Pontine abscess: survival following surgical drainage

Case report

JOHN C. VANGILDER, M.D., WILLIAM E. ALLEN, III, M.D.,
AND ROBERT A. LESSER, M.D.
The Sections of Neurological Surgery, Neuroradiology, and The Department of
Ophthalmology, Yale University School of Medicine and The Yale-New Haven
Medical Center, New Haven, Connecticut

The authors report a patient who survived following surgical evacuation of a pontine abscess. The pathophysiology, neurological symptoms, and surgical findings of this rare entity are discussed.

KEY WORDS brain stem abscess surgical drainage

SOLITARY brain stem abscess is a rare entity; only 44 cases have been reported. Although the diagnosis has occasionally been established during life, we know of no instances of survival. We are reporting a patient with pontine abscess who survived following surgical drainage.

Case Report

A 35-year-old man was admitted to the Ear, Nose and Throat Service of the Yale-New Haven Medical Center, September 2, 1972, with a 12-year history of intermittent purulent discharge from the right ear. The drainage became constant 4 months prior to admission, associated with fluctuating right facial weakness and headache. Physical examination disclosed a fistulous tract from the mastoid to the posterior superior auricular area draining purulent material (cultured Proteus mirabilis), a right peripheral seventh nerve palsy, absent caloric response, and total deafness in the right ear. A cholesteatoma was excised by a right mastoidectomy, and he was discharged 3 days following surgery with minimal nasolabial fold asymmetry. The patient was readmitted September 14, 1972, with a 3-day history of increasing dizziness, disequilibrium, dysphagia, dysarthria, vomiting, headache, and weakness of the left hand.

Examination. There was a purulent discharge from the right mastoid cavity (cultured Proteus mirabilis, Bacteroides fragilis, sensitive to chloromycetin). He was alert but showed bilateral horizontal nystagmus and dysarthria. There was right-sided peripheral facial nerve palsy, deafness, abducens nerve palsy, depressed gag reflex, intention tremor, and dysmetria of the arm. There was also a contralateral hemiparesis, greater in the arm than the leg, Babinski
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sign, and sustained ankle clonus, all on the left. Left facial hypesthesia was the only sensory abnormality. An opening pressure of 90 mm of spinal fluid was measured by subarachnoid lumbar puncture; the cerebrospinal fluid (CSF) contained 141 mg% protein, 254 cells, 80% lymphocytes, and 20% granulocytes. Three-vessel arteriography and a pneumoencephalogram were normal. Needle exploration through a right suboccipital burr hole placed over the cerebellum revealed no evidence of subdural, epidural, or intrinsic cerebellar abscess. The patient was started on chloromycetin antibiotic therapy.

The following day, the patient showed increased dysarthria, the paralysis of right conjugate gaze, absent right corneal reflex, a right Horner's syndrome, increasing left hemiparesis, and a left hemi-hypalgesia including the face. Steroid therapy was followed by subsequent improvement. Neurological examination on the 10th hospital day revealed a horizontal nystagmus on right lateral gaze with the quick component to the left, right-sided deafness, right-sided abducens and facial nerve palsy, spotty left arm hypalgesia, and hyperreflexia on the left side with no weakness. Lumbar puncture was repeated daily; the CSF contained protein between 100 and 140 mg%, and between 100 and 300 cells/mm³, predominantly granulocytes. On the 12th hospital day the patient suddenly became lethargic but would follow verbal commands. He had marked dysarthria, decerebrate thrusting of the left arm, and extensor rigidity of the left leg. There was hypalgesia on the left side, right total ophthalmoplegia, right peripheral facial paralysis, absent right corneal reflex and medial deviation of the left eye. A repeat pneumoencephalogram demonstrated a mass distorting the brain stem (Fig. 1).

Operation. Suboccipital craniectomy and posterior fossa exploration were performed. A small amount of granulation tissue was adherent to the right seventh and eighth nerves, extending from the porus acusticus to the pontomedullary junction. There was fullness in the ventrolateral pons, 2 mm cephalad to the pontomedullary junction, and needle aspiration produced 5 cc of purulent material. Gram stain of the pus demonstrated gram-negative rods and subsequent culture was Proteus mirabilis, sensitive to chloromycetin. The thin-walled cavity was then opened and profusely irrigated with normal saline-bacitracin solution; microbarium sulfate was placed in the abscess cavity. The extent of the cavitation as outlined by the microbarium is illustrated in the postoperative tomograms of the pons (Fig. 2).

