Jaundice due to sepsis ought not to be mistaken for icterus neonatorum, however, because of the elevated temperature, the impairment of the general condition, the presence of hemorrhages, cyanosis and so on. A rare cause of jaundice in the newborn is a catarrhal condition of the large bile ducts. In such cases the movements are clay-colored, the urine contains bile and there is, as a rule, vomiting. A still rarer cause of jaundice is congenital obliteration of the bile ducts. In this condition the movements may at first consist of meconium or be clay-colored. If they are at first composed of meconium, they become clay-colored after a few days; the urine contains bile; the liver and spleen are enlarged.

Icterus neonatorum is almost a physiological condition. Nevertheless, it is a very common practice, I find, to give calomel in this condition, presumably with the object of increasing the secretion of bile. It is irrational to give calomel for this purpose, however, as it has been conclusively proved that calomel does not increase the secretion of bile. There is, moreover, no reason to wish to increase the secretion of bile in this condition. The most reasonable explanation of icterus neonatorum is as follows: The bile capillaries at birth are filled with bile which is more tenacious than later. The expulsion of this bile requires more mechanical work than is needed later, that is, a higher secretion pressure. There is also an increased secretion of bile immediately after birth as the result of the hyperemia of the liver. The liver cells of the newborn are able to produce a large amount of bile, but they are not able to develop the necessary secretion pressure to push the more tenacious bile quickly enough through the over-filled bile capillaries. As the result of this peculiar condition the bile passes from the liver cells into the lymph or blood vessels. The clinical manifestation of this passage is icterus neonatorum. It is evident, therefore, that anything which tends to increase the secretion of bile will make the condition worse. It is, therefore, a bad, or at any rate a useless, practice, to give calomel.

Sepsis in the newborn. — Sepsis is much more common in the newborn than is generally supposed, and is often overlooked. I find that even if it is suspected, there is the same tendency to try to explain the symptoms in some other way than there is when the mother is septic. Sepsis is, undoubtedly, the most common cause of fever in the newborn. It also causes jaundice, cyanosis, hemorrhages, hemorrhagic disease of the newborn, disturbances of digestion, bronchitis and bronchopneumonia. It is an avoidable condition and is, of course, due to the entrance of bacteria. The bacteria sometimes gain entrance during labor; more often, however, after birth. They are probably often introduced when the mouth is cleaned with a dirty finger. Another common method of infection is during the bath, sufficient care not being taken to keep dirty water from getting into the mouth and nose. I doubt if they gain entrance through

the navel as often as is commonly supposed, because nowadays the navel is well taken care of while other portals and entrances are left open. The most important method of treatment is the preventive. This, of course, consists in absolute cleanliness and attention to details.

Auto-intoxication. — Auto-intoxication from the absorption of toxic substances from the intestines as the result of an infection of the normal meconium at or soon after birth is not very uncommon. The symptoms of this condition are, I think, most often misinterpreted. I have seen fever, often high, rigidity, convulsions and marked circulatory disturbances as the result of this toxic absorption. In some cases cerebral hemorrhage has been strongly suggested. The symptoms are entirely relieved by cleaning out the intestine, best with castor oil. In these cases, as always, it is advisable when giving castor oil, to give a good-sized dose, not less than a teaspoonful, — better, two teaspoonfuls.

Congenital deformities. — I will not burden you with other minor matters. I cannot, however, refrain from mentioning the importance of the thorough examination of the baby for the presence or absence of congenital malformations. This examination should include the heart. There seems to be a common impression among the obstetricians of Boston and vicinity, that a cleft palate is never found without a hare lip. There is nothing in the embryological development of these parts, however, to justify this impression. In fact, a study of the development leads us to expect otherwise. It is important, therefore, to examine the mouth and not to take it for granted that there is no cleft palate because there is no hare lip.

WHAT TYPE OF OPERATION IS BEST ADAPTED FOR THE RELIEF OF DISEASE OF THE FRONTAL SINUS?*

BY EUGENE A. CROCKETT, M.D., BOSTON.

THERE is scarcely any subject in our special surgery in which the experience of individual men differs so widely as in the choice of operation in acute and chronic disease of the frontal sinus. A fairly long experience in such operations has tended to make me conservative, to avoid any operation in acute conditions of the frontal sinus in a large majority of cases, and in such individuals to avoid external operation practically always, and in the severer types attended with involvement of the orbit or accessory sinuses to reject in practically every case the more radical operation popular in the German clinics and to substitute a simple operation which I have evolved from my own personal experience, an operation which is really a mixture of several standard operations.

It is fair to state that the vast majority of cases of frontal sinus disease that I have operated upon are from acute or chronic influenza infection,

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with only occasionally a tubercular infection; still more rarely a syphilitic case.

