membrane scraped. The naso frontal duct is then widened and curetted. The drainage of the frontal is secured by a wick at the base of the wound.

2. Method of Ogsten-Luc. An incision at the inner third of the edge of the orbit, which may be lengthened either outwards or towards the root of the nose. The periosteum is pushed upwards and outwards towards the orbit. The opening of the sinus is a little to the outer side of the median line. The nasal-frontal duct is curetted as well as the interior of the sinus and some of the anterior cells of the ethmoid. Through the wide communication with the nose thus made, a drainage tube is put in and the outer wound closed. After eight days the bandages are removed. First drainage tubes were used between sinus and nose, but these were later replaced by strips of iodoform gauze.

3. Method of Kuhnt. In this method the whole of the anterior wall of the sinus is removed with its diseased mucous membrane, as also the upper part of nasal frontal canal. The incision is as follows: a horizontal incision along the supra-orbital margin from the eye brow to the outer third of the edge of the orbit; then a vertical incision from the inner edge of the wound through the soft parts of the periosteum. After lifting the soft parts and the periosteum the whole wall of the sinus is removed with chisel and bone forceps and the edges of the wound are smoothed. All projections into the cavity are thoroughly removed, the mucous membrane is most carefully scraped from the sinus and from the upper part of the duct. The wound is sewed up, leaving only room for a large drainage tube. This method has met with fair success, but causes considerable depression and does not remove the anterior ethmoid cells. When the disease is bilateral, the cosmetic result is of course better.

4. Jansen's method. Removal of the lower wall of the sinus and resection of the lower border of the anterior

wall; curetting the mucous membrane of the sinus and of the granulation tissue. This method is not at present used by Jansen, but in 1903 he was doing a bone-flap operation of very much the same character as that practised by Hajek.

5. Method of Ridell. Removal of the anterior and lower wall of the sinus. Thorough and satisfactory except for the great deformity.

6. Killian's method. Incision as in Ogsten-Luc, with supplementary incision beginning at root of nose and passing under inner edge of orbit. Incision is not carried through the periosteum of the arch of the eyebrow, but the soft parts are lifted and incision through the periosteum made a little higher up so as to preserve that of the arch. Removal of the whole anterior wall of the sinus with curetting mucous membrane and all inequalities of the bone. Incision then made in the line below orbit as described. Ethmoid cells entered through nasal process of maxillary bone and thoroughly curetted. Upper wall of orbit removed, allowing orbital fat to fill up depression caused by removal of orbital wall. Closure of wound without drainage.

7. Coakley's method. Incision, as in Ogsten-Luc operation. Cavity thoroughly curetted with the assistance of electric lights placed in sinus. Nasal duct curetted but not widened, the object being to secure its closure; sinus then packed with gauze and repacked until it heals from the bottom.

The advantages and disadvantages of these methods may be summed up in a few words. The Ogsten-Luc has for advantage the slight deformity produced. For disadvantage it has the great probability of recurrence. The same is true of Jansen's method. Kuhnt's, Ridell's and Coakley's methods yield less probability of recurrence, as they destroy the sinus, but they produce greater or less facial deformity; Coakley's probably giving the least of the three. To all of these methods there is one great objection—that

the ethmoid cells are not sufficiently considered. Killian's operation seems to combine the advantage of sinus obliteration with the removal of the ethmoid cells; but it is hard to judge as yet of its practical results as far as deformity and danger to the eye are concerned.

