**Solitary Pyogenic Thalamic Abscess**
—Two Case Reports—

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**Abstract**

We report two patients with solitary thalamic abscess, occurring among 91 consecutive patients (2.2%) with computed tomography (CT)-diagnosed and surgically-verified brain abscess experienced in our college during 1975 to 1991. A 9-year-old girl with congenital heart disease experienced frequent vomiting followed by left hemiparesis and deterioration of consciousness. CT demonstrated a right thalamic ring-enhanced lesion. Purulent material was aspirated via a burr hole. She died of heart failure on the 5th postoperative day. Autopsy disclosed diffuse brain swelling and an encapsulated abscess in the right thalamus, which had ruptured into the third ventricle. A 30-year-old female experienced headache, nausea, and vomiting, which progressed to somnolence and right hemiparesis. CT demonstrated a left thalamic ring-enhanced lesion. Purulent material was aspirated by stereotactic procedures. All symptoms had resolved by the end of the 2nd postoperative week.

**Key words:** brain abscess, intracranial infection, stereotactic surgery, thalamic abscess, thalamus

**Introduction**

Solitary pyogenic abscesses of hematogenous origin are rarely located in the thalamus. Several cases had been reported before computed tomography (CT) was introduced as a neuroradiological diagnostic modality, but only 14 cases have been appeared since. We report two patients with solitary pyogenic abscess in the thalamus and review the literature.

**Case Reports**

**Case 1:** A 9-year-old girl with congenital heart disease (single ventricle associated with pulmonary stenosis) experienced nausea and frequent vomiting 4 days before admission. Her body temperature was 38°C. Two days later, motor weakness of the left arm and leg developed and her consciousness began to deteriorate. She was admitted to our facility on November 21, 1979.

On admission she was stuporous but could be aroused. Cyanosis, and cutaneous and mucosal telangiectases were observed. Body temperature was 38.5°C. A grade III systolic murmur was audible. Mild peripheral edema and digital clubbing were evident. Neurological examination revealed hemiparesis with positive Babinski reflex on the left side. Blood cell count disclosed leukocytosis and polycythemia. CT scans demonstrated a right thalamic ring-enhanced lesion (Fig. 1).

Under a diagnosis of thalamic abscess, systemic administration of ampicillin and cephalothin and tentative hyperosmolar treatment were initiated. She was not a good candidate for surgery under general anesthesia. However, she gradually became comatose and other neurological signs deteriorated 10 hours after admission. Emergency burr hole opening was carried out under local anesthesia. 10 ml of greenish-yellow purulent material was aspirated and a continuous ventricular drainage device was placed. The bacterial culture of the aspirated material was negative.

Postoperatively, there was no significant improvement in her consciousness or motor function. She died of heart failure on the 5th postoperative day. Autopsy disclosed diffuse brain swelling, and an en-
capsulated abscess in the right thalamus, which had ruptured into the third ventricle.

Case 2: A 30-year-old female consulted her family doctor with a 10-day history of headache, nausea, and vomiting, and was given medication. Four days later, she was admitted to the dermatological department of our facility with generalized drug-induced erythema. The next day she experienced tingling sensation in her right arm and motor weakness in her right leg. CT scans demonstrated a hypodense mass involving the left basal ganglia and thalamus with ring enhancement. She was referred to our department on May 18, 1989.

Neurological examination found she was lethargic and unable to name common objects. There was mild right-sided hemiparesis. Pinprick sensation was not diminished but she neglected her right side on double simultaneous stimulation. Blood cell count showed leukocytosis and body temperature was 36.7°C.

Although hyperosmolar treatment produced a temporary improvement, her symptoms subsequently deteriorated. Body temperature exceeded 39°C and the white blood cell count was 23,000/mm³ on the 9th post-admission day. CT scans on May 28 demonstrated an increase in the size of the left thalamic ring-enhanced lesion (Fig. 2). An exploratory stereotactic trajectory was performed to reach the lesion, demonstrating purulent material inside the lesion. 22 ml of yellowish-brown fluid was aspirated. Culture of the pus showed the presence of Peptococcus.