In the first place as to acute disease of the frontal sinus: Here nature points out clearly and conclusively the type of operation that we should follow. I have as yet seen no occasion in a first attack of frontal sinus disease to do any external operation whatever. The natural method of relief of acute inflammation of the frontal sinus is by the nasal frontal duct, opening and draining the infected mucus from the cavity. This, of course, will be accomplished in a large percentage of cases without any treatment in four or five days or a week. In mild infections, therefore, it will merely be necessary to spray the nose out with a solution of adrenalin chloride and apply an ice bag externally.

In severer cases and in all instances where the middle turbinate is polypoid and the ethmoid manifestly involved to any extent, the patient should be put under primary anesthetic and the middle turbinate and ethmoidal region as far back as the bulla removed with a Luc forcep. This procedure, provided the nose has been packed with adrenalin carefully before the anesthetic has been administered, can be done very quickly and satisfactorily in one or two minutes. I have never seen it attended with very much hemorrhage and have not for the last two or three years inserted any post-operative tampon. The operation, to any one familiar with nasal surgery, is a perfectly simple one and not dangerous, but of course there is the risk of involving the cribriform plate, which should always be borne in mind and guarded against, but which seldom occurs if due care is exercised. In the majority of cases this operative procedure will relieve the pain and symptoms of general infection in one or two days. Should it not do so, the anterior ethmoid region being thus removed, it is a perfectly easy matter to pass a probe up the nasal frontal duct once a day for two or three days, which, in rare cases, will be found necessary to relieve the frontal pain.

The vast proportion of cases in and around Boston, as far as my experience goes, will be shown to have an involvement of the ethmoid region and frontal sinus only, with occasionally also the antrum of Highmore filled with pus by drainage from above, but with no primary involvement of this sinus.

Sphenoidal disease, at least in the series of cases that I have observed, has been an extremely rare occurrence. I have certainly not seen it involved over three or four times in perhaps seventy-five frontal sinus operations. Involvement of the orbit in my own series of cases has been extremely common, probably owing to the fact that many of them have been referred from the eye side of the Eye and Ear Infirmary to the ear department, on account of exophthalmos or orbital cellulitis.

It seems to me that we have all been following one type of operation in frontal sinus disease, the exact type varying with the individual operator, without any regard for the type of

disease exhibited by the patient or their social position or standing in regard to the question of future deformity. You will find one operator using the Kühnt operation, another the Luc, and of recent years in practically all the large clinics the Killian operation is the only one thought of for the moment, at least by every younger member of the staff. As a matter of fact, the older surgeons, who have been doing frontal sinus work for a good many years, do a simpler type than the Killian with extremely satisfactory results to the patients, and while I do not deny that each type of frontal sinus operation may, in certain cases, be the proper one to do, yet I do deny that it is necessary to do any of the radical types of operation in at least 90% of the cases that one sees in private practice, and not over 50% that one sees in the hospital clinic.

In the private patient certain considerations are different from the hospital case. In the first place, the question of deformity is a great one and is usually the first question the private patient asks. The length of time of healing is a secondary consideration to such a patient. Then the chances are that the process has not been allowed to go very far and that probably only the frontal sinus and anterior ethmoidal cells are involved, and possibly the maxillary antrum has pus in it as a reservoir. In the vast majority of private cases the orbit has not been involved at all or has only a slight cellulitis. In such cases as this it seems to me the height of folly to do a Killian or any other type of radical frontal sinus operation. The cases I have to detail will show what I hope will prove a far simpler procedure as satisfactory to the patient in the relief afforded and more satisfactory as a type of healing without any facial deformity. I will also show you to-night a number of cases where there has been an extreme necrosis of the frontal and other sinuses as well as an extreme amount of orbital involvement where I have done the same simple type of operation, simply to recall to your minds that the relief of these extreme cases will be obtained by simpler means than is usually supposed. At the same time, these severer cases have required a longer period of post-operative treatment and have been kept away from their work a far longer time than would have been the case if the Killian operation had been performed.

In hospital cases of this type, where it is important to get the patient perfectly well as soon as possible (as he may be the main support of a large family),—in other words, hospital cases not private cases of this type,—I believe that the Killian operation is the proper surgical procedure and under such limitations the best type of radical operation to be pursued. I believe it is also the best type where the sphenoid sinus is involved. The same is also true where the posterior ethmoid region is involved. Both of these conditions are rather rare in my experience of cases in New England, consequently I do not mean to say that the conclusions I have drawn should be applied to all hospital

clinics; in fact I know, from my own experience in clinics in France, England and Germany, that they do see, owing to the neglect of the patients' early symptoms, a far severer type of sinus disease than we have here. I think, however, that a simpler type of operation could be resorted to in many of the foreign clinics, and certainly the question of facial deformity must be regarded far more in this country than it is abroad.

