CASE OF INTRANASAL ETHMOID EXENTERATION
ACCOMPANIED BY UNCONTROLLABLE
HEMORRHAGE; DEATH.

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Suppurative ethmoiditis occurs by no means infrequently in the practice of every rhinologist. Nasal polypi with the accompanying necrosing ethmoiditis is a familiar picture. After all the arguments have been adduced against its use, the writer is still convinced that the term necrosing ethmoiditis, attributed to Woakes, is the best general term suggestive of the real pathologic findings.

The management of these cases so as to produce a cure will tax the medical and surgical skill of the best in our profession. Whether by the use of either the external or internal operation, the fact still remains that what one would denominate as an actual cure is not always obtained. All can be benefited, but many of these will not be absolutely free from some catarrhal discharge, while in others the resulting scabby condition will be most annoying, and even the destruction of their sense of smell is by no means a remote possibility. Hence suppurative ethmoiditis must be looked upon as one of the hard problems for the rhinologist. It is not the purpose of this paper to discuss the various intranasal operative procedures which are used by different rhinologists, for the writer believes that he has obtained his fair share of success by the use of the snare, curette and punch forceps, but the object here is to present the record of one case where complications arose and where these were contributory to the final death of the patient. The more extended becomes my experience with operations on the ethmoid the more am I convinced that the exenteration of the ethmoid body is no simple procedure and should always be undertaken with the greatest precaution, and every step of the operation should be under visual inspection. The pres-

ence of suppurative ethmoiditis compels one to have great respect for the ability of nature to confine the suppurative process to these cells instead of there being a frequent extension of the same process to the cranial cavity. It is only after operative procedures that we are at all likely to have such an extension of the pathologic process, and it is for this reason that all operative work in this locality should be done with the most extreme caution. The fact that the literature will show a number of serious complications attending this operation, and even a few fatal cases, behooves us to consider it the major intranasal operation we are called upon to perform, especially if undertaken at the same time with a sphenoid involvement.

With these preliminary remarks the writer wishes to report a case of intranasal ethmoid exenteration accompanied by practically uncontrollable hemorrhage, followed by death upon the operating table where extreme measures were being instituted in our effort to save the patient.

E. J. B., age 18, a strong, robust country lad, consulted me on October 28, 1918, in reference to a very severe purulent discharge from both nasal cavities and which had been present for several years. He was also suffering with quite severe headaches. Family history was negative.

Examination of the nasal cavities revealed a suppurating ethmoiditis with numerous polypi. Transillumination showed both maxillary antrums clear, although both were punctured in order to be sure of the diagnosis, as also both frontals. X-ray plates showed practically the same thing. No blood examination was made. On the next morning an intranasal exenteration was performed on the left side. The whole ethmoid region was polypoid and soft, requiring the use of the snare, curette and cutting forceps. A good opening was also made through the nasofrontal duct and the frontal sinus thoroughly irrigated. The sphenoid was also opened, because it was very soft and a curette easily entered the antrum. No packing was used and there was no undue amount of hemorrhage. In three days the patient returned home with instructions to irrigate his nasal cavities with a saline solution.

On January 22, 1919, about four months after the first operation, the patient returned for another examination. The

left side appeared in excellent shape, with only a slight amount of catarrhal secretion. Headache on that side had entirely disappeared. Over the right or unoperated side there was still present severe headaches and a profuse purulent discharge. The next morning this side was operated upon in the same manner and with the same care and thoroughness as the left. The frontal was irrigated and also the sphenoid. No unusual amount of bleeding occurred and no packing was used. The next morning the patient reported to the office and the operated nasal cavity seemed to be in good shape. He remained in the city for a few days so that I might irrigate the cavities myself. The operation was performed on Thursday. On the following Monday, four days after the operation, he came to my office late in the afternoon on account of hemorrhage from the right side. This was checked without difficulty and without the necessity of a tampon. He remained in the office for an hour and, there being no further bleeding, he was allowed to return to his hotel. Seen the next morning, Tuesday, and also Wednesday, when the nasal cavity appeared to be doing nicely. On Wednesday night, about 11 o'clock, a message from the hotel informed me that Mr. B. seemed to be bleeding to death. I immediately told them to rush him to the hospital in an ambulance. This was done; at 12 o'clock midnight, with the assistance of a colleague, I under- from both sides, anteriorly and posteriorly. He had already from both sides, anteriorly and posteriorly. He had already been given a hypodermic of morphin and atropin by the house surgeon and temporary measures had also been used. A large sterile postnasal cotton tampon was used and both sides packed tightly with sterile gauze from the front to the posterior opening of the nasal fossæ. He was immediately given 30 cc. of horse serum intravenously and $\frac{1}{8}$ gr. morphin, $\frac{1}{200}$ gr. atropin hypodermically every six hours. This seemed to control the hemorrhage. We left the hospital at 4 a. m.

