Multiple abscesses of the brain

Case report

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A case of multiple brain abscesses is presented. The patient was treated with systemic antibiotics; one of the lesions acutely increased in size, became life-threatening, and was surgically removed. The patient continued with antibiotic treatment, and the remaining brain abscesses completely disappeared. Recent follow-up review almost 2 years after diagnosis demonstrated no evidence of recurrence.

T he time-honored surgical principle of draining purulent collections in the body pertains equally well to the treatment of brain abscesses. Since Macewen's surgical treatment of brain abscess in 1893, some controversy has existed as to whether drainage or excision is the ideal treatment. We have recently had experience with a case that supplies interesting data concerning the natural history of brain abscesses.

Case Report

In August, 1977, this 26-year-old man acutely developed a high fever with chills, delirium, nausea, dizziness, and ataxia. He had recently been swimming in a stagnant pond in suburban Virginia. He consulted his local physician who diagnosed a viremia, and prescribed Minocin (minocycline hydrochloride). Six days later the patient was noted to be ataxic, with a high fever, and complained of headaches and double vision. He continued to take Minocin for an additional 2 days, for a total of 6 days on Minocin, at which time his symptoms worsened and he was seen in a local emergency room.

The patient was found to be lethargic, demonstrating eyeball tenderness, mild neck resistance and pain on flexion, mild bilateral ptosis, a flat right nasolabial fold, and deviation of the tongue to the right. Lumbar puncture revealed yellowish-pink cerebrospinal fluid (CSF), normal manometric values, 200,000 red blood cells/ml, 2600 white blood cells (WBC's)/ml, 46% polymorphonuclear cells, 54% lymphocytes, protein 325 mg%, and glucose 60 mg%. The clinical impression was viral meningoencephalitis. Smears of CSF for Gram stain, acid-fast bacillus, and Cryptococcus were negative, as were serial blood cultures. Chest x-ray film was negative, and a brain scan showed diffuse abnormal uptake bilaterally. The patient was given supportive therapy and discharged approximately 9 days later with a diagnosis of viral meningoencephalitis. The patient stated that, upon discharge, he felt stronger, and was eating better, but that his balance and vision had not improved significantly. He had a mild fever when he was sent home.

Approximately 1 week following release, he returned to the local emergency room, complaining of headache, nausea, vomiting, fever, and neck and back pain. Repeat lumbar puncture revealed 1050 WBC's/ml, 90% polymorphonuclear cells, protein 172 mg%, glucose 39 mg% (serum glucose 135 mg%). Gram stain and india ink preparations were negative. Cultures of the CSF, blood, urine, sputum, and throat were all negative. Computerized tomography (CT) was performed and demonstrated four distinct intracerebral lesions. A tentative diagnosis of multiple brain abscesses was made and the patient was begun on a course of ampicillin, 12 gm/day intravenously, and chloromycetin, 1 gm intravenously every 6 hours, as well as Decadron (dexamethasone), 16 mg/day in divided doses, and Dilantin (phenytoin), 400 mg/day intravenously. The patient was then transferred to the
George Washington University Hospital. Upon admission he was lethargic but oriented. He was noted to have a left mild ptosis, and significant meningismus. He was severely ataxic and could only walk by holding onto walls.

Laboratory tests included negative cold agglutinins, mycoplasma titers, febrile agglutinins, and VDRL venereal disease testing. Repeat CT scan (Fig. 1) demonstrated five or six discrete intracerebral lesions. Tuberculosis and fungal serologies were negative. The patient continued to receive antibiotics as above. Eleven days later, the patient’s neurological status acutely deteriorated. He became difficult to arouse and developed a partial right third nerve palsy. Repeat CT scan (Fig. 2) demonstrated a marked increase in the size of the right temporal lobe lesion. Cerebral angiography was performed, which demonstrated an avascular area corresponding to the lesion seen on the CT scan.

A right frontotemporal craniotomy was performed, with removal of an intact golf ball-sized fluctuant mass from the right temporal lobe. The lesion was an abscess, 4 cm in diameter, with the abscess wall approximately 0.3 cm thick. Both aerobic and anaerobic cultures of the purulent contents of the abscess were negative.

Postoperatively, the patient’s neurological status improved. One week after surgery, chloramphenicol therapy was stopped because of a sideroblastic effect seen on bone marrow examination. The patient was begun on oral rifampin. He slowly improved neurologically, but developed bizarre behavior and began discussing suicide. After return of his peripheral WBC count to the normal range, intravenous chloramphenicol, 1 gm every 6 hours, was reinstalled.

