Experience with multiloculated brain abscesses

STEPHAN STEPHANOV, M.D., PH.D.
Department of Neurological Surgery, Wentworth Hospital, Durban, South Africa

The author reports his experience with 10 consecutive multiloculated brain abscesses diagnosed by computerized tomography and successfully treated by excision (primary or early secondary) or repeated aspiration.

KEY WORDS • brain abscess • computerized tomography • surgical treatment

Walter Dandy's statement that brain abscesses are "the most vicious lesions in the brain without any question" is most particularly true of multiloculated abscesses. Authors dealing with brain abscesses report different proportions of multiloculation. Erasmus found six multiloculated abscesses in a series of 29 brain abscesses, Tutton and Shepherd reported 23 among 56, Jooma, et al., 39 among 91, Kiser and Kendig, 11 among 121, and Le Beau, et al., 14 among 154. Tutton reported in 1953 that about 40% of abscesses are loculated, and Lewin concluded similarly in 1955. In the series of 110 cases reported by Liske and Weikers, "almost three quarters of the cases were solitary parenchymal abscesses." Several other articles make no mention of multiloculation.

This report consists of a personal series of 10 multiloculated lesions among 85 intracranial abscesses treated in our department during a period of 2 years and diagnosed by computerized tomography (CT) scan.

Summary of Cases

Table 1 gives a summary of the clinical course of the 10 patients. The youngest patient was 3 years old and the oldest, 46; there were seven males and three females. The primary source of infection was identified in all the patients: in five the abscesses were of otogenic origin, two followed sinus infection, two were post-traumatic, and one was pulmonary. Staphylococcus aureus was identified in six cases, mixed flora in two, and sterile pus in two.

Signs and Symptoms

All patients except two exhibited some disturbance of consciousness and focal neurological signs. One was in a state of coma on admission and another in semicoma. Papilledema was found in five patients. Lumbar puncture was performed in only two patients, and the CSF showed increased protein and pleocytosis. Eight patients had pyrexia, and three had meningitis. Six abscesses were located in the right hemisphere, three in the left, and one bilaterally in the posterior fossa.

Treatment

Two of the biloculated abscesses (Cases 1 and 2), were treated by repeated aspiration
TABLE 1
Summary of 10 consecutive multiloculated brain abscesses diagnosed by CT scan

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Age (yrs), Sex</th>
<th>Status on Admission</th>
<th>Location of Abscess</th>
<th>Origin of Infection</th>
<th>Method of Treatment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7, M</td>
<td>poor general condition, pyrexia, drowsiness, papilledema, rt hemiparesis</td>
<td>lt temporal</td>
<td>otogenic</td>
<td>repeated aspiration</td>
<td>good</td>
</tr>
<tr>
<td>2</td>
<td>19, M</td>
<td>pyrexia, confusion, lt hemiparesis</td>
<td>rt frontal</td>
<td>sinogenic</td>
<td>repeated aspiration; 3rd aspiration under direct vision</td>
<td>good</td>
</tr>
<tr>
<td>3</td>
<td>40, M</td>
<td>alert, aphasia, rt arm weakness</td>
<td>lt frontal</td>
<td>posttraumatic</td>
<td>primary excision</td>
<td>good</td>
</tr>
<tr>
<td>4</td>
<td>14, F</td>
<td>alert, lt hemiparesis</td>
<td>rt frontal</td>
<td>sinogenic (osteitis)</td>
<td>primary excision</td>
<td>good</td>
</tr>
<tr>
<td>5</td>
<td>10, M</td>
<td>pyrexia, drowsiness, papilledema, lt hemiparesis</td>
<td>rt temporal</td>
<td>otogenic</td>
<td>early secondary excision</td>
<td>good</td>
</tr>
<tr>
<td>6</td>
<td>33, F</td>
<td>pyrexia, confusion, papilledema, lt hemiplegia</td>
<td>rt temporal</td>
<td>otogenic</td>
<td>early secondary excision</td>
<td>good</td>
</tr>
<tr>
<td>7</td>
<td>46, M</td>
<td>pyrexia, drowsiness, papilledema, lt hemiparesis</td>
<td>rt frontal</td>
<td>pulmonary</td>
<td>early secondary excision</td>
<td>good</td>
</tr>
<tr>
<td>8</td>
<td>25, M</td>
<td>pyrexia, coma, meningitis</td>
<td>lt subdural</td>
<td>posttraumatic</td>
<td>early secondary excision</td>
<td>good</td>
</tr>
<tr>
<td>9</td>
<td>3, M</td>
<td>poor general condition, pyrexia, semi-coma, lt hemiplegia, meningitis</td>
<td>rt temporoparietal</td>
<td>otogenic</td>
<td>repeated aspiration; secondary excision</td>
<td>satisfactory</td>
</tr>
<tr>
<td>10</td>
<td>9, F</td>
<td>poor general condition, pyrexia, drowsiness, papilledema, ataxia</td>
<td>bilateral posterior fossa abscess; rt uniloculated; lt multiloculated</td>
<td>otogenic (bilateral otitis media)</td>
<td>repeated aspiration rt abscess; primary excision lt abscess</td>
<td>significant neurological deficit</td>
</tr>
</tbody>
</table>

