BRAIN ABSCESS IN TWO PATIENTS WITH CONGENITAL CARDIAC DISEASE

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The so-called paradoxic brain abscess in congenital heart disease apparently is encountered rarely in neurosurgical practice, for very few examples have been recorded in the literature. Also the surgical results obtained have been poor. In fact, in a review of the neurosurgical literature of the last 10 years, only 6 cases were found in which this condition was reported as cured.

Smolik et al., 2 in 1946, were the first to report a brain abscess of this type cured by surgical drainage and sulfonamides. 2 Two other cases of successful removal of the abscess under the protection of antibiotics were reported in 1951 by Cohen et al. 2 and Beller. 1 Ingraham and Matson 3 mentioned 2 instances in which brain abscess associated with tetralogy of Fallot was successfully removed. Finally, in 1956, Lafon et al. 4 recorded another patient with the same condition who recovered after excision of the abscess.

Within the last few months, we have operated upon 2 patients with brain abscess associated with congenital heart disease of the type of the tetralogy of Fallot. These 2 cases are the only examples of this condition observed in our neurosurgical practice during the last 15 years.

The rarity of this brain lesion, together with the isolated and rather exceptional reports of surgical cure, justify, in our view, the publication of a summary of the clinical records of our 2 patients.

CASE REPORTS

Case 1. M.C.B., a girl 8 years of age, was admitted to one of our Neurosurgical Services (E.L.) of the Central Hospital of the Red Cross on May 29, 1956. When the patient was 1 month old it was found that she had a cardiac bruit. Cyanosis and breathlessness were noted when she began to walk at the age of 1 year. A diagnosis of tetralogy of Fallot was established. The cardiac symptoms gradually increased and Blalock's operation was performed when she was 6 years old. She was greatly improved subsequently and had only minor illnesses, i.e., whooping cough. Three months before admission she suffered a cold with cough and some nasal secretion. About the same time she had a tooth extracted without any obvious complication. Ten days later her temperature was elevated and a slight epileptiform attack occurred, with twitchings in the right side of the face for several minutes but without loss of consciousness. The fever continued and the attacks recurred, frequently spreading to the right arm. In spite of treatment with antibiotics there developed weakness of the right arm, right side of the face, and right leg. At this time she had headaches accompanied by vomiting and later by somnolence.

Examination. The patient was in poor condition, cyanotic and somewhat lethargic. Positive findings were bilateral papilledema, slight low right facial weakness, right hemiparesis,

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more marked in the arm, with hypertonia, increased tendon jerks and positive Babinski and Hoffmann signs. There was a cardiac murmur on auscultation. The only positive laboratory finding was leucocytosis (14,200) with some increase of neutrophils (72 per cent).

Left carotid arteriography confirmed the presence of an expansive lesion in the left parietal region.

1st Operation. Through a left parietal burr hole an abscess was tapped and 45 cc. of pus were removed. Penicillin and streptomycin were injected into the abscess cavity.

Bacteriological study of the pus and its culture failed to demonstrate any micro-organisms.

Course. Though the child improved immediately after operation and received antibiotics, on the 9th postoperative day the hemiparesis increased and she became stuporous. Lumbar puncture showed a spinal fluid pressure of 280 mm. of water. The abscess was tapped again and 35 cc. of pus were evacuated and more antibiotics were injected locally. Bacteriological studies of the pus again revealed no organisms. In spite of some improvement in the patient's condition, the cerebrospinal fluid pressure continued to increase (over 300 mm. of water) and another tap of the abscess was performed, 25 cc. of sterile pus being obtained.

2nd Operation. Under general anesthesia a lateral osteoplastic flap was carried out, nearly 3 weeks after the first brain puncture. A subcortical parietal abscess with a definite capsule was totally removed. Penicillin and streptomycin were instilled in the operative cavity of the brain and the wound was closed without drainage.

Postoperative course was uneventful except for a reaction to a blood transfusion 24 hours after surgery. The child was discharged 10 days after operation. She had no symptoms of increased intracranial pressure but the right hemiparesis persisted. This has improved steadily during the 4 months since operation.

Case 2. M.C.M.J., a girl 7 years of age, was admitted to one of the Medical Services (Dr. Barreda) of the Institute of Medical and Clinical Research (Director Prof. Jimenez Diaz) on July 17, 1956. Shortly after birth her mother noticed a cyanotic coloration of the distal portions of the extremities and of the tongue. She had occasional difficulty in breathing. These symptoms gradually increased, becoming more apparent when the girl tried to play and run with other children. At the same time the tips of the fingers slowly became deformed and had the typical shape of drumsticks.

Twenty days before her admission to the clinic for consideration of surgical treatment of her cardiac disease, she began to have headaches and vomiting. Her temperature was elevated and a diagnosis of possible meningitis was made by several physicians. She was treated with antibiotics.

