FRONTAL LOBE ABSCESS SECONDARY TO SINUSITIS.*

DR. JOSEPH FRIEDMAN and DR. SAMUEL D. GREENFIELD,
Brooklyn, New York.

Abscess of the frontal lobe most often occurs as a complication of frontal sinus disease. In empyemas of long duration, the posterior sinus wall, which is often very thin, may become eroded and a fistulous communication be established with the cranial cavity. This possibility is greatly enhanced when one recalls that the internal table occasionally presents dehiscences through which, especially in chronic cases with stagnation, secretions and microorganisms may find their way into the adjacent structures. Furthermore, the cerebral wall contains numerous small foramina for the transmission of veinlets, thus affording additional routes for invasion.

In a case in which there has been established a fistulous opening the dura, at the point of solution of continuity, becomes affected. Granulations and a plastic exudate begin to form and soon there is agglutination of the dura to the underlying bone and we have a localized pachymeningitis. If the process continues the infection may penetrate the dura and involve the pia mater. At this stage one of two conditions may occur. If the purulent process becomes encysted and well walled off from the remaining cranial contents it does not spread, but progresses internally and gradually the brain substance is penetrated with the ultimate formation of a brain abscess. If, on the other hand, the limitation of the infection is not complete the process extends over a considerable portion of the pial surface and results in a diffuse purulent internal pachymeningitis. Very often, however, we get a combination of both of these processes.

It is, of course, our duty as rhinologists to avoid these serious sequelae, by the early recognition of these signs and symptoms, which point to extension of a more or less benign chronic frontal suppuration to endocranial structures. But this is often times no easy matter when we consider that the symptoms of beginning

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meningeal complications and those of a severe attack of uncomplicated frontal sinus disease are practically identical. Furthermore a severe frontal sinusitis may continue for days unchanged and upon operation we most unsuspectingly discover evidences of extensive disease with meningeal involvement. Then, there are those cases that come to us already well advanced, when the attempts at operative amelioration are futile. And lastly, we must not forget those cases in which, search diligently and assiduously as we will, there seem to be lacking sufficient evidence to justify more radical operative measures, and which process under our very fingers seems to slip ahead of us despite our efforts.

This is due to the fact that the frontal lobe is a silent area and definite symptoms of frontal lobe abscess are wanting. The condition may manifest those symptoms found accompanying brain abscess elsewhere, such as headache more or less localized, evidences of increased intra cerebral pressure, e. g., choked disc, slowing of the pulse and increased tension of the cerebro-spinal fluid, but on the other hand these may be indefinite and difficult to discern.

The case we are reporting is certainly a unique one in that it presented several features of unusual interest. The patient came to us when the condition was more or less well advanced. The signs and symptoms that directed our attention to the affected sinus were misleading in that, although upon operation we found sufficient pathology to explain the present symptomology, the real condition that ultimately brought about the fatal termination was certainly an obstruse one and which, during all the period of observation gave absolutely no clue of its presence nor of its pernicious progress, until a time when the process had become established well beyond the stage where surgical intervention could be of any avail.

REPORT OF CASE.

Dora Maribella, aged 11, was admitted to the Beth Moses Hospital on June 11, 1921 with the following complaint: pain over the left eye, fever and swelling of left side of forehead and face.

Family History, Negative. Previous Personal History. The patient had always been in comparatively good health. She had the usual diseases of childhood, but never suffered from any severe illness. She was subject to frequent head colds and the mother stated that she was practically never without some form of nasal complaint.

History of Present Illness. Two weeks prior to admission to the hospital, the patient suffered from a new attack of rhinitis. The nasal discharge was profuse, and three days later she complained of rather severe headache, limited, however, to the left frontal region. This continued unabated for several days and then the condition subsided somewhat. Four days prior to admission she had a chill followed by a profuse sweat. The next day there appeared a swelling over the left eye, which gradually increased up to the third day when she was admitted to the hospital.

PHYSICAL EXAMINATION UPON ADMISSION.

General Appearance: Well nourished girl apparently very sick; conscious responding to interrogations slowly but accurately. Temperature: 103.5°, pulse 140, respiration 35. Head: Normal in size and shape. Face: Marked swelling of left half of face, involving left cheek, lower and upper lids and left forehead. Eyes: Pupils equal, react to light and accommodation. Mouth: Teeth in very poor condition, tongue coated. Neck: No rigidity, no masses, no abnormal pulsations. Chest: Breath sounds normal. Heart: Normal. Abdomen: No distension, no rigidity, liver, kidneys, and spleen not palpable. Extremities: Normal. Reflexes: Present and equal; no pathological reflexes present.

June 13, 1921. Rhinological examination reveals the presence of pus in both nares, with marked swelling and congestion of the mucous membrane. There is present marked swelling, edema and redness of the upper and lower lids and region of frontal on left side. Elicit acute tenderness over left frontal and floor of orbit. No tenderness over the antrum. The left eyeball is somewhat prominent and displaced slightly downward. The mobility of the globe is not interfered with however. Diagnosis: Suppurative frontal sinusitis with probable perforation of anterior wall of sinus. X-ray was immediately ordered; blood culture was taken, spinal tap advised.

June 14, 1921. The following data was reported: X-ray shows involvement of left antrum and ethmoid; frontals of large size with mild involvement. Spinal fluid: 20 c.c. withdrawn under slight pressure; clear, no increased cytology. Blood culture: 24 hour report negative. Blood count: 30,000 white cells, polys, 84 per cent. Urine: Slight trace of albumen, with some small hyaline casts. Treatment advised was immediate operation. Operation: June 14, 1921, 9:00 p. m.