On visiting him about 9 o'clock the next morning, only a slight serous bloody oozing was present. Temperature, 101.2; pulse, 110. Ice packs were kept over the nose and only liquid diet given. It was noted that the blood coagulated readily, giving no indications of his being a hemophiliac. Horse serum was given subcutaneously every four hours. In addition to

this, pituitrin, coagulose and other various remedies of this kind were used. At this time the patient was considerably nauseated and vomited blood. Orange albumen was administered with other liquid diets. There being considerable pain in the abdomen and evidence of gas accumulation, an enema was administered, which brought relief from these symptoms. In addition to the bloody serous discharge there was considerable flow of mucopus from both nostrils. At 6 p. m. some of the tampon was removed from the left side.

January 30th. Patient had a fairly good night. Morning temperature, 101; pulse, 102. Complains of severe headache, probably due to the damming back of the purulent discharge. Saline solution was dropped freely into both sides every hour. Small doses of calomel and soda were given to counteract the flatulency.

January 31st. Patient had a very restless night. Morning temperature, 101.2; pulse, 88. Aspirin administered for headache. No signs of bleeding. Patient feeling much more comfortable. Taking light diet. Evening temperature, 99.2; pulse, 100.

February 1st. Patient slept fairly well. Nasal cavity looked encouraging. At 6 p. m., the patient began to bleed from both nasal cavities. Ice compresses used. Morphin and atropin administered hypodermatically. Horse serum given intravenously. At 7 p. m., both sides were bleeding freely. After consultation with my colleague, Dr. Lokey, the packing in both sides was removed and the cavities irrigated with hot saline solution. The blood clotted freely. The hemorrhage was very profuse from both sides, but by exclusion and close observation the majority of the hemorrhage seemed to be coming from the left. Nothing was left to do but to repack, and this we did with iodoform gauze post-nasal and both sides of the nasal cavities. This checked the bleeding. At 9:30 p. m., horse serum was again administered. Bleeding very slight from nasal cavities and no bleeding from postnasal space.

Sunday, February 2d. Temperature, 101; pulse, 92. Patient very uncomfortable and still some blood oozing from both nasal cavities. Tampons kept saturated with adrenalin chlorid. Ice compresses continuously applied and coagulose given subcutaneously. This treatment was continued during the day.

At 8 p. m., temperature was 102, and pulse 120. He had now started bleeding profusely again from both nostrils.

We now called in consultation Dr. W. P. Nicolson, a general surgeon. As all indications pointed to the fact that most of the hemorrhage was coming from the left side, it was Dr. Nicolson's opinion that the tying of the common carotid on that side would probably stop the bleeding and that the seriousness of the case demanded radical action.

At 9 p. m., the patient was taken to the operating room, and under gas anesthesia Dr. Nicolson ligated the common carotid on the left side, Drs. Roy and Lokey assisting. While the patient was under the anesthetic both nasal cavities were cleaned and repacked with iodoform gauze and a fresh tampon placed in the nasopharynx. No bleeding could be discovered when the patient left the operating room and his general condition was very good. At 12 m. his pulse was 110; at 1:30 a. m., it was 144. Some blood oozing from both sides.

Next day, Monday, February 3d, at 6 a. m., the temperature was 100.2; pulse, 92. Patient complained of considerable pain over the right eye and both eyelids were swollen. Both eyes were kept washed with boric acid solution. Patient was quite uncomfortable, and there was considerable mucopus dripping into his throat. At 9 a. m., temperature, 100; pulse, 90. Iced applications over the nose and eyes and small doses of calomel and soda administered on account of the accumulation of gas in abdomen.