Fig. 1. Case 2. Computerized tomography scans of a patient with a right frontal biloculated brain abscess. Left: Before operation. Right: After repeated aspiration.

Fig. 2. Case 4. Computerized tomography scans of a patient with a right frontal triloculated brain abscess. Left: Before operation. Right: After primary excision.
Multiloculated brain abscesses

with good results. The patient in Case 1 was in poor general condition and had advanced papilledema on admission. The follow-up CT scan showed no residual pus after the third aspiration and shrinkage of the abscess cavity. Case 2 was also treated by aspiration. Excision of the abscess was planned after the second aspiration and a small craniotomy was done in the right frontal region, but when it was seen that the abscess was situated about 6.5 cm from the cortical surface and close to the ventricle, excision was abandoned and the abscess was aspirated under direct vision (Fig. 1). Primary excision was performed in Cases 3 and 4 with good results (Fig. 2). Both patients were in relatively good preoperative condition. The recovery of both was uneventful.

The next four cases (Cases 5–8) were treated by what is here called “early secondary excision.” All presented with gross neurological deficit on admission. The first procedure was an aspiration of the main loculus via a burr hole, with penicillin solution used for irrigation of the abscess cavity; then, within the next 3 to 4 days, a complete excision was performed in these four cases (Figs. 3 and 4).

The patient in Case 9, a 3-year-old boy in poor general condition, was initially treated by repeated aspiration and later by excision of the abscess (Fig. 5). He was discharged in satisfactory condition. In Case 10 there was a bilateral posterior fossa abscess, uniloculated on the right side and with subsequent development of a left multiloculated abscess. The right-sided abscess was treated by aspiration, and the left totally excised, after which a dilated fourth ventricle required a subsequent shunting procedure (Fig. 6). The patient survived but remained incapacitated.

Discussion

The great value of CT scanning is the early and precise diagnosis of brain abscesses, and the accurate postoperative evaluation of the patient. With this diagnostic method, further investigation by ventriculography or angiography is not required. Before the era of the CT scan the incidence of loculus formation was not easy to assess. In multiple abscesses with noncommunicating loculi, only one might be detected and aspirated, despite pyographic investigation. It is easy to

Fig. 3. Case 7. Computerized tomography scans of a patient with a right frontoparietotemporal multiloculated brain abscess. Left: Before operation. Right: After early secondary excision.

Fig. 4. Case 8. Computerized tomography scans of a patient with a left subdural abscess with six loculations. Left: Before operation. Right: After early secondary excision.

Fig. 5. Case 9. Computerized tomography scans of a patient with a right temporoparietal bilocular brain abscess. Left: Before operation. Right: After repeated aspirations and secondary excision.
assess the capsule formation of the abscess, its location, and loculation with the aid of CT scan, after intravenous enhancement with contrast material. A decision can then be made as to the choice of aspiration or excision.

In this series of 10 consecutive multiloculated brain abscesses we have used the two main methods of treating the brain abscess: aspiration alone and excision (primary and early secondary) according to our judgment of the preoperative condition of the patient. The CT scan is invaluable for the detection of multiloculation of a brain abscess.

References

Multiloculated brain abscesses


Address reprint requests to: Stephan Stephanov, M.D., Department of Neurological Surgery, Wentworth Hospital, Durban, South Africa.