As an example of this, two private cases which I operated upon in the past year are interesting, as in both the question of deformity was important.

A woman thirty-five years old had an indefinite history of several acute attacks of frontal sinus for several years past. Three months before I saw her she had influenza and had since been under treatment by the family physician for trigeminal neuralgia; the sinus was evidently involved all this time. When I first saw her she had tenderness over both frontal sinuses and a certain amount of edema of the superficial tissue, a profuse discharge of pus from both nares and temperature of 103°. The nasal mucous membrane was swollen and edematous, evidently from infection, but there was no sign of ethmoiditis. She had been unable to sleep without opiates for a good many nights and had lost a great deal of flesh and strength and had chilly sensations and other signs of sepsis. Her x-ray plate which I shall now pass around shows both frontal sinuses very large, filled with pus and divided by seven septa into as many compartments, most of which at the time of operation were found to be firmly walled off from each other. All were filled with pus. I also found from the x-ray plate what I had not found clinically, that the maxillary antrum was also filled with pus.

This case is particularly important as showing the advantage of the x-ray plate, because you will see on looking closely that there is at the extreme outer edge of each lateral sinus a lateral septum which was so firm that in spite of having seen it in the x-ray plate it required considerable urging from Dr. Tobey, who was assisting me, before I was willing to break it down. It seemed to me impossible that the sinus could extend so far over and that I was more likely pushing into the frontal lobes of the brain. I certainly would never have opened this without the help of the plates. There was, in this case, no septa dividing the two sinuses. The pus was extremely foul and the cavities filled with granulation and cheesy detritus. Owing to the large size of the combined space, an incision was made over each eyebrow, and the septa broken down, and the cavity thrown into one, and then, with a Luc forcep, as much as possible of the middle turbinate was removed. The sinuses were washed out thoroughly through the nose and a small rubber drainage tube passed into the extreme latter corner of the incision and brought out through the nasal pharyngeal duct on the corresponding side of the nose. The external incisions were then sewed up, except for a small piece of drainage tube left projecting. These tubes were removed on the second day and were not replaced. There was no pus in the nose

at this dressing and the patient left the hospital on the fifth day and went to her home thirty miles out of the city. I did not see her again for nearly six weeks, when she came in to show me how she had been getting on. She had had no after-treatments or dressings, no pus in the nose and almost no scar to be seen. I am very sorry I cannot show her to-night.

Last August I operated upon another case. A young man twenty-eight years old had last year in Chicago an acute infection of the frontal sinus with pain and discharge of pus from the nose for eighteen days. The question of external operation was considered by a Chicago physician, but was not done.

During the last six months he had a good deal of neuralgia and was decidedly anemic, had chilly sensations and a slight temperature at times, lost ten pounds in weight, and while he had been at work he was a source of great worry to his family, who thought he might have tuberculosis. In the middle of July he had a severe head cold and a recurrence of pain in the sinus. I treated him in the usual way for four or five days and then had an x-ray picture taken by Dr. Percy Brown. This I will now pass around. The frontal sinus on the right side is large, with a winged projection passing high above the left frontal sinus, which is small and low. The antrum is also filled with pus. There are in this case also no ethmoidal infections. I operated upon him on Sept. 16, 1908, and it was the quickest case of healing I have ever seen. After the sinus had been opened and curetted thoroughly and the ethmoidal region cleared in the usual way, I sewed up the external wounds tight without any drainage in the nose. In this case the naso-frontal duct was very large, and after the middle turbinate was removed it was possible to pass into the nose through the opening from the frontal sinus a fairly large mastoid curette. A regular collodion dressing was applied over the external incision and the third day after the operation he went back to his work. He never had any pus in his nose following the operation.

I think these two cases were of a fairly severe type of frontal sinus infection and could not have healed better by any other operative procedure than that which I used.

In the cases which I shall show you to-night the following operative procedure has been followed.