Tuesday, February 14th, 6 a. m., temperature, 98; pulse, 120. Patient very uncomfortable. Enemas given. Patient taking liquid diet. 6 p. m., temperature, 101.2; pulse, 110. Packing removed from left side of nose. No bleeding. Patient seems much better. Greatly troubled with mucopus in pharynx and larynx. This was removed with suction, much to the patient's comfort.

Wednesday, February 5, saline given. Soft diet readily taken. Temperature at noon, 101.2; pulse, 110. Packing removed completely from right side of nose. No bleeding. Patient much more comfortable and able to expel the mucus from his throat. Saline solution with carbolic acid used every two hours.

February 6th. Temperature, 100.3; pulse, 106. Patient had a fairly good night. Light diet being taken. 2 p. m., postnasal packing entirely removed. No bleeding. This gave the patient great relief.

Friday, February 7th. Temperature, 98.2; pulse, 100. Patient had a good night. Mouth and nose irrigated. Bowels moved normally. At 5:30 p. m., the external dressing was changed for the first time by Dr. Nicolson. One stitch abscessed. Small amount of seropus. Iodoform dressing and bandage applied.

Saturday, February 8th, 6 a. m., temperature, 99.4; pulse, 90. At 6:30 a. m., hemorrhage started from the neck incision. Dressing changed by the house surgeon and the wound tightly packed, which controlled all hemorrhage. At 10 a. m., patient had another hemorrhage from the incision. Blood clotted immediately. Dr. Nicolson again saw the patient. Given $\frac{1}{6}$ morphin, $\frac{1}{150}$ atropin. Wound packed again. No signs of bleeding from nose and throat. Patient had renewed hemorrhage again in afternoon.

At 8 p. m., Dr. Nicolson decided to place the patient under an anesthetic and to stop the bleeding surgically. Patient was removed to the operating room at 8:30. Gas ether anesthetic given by the same anesthetist as at the previous operation. Temperature at that time was 101.3; pulse, 100. Patient took but a few whiffs of gas when he stopped breathing. Oxygen and artificial respiration were used. The heart continued to beat for ten minutes after all breathing had ceased. Death. No autopsy was allowed, but Dr. Nicolson opened up the incision on the operating table and found a most peculiar condition. All of the neck muscles and fascia were undermined and an immense cavity found filled with clotted blood. This extended even up to the chin. The suture on the carotid was firm and there was complete ligation.

Like many others, I have operated upon a number of cases where there has been very severe hemorrhage, but this was the only case where the condition taxed my surgical ingenuity to its utmost. Knowing that the posterior ethmoid cells derived their arterial supply from the sphenopalatine, a branch of the internal maxillary, from the external carotid and from the ethmoidal branches of the ophthalmic artery, a branch from the

internal carotid, we felt assured that the tying of the common carotid would take care of all the hemorrhage on the left side. This proved correct, as all bleeding ceased from the nasal cavities and all tampons were removed. But why the hemorrhage should start from the wound in the neck, and this also be so uncontrollable, is a question difficult to answer. It is of course unfortunate that no blood examination was made, but this was due to the fact that the blood clotted freely and we were expecting every moment to have the hemorrhage under control. Evidently a slow bacteremia had been progressing for some time, due to the absorption for years of pus from the ethmoid cells, and this had undermined the coats of the blood vessels as well as the integrity of other body tissues. It is undoubtedly true that the immediate cause of death was the general anesthetic, but it is equally true that the same might not have produced death had there not been such an excessive loss of blood and the whole system in such an abnormal state. So that we are not entirely in error in saying that death was due to uncontrollable hemorrhage. Such cases, while unfortunate in their termination, make us realize that these extreme cases of necrosing ethmoiditis are not without their dangers.

Arrowsmith¹ reports one case in a negro male, age 56, from whom a growth in the nose was removed by the cold snare. This was followed by severe hemorrhage and later by repeated attacks of nosebleed. On readmission to the hospital the left nostril was exposed by a lateral rhinotomy, after Moure's method, and a friable yellow mass of material which had involved and destroyed the entire left ethmoid region and inner wall of the orbit was removed. The bleeding from the field of operation was very profuse in spite of a preliminary ligation of the left external carotid. A similar tumor was removed from the supraclavicular region, where there was also considerable hemorrhage. For this reason the patient, "already greatly reduced by his previous loss of blood," died in three hours after leaving the operating room. The nasal and supraclavicular tumors were alike in gross appearance—both hypernephroma.