She was initially given intravenous flomoxef, which was changed to latamoxef for a total of 40 days after the culture results became available. By the end of the 2nd postoperative week, all symptoms had resolved. Follow-up CT scans showed resolution of the thalamic abscess. An extensive search could not identify any extracerebral origin for the abscess. She was seen for a routine check-up 3 years after surgery, and was in good health.

Discussion

Supratentorial abscesses of hematogenous origin are most often located in the territory of the middle cerebral artery, and only rarely in deeper parts of the brain like the basal ganglia and thalamus.1,2,3,4,7,12) Most brain abscess series, even though with a large number of patients, do not contain any cases of thalamic abscess.3,7) The incidence of this condition, therefore, has yet to be established. Loeser and Scheinberg12) found two patients with an abscess in the region of the thalamus and basal ganglia in a series of 99 brain abscess cases, but the two sites were not differentiated. Danziger et al.9) identified three cases of thalamic abscess among 90 cases of intracerebral abscess, but the localization was vague, because the thalamus is only one deep cerebral location among many frontal, parietal, temporal, and occipital sites. Donald et al.10) also presented two patients among 24 intracranial abscess cases, but the sample size was relatively small. Our two patients were 2.2% of the 91 consecutive patients with a brain abscess diagnosed by CT and verified during surgery in the two facilities of our college (Dai-ni Hospital and Neurological Institute) seen since 1975 when CT was introduced.20)

Table 1 lists the nine well-documented cases of a
Table 1 Summary of 11 reported cases

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Age/ Sex</th>
<th>Infectious foci and predisposing factors</th>
<th>Signs and symptoms</th>
<th>Fever/leuko- cytosis</th>
<th>Tentative diagnosis</th>
<th>Type of surgery (subsequent procedure)</th>
<th>Micro-organism isolated</th>
<th>Outcome (postoperative period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ercius et al. (1982)</td>
<td>42/M none</td>
<td>lethargy, lt hemiparesis</td>
<td>febrile/ +</td>
<td>glioblastoma or abscess</td>
<td>evacuation via craniotomy</td>
<td>hemolytic streptococi, <em>Eubacterium lentum</em></td>
<td>lt hemiparesis (1 yr)</td>
<td>no deficit (9 mos)</td>
</tr>
<tr>
<td>Black et al. (1983)</td>
<td>63/F tracheobronchitis</td>
<td>headache, rt hemiparesis</td>
<td>febrile</td>
<td>metastatic brain tumor</td>
<td>aspiration via burr hole and ventricular drainage (VP shunt)</td>
<td><em>alpha-streptococi</em></td>
<td>[no deficit (9 mos)]</td>
<td></td>
</tr>
<tr>
<td>Broggi et al. (1985)</td>
<td>45/M none</td>
<td>headache, lt hemiparesis</td>
<td>febrile/ -</td>
<td>abscess</td>
<td>stereotactic aspiration and implantation of reservoir</td>
<td>negative culture, but immobile coccyx found</td>
<td>no deficit (45 mos)</td>
<td></td>
</tr>
<tr>
<td>Hollander et al. (1987)</td>
<td>69/M <em>Bacteroides</em> species (focus unknown)</td>
<td>somnolence, lt hemiparesis</td>
<td>febrile</td>
<td>thalamic hemorrhage</td>
<td>stereotactic aspiration</td>
<td><em>Bacteroides fragilis, Clostridium</em></td>
<td>no deficit (not given)</td>
<td></td>
</tr>
<tr>
<td>Venger et al. (1987)</td>
<td>66/M influenza</td>
<td>lt numbness, lt hemiparesis</td>
<td>afebrile/ -</td>
<td>metastatic brain tumor</td>
<td>ultrasonography-guided aspiration</td>
<td><em>Histoplasma capsulatum</em></td>
<td>hand clumsiness (15 mos)</td>
<td>no deficit (4 mos)</td>
</tr>
<tr>
<td>Yasargil et al. (1988)</td>
<td>54/M</td>
<td>apathy, rt hemiparesis</td>
<td>tumor or abscess</td>
<td></td>
<td>evacuation via craniotomy</td>
<td><em>Haemophilus paraprophilus</em></td>
<td>[no deficit (1 yr)]</td>
<td></td>
</tr>
<tr>
<td>Naidu (1988)</td>
<td>32/M ventricular septal defect</td>
<td>headache, convulsion</td>
<td>febrile</td>
<td>abscess</td>
<td>aspiration via burr hole (VP shunt)</td>
<td>negative culture</td>
<td>[no deficit (1 yr)]</td>
<td></td>
</tr>
<tr>
<td>Yorita et al. (1990)</td>
<td>55/M diabetes mellitus</td>
<td>somnolence, rt hemiparesis</td>
<td>febrile/ +</td>
<td>abscess</td>
<td>stereotactic aspiration and continuous drainage</td>
<td><em>Fusobacterium nucleatum</em>, <em>Peptostreptococcus micros</em>, <em>Bacteroides gracilis</em></td>
<td>lt hemiparesis (4 mos)</td>
<td>[no deficit (3 mos)]</td>
</tr>
<tr>
<td>Scully et al. (1990)</td>
<td>57/F arteriovenous fistula of lung</td>
<td>somnolence, rt hemiparesis</td>
<td>febrile/ +</td>
<td>abscess or glioma</td>
<td>stereotactic aspiration</td>
<td>[negative culture]</td>
<td>died due to heart failure (5 days)</td>
<td>[no deficit (3 yrs)]</td>
</tr>
<tr>
<td>Present Case 1</td>
<td>8/F single ventricle</td>
<td>coma, lt hemiparesis</td>
<td>febrile/ +</td>
<td>abscess</td>
<td>aspiration via burr hole and ventricular drainage</td>
<td><em>Peptococcus</em></td>
<td>[negative culture]</td>
<td>[no deficit (3 yrs)]</td>
</tr>
<tr>
<td>Present Case 2</td>
<td>30/F none</td>
<td>somnolence, rt hemiparesis</td>
<td>febrile/ +</td>
<td>glioma or abscess</td>
<td>stereotactic aspiration</td>
<td>[negative culture]</td>
<td>[no deficit (3 yrs)]</td>
<td>[no deficit (3 yrs)]</td>
</tr>
</tbody>
</table>