Examination. The patient was fairly well developed, but rather pale, and cyanosis, especially marked on the lips, was evident. A strong systolic murmur was heard in auscultation of the heart. The edge of the liver was felt just below the costal margin. Typical clubbing of the fingers of both hands was present.

Roentgenograms revealed hypertrophy of the right ventricle of the heart, a concave left border of the heart secondary to disappearance of the pulmonary conus, and extreme dextroposition of the aorta in the right anterior oblique view. There was a right axis deviation in the electrocardiogram. The clinical diagnosis made by the Department of Cardiovascular Surgery (Dr. Castro Farinas) was Fallot's tetralogy.

Routine laboratory studies showed anemia, normal white blood cells and increased sedimentation rate (index 48.5). Culture of the blood (Schottmüller's method) was negative.

On the first examination made by the Neurosurgical Section of the Institute, directed by one of us (S.O.), the child was found to be very stuporous. Positive neurological findings were slight rigidity of the neck, bilateral papilledema, paresis of the right 6th cranial nerve and discrete right hemiparesis with a tendency to a Babinski sign on that side. Although study of sensibility was difficult because of the patient's condition, some alteration of postural sense was obvious in the right hand and foot.

Operations and Course. An exploratory puncture in the left parieto-occipital region of the brain through a burr hole disclosed a deep abscess and 80 cc. of pus were aspirated. Penicillin
and streptomycin were injected locally. During the following 10 days two more taps of the abscess were carried out, 30 and 7 cc. of pus being removed. The child improved with this treatment and systemic administration of antibiotics, but about 2 weeks later fever and headaches recurred. Another puncture of the abscess failed to obtain much pus and the resistance of the capsule was then very definite. The injection of a few cc. of Pantopaque into the cavity of the abscess and subsequent roentgenograms revealed the extension and depth of the lesion.

**Bacteriological Studies** (Dr. Ales). The culture of the pus showed a late growth (2-3 days) of a gram negative coccus-bacillus which can be included in the *Parvobacteriaceae*, group *Pasteurellae*, type *Actinobacillus lignieresi*. Sensibility studies of this micro-organism demonstrated that Terramycin, aureomycin, Chloromycetin and Tetracyclin were the more active antibiotics.

**Course.** The initial improvement of the child after the first punctures of the abscess was not sustained. She continued to complain of headaches, her temperature was elevated, and there were periods of obnubilation and stupor. The papilledema and some degree of right hemiparesis persisted and she also showed slight meningeal signs. The cerebrospinal fluid was, however, normal.

**4th Operation.** A left parieto-occipital bone flap was carried out under general anesthesia about 7 weeks after the first puncture of the abscess. Through a cortical incision a very large and deeply situated abscess was exposed and its capsule, very irregular in shape, was dissected from the white matter until it was completely removed. In some places the capsule was very hard and resistant, but elsewhere it appeared to be very thin and was broken during the dissection. At this point a fair amount of pus escaped. The lateral ventricle was opened because of the deep location of the abscess, the choroid plexus being coagulated partially. The residual cavity left by the excision of the abscess measured about 7×5 cm. in the anteroposterior and coronal planes. Antibiotics were instilled locally and the wound was closed without drainage.

**Postoperative course** was quite good. Several lumbar punctures were necessary because the intracranial pressure was moderately high. There was an increase of cells in the cerebrospinal fluid during the first weeks after operation, but this and other less important changes slowly cleared up. Terramycin was given during the first 2 postoperative weeks. A very slight decrease of motor power and some alteration of postural sense in the right limbs were the only positive neurological findings at the time of her discharge, 3 weeks after operation. The symptoms of increased intracranial pressure had completely subsided and the patient’s general condition was good at that time. Unfortunately this child presented later a sudden and unexpected recurrence of the abscess and died 5 months after operation in spite of immediate cerebral puncture with evacuation of a large amount of pus.

**SUMMARY**

Two children, 7 and 8 years old, suffering from Fallot’s tetralogy, one of them having been operated upon 2 years previously (Blalock’s operation) and the other still being studied, exhibited symptoms of increased intracranial pressure and focal signs indicating a lesion in the left cerebral hemisphere. One had no history of an obvious infection, and the other had had only a slight cold and extraction of a tooth 10 days before onset of symptoms. The clinical diagnosis of cerebral abscess associated with congenital heart disease was confirmed by puncture of the brain. A very rare coccus-bacillus was isolated from the pus in 1 of the cases. In the other the pus was sterile. After several punctures the abscesses were totally removed under the protection of locally and systemically administered antibiotics. An excellent immediate result was obtained in both cases although one of the patients died with sudden and unexpected recurrence of the abscess several months afterwards.

The previously reported examples of surgical cure of brain abscesses associated
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with congenital cardiac disease are so exceptional that only 6 other cases were found in the neurosurgical literature.

REFERENCES