Felix⁴ reviews many cases of fatalities following nasal operations. While he notes several deaths due to meningitis after the ethmoid operation, he makes no mention of hemorrhage

as a cause of death in these cases. These cases of meningitis are included in the following notes, under the name of the author making the original report:

Dabney³ notes three deaths following the ethmoid operation due to meningitis; none due to hemorrhage.

Hajek⁵ mentions one case in which death following the ethmoid operation was due to meningitis.

In the discussion of Hajek's paper, Lack says that in over 300 ethmoid operations he had but one death. This was due to meningitis. He adds that of all other operators using his technic who reported to him, eight stated that they have had no fatalities; the other three report six deaths. All were due to meningitis. Lack says: "I have heard of no death from any other cause."

In this discussion, Ballenger states that he had but one death, also due to meningitis; he had never had any other complication "of any moment." He reported over 200 cases without his being called to check hemorrhage occurring after operation.

Halle⁶ notes that he has performed 76 ethmoidal and frontal sinus operations by his intranasal technic. In one of these cases a meningitis developed that proved fatal. No mention of hemorrhage as a dangerous complication.

Hinsberg⁷ reports three cases of death following intranasal exenteration of the ethmoid. All due to "infection" (meningitis). No mention of hemorrhage.

Tawse¹³ reports two deaths from meningitis following the ethmoid operation.

McCullagh⁸ advocates Mosher's technic for ethmoid exenteration. He states that Mosher has told him of two cases of postoperative meningitis following this operation, but not among his own cases. No fatal case of hemorrhage is noted. In regard to postoperative treatment, McCullagh says:

"The principal part of the postoperative treatment of these cases is noninterference with nature. Personally, I order no local treatment for forty-eight hours. Packing should never be used unless hemorrhage demands it or the patient is so situated as not to be within easy reach of skilled assistance if secondary hemorrhage occurs."

Pratt¹⁰ states that he has performed between 200 and 300 operations on the ethmoid. In none of these does he record a

fatal or even dangerous hemorrhage. With his technic, he says, there is little bleeding.

Shambaugh,¹² after describing the technic for the ethmoid operation, says:

"Most of the cases require no tampon if the patient remains at the hospital, where directions can be left for the introduction of a tampon in case secondary bleeding requires it. Occasionally one meets with severe bleeding at the time of operation which may require the introduction of a tampon. This should always be removed not later than the following day."

Ballenger² says in regard to hemorrhage following the ethmoid operation:

"Hemorrhage nearly always attends the operation, and it may either persist, or appear later as a secondary hemorrhage, though the latter is comparatively rare. By packing the nose as described, this complication may be controlled. A slight serosanguinous oozing may continue for twenty-four or forty-eight hours, in spite of the gauze packing, but it is of no serious consequence. If the patient is operated on in a hospital and remains there for three days, it will rarely be necessary to pack the nose."

Oppenheimer and Gottlieb⁹ state that blood examinations should be made prior to nasal operations, and if either the coagulation time or the bleeding time vary much from the normal the operation should not be undertaken without preliminary treatment to improve the blood condition.

They report no fatal case of postoperative hemorrhage. In one case an ethmoid operation was followed by "secondary oozing for five days." The coagulation time in this case was markedly delayed.

Weinstein also notes the need for the determination of coagulation time of the blood before nasal and nasopharyngeal operations.

Pugnat¹¹ reports four cases of postoperative hemorrhage, not fatal, two following turbinectomy and two tonsillectomy. In all these cases there was evidence of cirrhosis of the liver or other hepatic insufficiency. Other investigators have found that hepatic insufficiency may alter the coagulability of the

blood, and he believes that this factor should be considered in preparing for nasal operations.

Theisen and Fromm¹⁴ report the use of horse serum pre-operatively in nose and throat operations in any case where they expected an unusual amount of postoperative bleeding, either from a history of the patient or of the patient's family.

The ethmoid operation, they say, "is usually attended by profuse bleeding," but following the use of the serum there was very slight loss of blood in their cases.

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