*CT scans showed a hyperdense lesion. *The patient’s dog died of *Histoplasma* infection 1 month before his onset. *A total dose of 28 Gy was delivered. *Radical operation had not been carried out. *The patient had not been treated. VP: ventriculoperitoneal.

solitary thalamic abscess reported since the introduction of CT. Common primary sites of infection were the lung and heart (5/10 cases). Bacteremia was reported as the origin in one case. Diabetes mellitus was a predisposing factor in one patient. The focus could not be determined in three cases. Patients presented with deteriorating consciousness (7/11), headache (3/11), hemiparesis (10/11), fever (8/10), and leukocytosis (5/7). Various micro-organisms were isolated from the aspirated abscess content in seven cases, three with polymicrobial infections. Culture was negative in the remaining four cases.

CT has facilitated the rapid identification of thalamic abscesses. Differential diagnosis is still difficult. The lesions which are far more common in this area such as glioblastoma, metastasis, infarction, and resolving hematoma, must be excluded. The diagnosis can be particularly difficult in cases lacking fever or leukocytosis. Even when fever and/or leukocytosis is present, a tissue diagnosis is necessary, but this can be obtained with no major risks by utilizing a stereotactic procedure. We strongly advocate delaying specific treatments, such as radiation, steroid or antibiotics administration, for a thalamic lesion until a tissue diagnosis has been obtained.

All patients were treated surgically by aspiration...
of the abscess via burr hole or evacuation via craniotomy; six recovered completely, four survived with minimal to moderate neurological deficit, and one of our patients (Case 1) died due to heart failure. CT-guided stereotactic techniques were not available for routine clinical practice when we treated this patient. Her cardiac condition precluded craniotomy under general anesthesia or conventional stereotactic operation accompanied by ventriculography. The free-hand puncture procedure adopted failed to aspirate the content completely. Furthermore, management of patients with severe heart defects was not then well developed. Today treatment can easily be achieved by timely surgical intervention using stereotactic procedures. Nevertheless, additional clinical experience is necessary to resolve controversies such as whether topical administration of antibiotics, irrigation, or placement of a continuous drainage device or reservoir is required.

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