First, having obtained an x-ray plate showing the frontal and lateral views of the head, an idea has been obtained of the size and position of the two frontal sinuses and especially as to the number of septa dividing the cavities; also exactly which accessory sinuses are involved. As simple an incision as possible is made in the line of the hair of the eyebrow (the hair not being shaved), bringing it as near as possible to the inner side of the eyebrow, except in cases of very wide lateral sinus where an incision more in the middle of the brow may be necessary. The frontal sinus is then opened with a mallet and gauge, and the opening enlarged with some sort of a biting forcep until the opening is large enough to admit the little finger; then through this opening the sinus is thoroughly curetted, and here the x-ray is particularly important as showing the presence of orbital prolongations or

deep recesses which might prevent the thorough curetting of the cavity. Upon this thorough curetting depends the success of the operating procedure. The transverse septa present should be broken down until one large cavity is obtained, and under no conditions is the external opening to be made larger than the tip of the forefinger, and in some cases smaller. Of course this opening is made above the brow and does not involve the orbital ridge. In some cases, one of which is illustrated by a plate I shall show you to-night, the frontal sinus has been so large that it projected over the eye to the opposite side, yet it has been successfully curetted from one opening.

Where there is an orbital cellulitis present, the orbital abscess is opened as a second procedure by a separate incision, usually in the most prominent point of the orbital swelling. In special cases the opening has been through the lid and a drainage tube passed through the lid and kept in for five or six days, leaving no scar which could bother the patient in the future.

Just to briefly state the conclusions which I have derived from my own operations.

First, in acute frontal infections, in mild cases, the use of the ice-bag over the sinus and an adrenalin spray is all that is necessary. In severer cases the patient should in addition be anesthetized and the middle turbinate or at least the anterior portion removed. I do not believe this should be attempted without anesthesia, as it is extremely painful under cocaine. The nose should not be packed.

Secondly, in chronic disease of the frontal sinus, and in all cases where the infection involves merely the frontal sinus and anterior ethmoidal region, with perhaps the antrum of Highmore filled with pus by drainage, the simple type of operation that I have been describing to-night should be performed, the antrum being in addition opened with a trocar and washed out at the time of operation. The best trocar for this is perhaps the hollow one devised by Dr. Tobey of the Massachusetts Eye and Ear Infirmary, by which you can, with the same instrument, puncture the antrum and wash it out as one process.

In chronic cases, where the frontal sinus disease is accompanied by an orbital abscess, and where the infection is through the floor of the sinus, the same operative procedure will be the best, combined with a simple opening of the orbital swelling. In all cases where there is caries of the ethmoidal plate of the orbit, or the sphenoidal sinus or posterior ethmoidal region is involved, the Killian type of operation will be the best one, — certainly in all hospital cases. I think by the use of this operation there will be slightly more external deformity, although not enough to make this a factor in making the decision.

As to complications, I have been so extremely fortunate as never to have seen a case of leptomeningitis follow any type of sinus or nasal operation. This is probably largely good luck, but I do think that a good deal of trouble can be avoided by not packing the nose at all and

not packing the sinus too tightly. Too tight a packing undoubtedly interferes with the natural channel for drainage.

Sepsis has been my only trouble. I have seen well-marked septicæmia several times for a number of days following an operation, but never except where it existed prior to the operation. It is quite common to see a good deal of edema of the brow and whole side of the face on the second or third day, but this has no significance. I never had any one complain of the deformity resulting from the operation, it has been practically nil. As far as I know, in something like seventy-five cases, a secondary operation has only been performed in three cases. Once I think the second operation was unnecessary, once there was an infection of the periosteum frontal bone evidently from pus getting under it at the time of operation. The sinus in this case did not have to be reopened, but this infection caused more pain than the original sinus abscess.

I also have one case, that of a physician operated upon for the relief of chronic trouble, in whom the supra-orbital nerve became involved in the scar tissue. I dissected the neuroma out, and found that the sinus was filled tight with fibrous tissue.

LARYNGOTOMY AND LARYNGECTOMY FOR CANCER WITH REPORT OF FOUR CASES.*

BY D. CROSBY GREENE, JR., M.D.,

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PREVIOUS to the year 1888 radical operations on the larynx for malignant growths were justly to be regarded as among the most dangerous of surgical operations. As shown by the tables of Sendziak,¹ the mortality up to that time from the operation of total laryngectomy in 147 cases was 39%, and that from the operation of laryngotomy in 89 cases was 13½%. These figures represent a careful tabulation of the cases reported in medical literature up to the year 1888 and must be considered as understating the actual mortality. For, as is well known, the results of successful operations are more often published than those of unsuccessful ones.

The cause of this high mortality may be traced in the first place to a poor selection of cases with regard both to the extent of the local disease and to the general physical condition of the patient; in the second place to deaths from pneumonia, due to inhalation of blood during or after the operation, or from the inhalation of food into the lower air passages after the operation; and in the third place to operative or post-operative shock.

A comparison of the statistics just given with those collected by Sendziak since 1888 up to and including 1905 is most encouraging. We find, for example, in 257 cases of total laryngec-

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¹ Rev. Hebd. de Laryngol., d'Otol. et de Rhinol., Oct 26, 1907.