Incision over left eyebrow and lateral aspect of nose with elevation of the soft parts and periosteum. This disclosed the presence of a cortical perforation one-fourth inch above and external to the supra-orbital foramen. The entire anterior wall and floor of sinus were soft and necrotic. These were removed and a large quantity of foul smelling pus evacuated. The entire mucosa of the frontal sinus was thickened and polypoid. This was removed and the posterior wall carefully inspected. There was no evidence of softening nor necrosis. The ethmoids were not opened and the sphenoid not drained. The entire wound was left widely open and rubber tubes inserted for drainage. Iodoform gauze was lightly packed about the tubing and a dressing applied.

A culture of the pus taken at the time of operation was subsequently reported; mixed infection with a predominance of *straptococcus hemolyticus*.

June 15, 1921. Patient rallied from the operation and is somewhat improved. Temperature 102°, pulse 132, respiration 34. Complaints of severe pain over the wound area. Is restless. Examination of the eyegrounds shows no disc changes. There is slight fullness of the veins. There is absence of neck rigidity. Kernig and Babinsky also negative.

June 16, 1921. Wound dressed; no pus present in cavity. Iodoform gauze packing loosened; hot boric acid dressing applied. At 3 p. m. had a severe chill lasting five minutes followed by a profuse sweat. Blood culture of previous day reported still negative. Headache somewhat relieved.

June 17, 1921. Patient did not sleep well. She was restless and toward morning she became irrational. Temperature 103°, pulse 148, respiration 36; outer dressing changed. In the evening patient became quiet and then lapsed into drowsiness.

June 18, 1921. Condition of patient progressively poorer. Temperature 104°, pulse 150, respiration 38. Irrational most of time. Involuntary evacuation of feces and urine; chill followed by profuse sweat. There is present a facial paralysis of left side of face with involuntary contractions of left upper and lower extremities. Eyes are not deviated from the normal; examination of eyegrounds shows increased fullness of the veins, especially of left eye. There are no signs of papillary edema.

Upon the advent of these signs and symptoms, the first to call our attention to the presence of increased intra-cranial pressure, we suggested operation. The extraordinary feature was the develop-

ment of irritative symptoms from the cerebrum of the other side. A number of various diagnoses were made by the consulting physicians and none seemed to be able to explain the reason for the appearance of these irritative symptoms apparently originating from the other side.

The parents of the child refused operation.

June 19, 1921. There is present a complete left hemiplegia. Toward noon the patient lapsed into a comatose state and terminated the same p. m.

POST MORTEM FINDINGS.

Frontal sinus on left side clean. There are no evidences of bone involvement of posterior sinus wall. Septum of sinuses is intact. Removal of inner table on left side shows a normal dura. Incision of the dura discloses nothing pathological.

Frontal sinus on right side diseased and filled with pus. Mucosa thickened and polypoid. Inner table shows no areas of necrosis nor can there be made out any fistulous communication. Removal of inner table shows the dura thickened and presents a small area covered with granulations. Incision of the dura shows an absence of pus on the brain surface. Exploration of the frontal lobe discloses the presence of an abscess cavity about 3 mms. below the surface, in the direction of the falx. A culture from the pus subsequently showed the streptococcus hemolyticus.

The points of interest in this case are as follows:

1. The age of the patient. Complications of such severe nature are to be looked for in older individuals. This patient was only 11 years old.
2. All signs and symptoms referred us to the left frontal sinus. Nothing in the history nor in the examination directed our attention to the possibility of a severe involvement of the right sinus.
3. The absence at the time of operation of indications that the cranial cavity was involved.
4. Our suspicions were first aroused to the possibility of a bilateral affair, only when evidences of increased intracranial pressure became manifest; especially with the appearance of irritative symptoms indicating that their origin must be on the other side of the cerebrum.
5. The presence of the abscess on the side that originally gave no symptoms. It is not reasonable to suppose that one should suspect disease in the right frontal sinus when there was swelling and edema over the left frontal.

6. The failure to find any macroscopical break in the bony continuity tends to prove that the anatomical communications can well afford portals of entrance in such infections.

7. The interesting post-mortem findings.

In conclusion, we wish to bring up the question as to the advisability of exploring the other sinus in cases similar to this; where we have acute unilateral symptoms. There is no doubt, even if we had opened the right sinus by breaking through the septum of the sinuses, little would have been gained, because as was stated before we could not detect any break in the bone. However, other cases may show bone changes and so call for further exploration. As to the justification of exploring the cranial cavity, it is our opinion that in cases of a similar nature, when the establishment of drainage does not relieve the headache immediately, and when the spinal fluid gives evidences of inflammation we have a just indication for such a procedure. To wait until manifestations appear, indicating involvement of the motor area, renders the case practically hopeless. In our case it can readily be seen, had we decided to explore the left frontal lobe little would have been gained, because the abscess was located on the right side.

An important consideration in these cases is to determine the extent of our operative interference. These patients are usually very sick and anything but the establishment of adequate drainage is contra indicated. We certainly would strongly advise against any unnecessary manipulation. We saw a similar case recently in the clinic of Professor Hajek, of Vienna. This patient also terminated as a result of a frontal lobe abscess that had not been diagnosed, the abscess, however, occurred on the side of the diseased sinus.

691 Lafayette Ave.