Postoperative Course. Following surgery, the patient progressively improved and antibiotic therapy was discontinued after 20
days. At discharge, October 21, 1972, he was ambulatory, there was skew deviation of the right eye, vertical nystagmus on upward gaze (quick component upward), right peripheral facial paresis, deafness of the right ear, dysmetria of the right arm, and a mild left hemiparesis. In June, 1973, the only neurological deficits were asymmetry of the right naso-labial fold, deafness of the right ear, and hyperreflexia of the left arm and leg. He had returned to full employment.

Discussion

In large collected series of solitary brain abscess, the incidence of suppuration in either the pons or medulla oblongata is less than 2%.5,14 However, in smaller individual series, a higher percentage (4% to 6%) of brain stem abscess has been reported.4,10 The longest reported survival following medical treatment is 8 months after the onset of symptoms, the patient being institutionalized with severe neurological deficit.23 The more usual clinical course is rapidly progressive deterioration ending in death a few days after the onset of symptoms.1,4,6,10,11,17,28,24

Brain stem abscess may occur by: direct implantation, contiguous extension from adjacent infection, metastatic extension or by way of undetermined pathways. Middle ear infection is the most common etiology in those patients where the pathogenesis can be attributed to contiguous spread.18 The route of brain stem seeding from mastoiditis may be by: 1) spread from the mastoid through the labyrinth to the tegmen tympani with rupture through the petrous pyramid, 2) extension through the internal auditory meatus along the facial and auditory nerves, 3) through the vascular venous system, especially the inferior petrosal sinus, and 4) from associated meningitis. In our case, the granulation tissue found along the course of the seventh and eighth cranial nerves probably indicated the responsible pathway.

The signs and symptoms of brain stem abscess obviously may be as varied and specific as the area involved. Most patients present a pontine tegmentum syndrome, either contralateral hemiparesis, ipsilateral abducens and facial nerve palsy (Millard-Gubler syndrome), or contralateral hemiplegia, ipsilateral facial palsy, paresis of conjugate gaze toward the side of the lesion and dissociated contralateral hemi-anesthesia (Foville’s syndrome). In our patient, the pathology involved the right side of the brain stem to include the abducens and facial nerves and/or nuclei, the medial lemniscus, and the descending sympathetic and cortico-spinal fibers. Extension to the superior cerebellar peduncle is probably responsible for the ipsilateral cerebellar signs and the transient gaze palsy secondary to involvement of the pontine paramedian reticular formation.9 In contrast to hemispheric lesions, gaze palsies of pontine origin are toward the side of paralysis and are usually asymmetrical.22 Indeed, the symptoms of headache, dysarthria and vomiting combined with the aforementioned neurological deficit and spinal fluid pleocytosis are the most frequent findings associated with brain stem abscess.23

The exploratory burr hole over the posterior fossa was prompted by the erroneous interpretation of bilaterality of brain stem signs and failure to demonstrate a posterior fossa mass by contrast studies;
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this suggested an ischemic process resulting from vasculitis secondary to an epidural or subdural empyema. This misinterpretation of signs from brain stem abscesses have resulted in negative cerebellar explorations by others. The clinical improvement following steroid therapy suggests that the patient’s initial symptoms were in part secondary to edema surrounding a small abscess; the acute exacerbation of symptoms 10 days later was consistent with rupture of the abscess, probably through an irregular thin-walled area of encapsulation.

Postoperative laminograms showed the abscess in the right inferior pons demarcated by the barium instilled at time of surgery (Fig. 2). More commonly, the abscess configuration in the brain stem is oval or circular; in this case it was elongated in a rostral-caudal direction, a shape more characteristic of intramedullary abscess of the spinal cord. Extension along the white matter fascicules would be more likely to occur in the basis pontis or ventral lateral tegmentum as in this instance, than if it were in the more dorsal or mid-tegmental area of the pons.

Postoperatively, the striking ocular findings were the defects in vertical gaze mechanisms consisting of up-beating vertical nystagmus and skew deviation. The former probably represents a ventral pontine lesion and the latter can arise from a lesion in the lateral pontine tegmentum but may be secondary to disease anywhere in the brain stem. The improvement of the patient’s neurological deficit consisting of mild left hyperreflexia and right ear deafness 8 months after surgery, reflects the minimal amount of permanent damage secondary to the abscess. Although the location of a brain stem abscess may frequently be incompatible with functional neurorecovery or with life, the prognosis of this entity is such that it has been universally fatal without surgical drainage. Other space-occupying lesions of the brain stem such as hematoma or cystic tumors may be compatible with survival following surgical evacuation. Our experience contradicts Hulme’s statement that: “Hitherto the diagnosis has been made only at autopsy; it seems unlikely, however, that any effective surgical intervention would be practical even if the condition were recognized during life and its rarity is indeed fortunate.”

References


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Address reprint requests to: John C. VanGilder, M.D., Yale University School of Medicine, Section of Neurological Surgery, New Haven, Connecticut 06510.