Three weeks after surgery (October, 1977), the CT scan revealed thickening of the capsules of the remaining abscesses (Fig. 3). It was thought that further surgical intervention was not wise at this point. The patient was begun on oral chloramphenicol, 1 gm every 6 hours, and discharged to be followed as an outpatient. At the time of discharge, all of his neurological abnormalities had essentially resolved. He had a very mild memory loss but no focal neurological signs. He was kept on oral chloramphenicol treatment, 1 gm every 6 hours, for an additional 3 months. In December, 1977, repeat CT scan demonstrated complete resolution of all previously seen lesions, with postsurgical changes in the right temporal lobe as the only abnormality.

Since then he has remained asymptomatic and neurologically intact. He has taken no antibiotics since December, 1977. He presently works full time, is married, and self-supporting. Computerized tomography in August, 1979, demonstrated continued complete absence of all previous lesions (Fig. 4). The only abnormality seen on the most recent CT scan is residual of previous surgery.
Multiple abscesses of the brain

**Fig. 2.** Computerized tomography sections taken on September 30, 1977, demonstrating acute increase in the right temporal lesion.

**Fig. 3.** Computerized tomography sections taken on October 28, 1977, demonstrating postsurgical changes in the right temporal area with thickening of the capsules of the remaining lesions.
A. I. Kobrine, D. O. Davis and H. V. Rizzoli

FIG. 4. Computerized tomography sections taken on August 14, 1979, demonstrating postsurgical changes in the right temporal area and complete resolution of the other lesions.

Discussion

The treatment of brain abscesses can be traced to the late 19th century when both Horsley and MacEwen reported surgical drainage. Dandy suggested aspiration of the abscess through a burr hole in 1926. Excision of cerebral abscesses was suggested by Vincent, et al., in 1937. Since then all three procedures, drainage, aspiration, or excision, have been advocated by various surgeons. The mortality rate has remained relatively constant at 20% to 40% for surgically treated cases of single brain abscesses. Patients with multiple brain abscesses have fared less well. Carey, et al., reported an 8% occurrence of multiple abscesses, and suggested the overall incidence of multiple brain abscesses was 5% to 15%, with an 85% average mortality.

Black, et al., studied the effects of systemically administered antibiotics in patients with brain abscesses. They demonstrated therapeutic levels of systemically administered antibiotics (chloramphenicol, methicillin, and penicillin) in the abscess cavity. However, all patients continued to deteriorate neurologically and required needle aspiration, leading the authors to conclude that antibiotics alone are insufficient treatment for brain abscesses and that surgical evacuation of the abscess is essential.

Recently, the addition of the CT scanner to the neurosurgeon's armamentarium has appeared to change the prognosis of patients with brain abscess. Rosenblum, et al., reported a recent mortality rate of 0, based on 20 consecutive patients treated for brain abscess since CT scanning became a routine diagnostic procedure at their institution. This figure compares with a previous mortality rate at their institution of 36% for all patients with brain abscess operated on before the availability of the CT scanner. They cited more accurate diagnosis and localization of abscesses, as well as the rapid detection of postoperative complications as possible reasons for the remarkable change in the mortality rate after CT scanning was available.

In 1977, Berg, et al., reported the nonsurgical cure with antibiotic drugs of four patients who had clinical features and CT characteristics of brain abscesses. There was no surgical confirmation of cerebritis versus brain abscess, or surgical information as to the thickness of the abscess wall in any of these patients. Three of the patients were treated with chloramphenicol and one with ampicillin followed by penicillin, all in high doses.

The present case has characteristics that would support several of the above treatment modalities. The patient was treated with antibiotics (a tetracycline
Multiple abscesses of the brain
derivative) early in the disease. The development of
the brain abscesses progressed. After the diagnosis of
multiple brain abscesses was made, he was treated
with ampicillin and chloramphenicol. On this treat-
ment regimen, one of the abscesses (in the right tem-
poral lobe) enlarged and became life-threatening,
necessitating surgical excision. A well formed abscess
was removed. The remainder of the abscesses, which
appeared well formed on the CT scan, disappeared
within 3 months of the continued chloramphenicol
therapy.

It is difficult to explain at this time why one of the
abscesses would acutely increase in size during anti-
biotic treatment, while the remaining abscesses
remained unchanged and eventually disappeared. The
observation emphasizes the necessity for frequent
repeat CT studies if the medical treatment approach is
considered, and the potential danger of acute neuro-
logical deterioration due to change in abscess size.

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