TEMPORAL ARACHNOID CYST

TAKASHI HAYASHI, TORU SHIROUZU, JUN MIYAGI, KOHICHI KAWAI, SHIGETAKA ANEGAWA AND SHINKEN KURAMOTO

Department of Neurosurgery, Kurume University School of Medicine, Kurume, 830, Japan

Received for publication October 28, 1978

INTRODUCTION

Intracranial arachnoid cyst may occur in every site where the arachnoid exists, and it can be seen in the middle fossa, interhemisphere, parasellar, paracollicular, cerebellopotine angle and retro-cerebellar regions. Among them, there is a high incidence of arachnoid cyst in the middle fossa, and is diversely characterized by its clinical symptoms and radiological findings.

This paper describes the clinical analysis and radiological findings of 6 cases of "idiopathic" arachnoid cysts in the middle fossa which the authors have experienced during the past 4 years.

ANALYSIS OF THE CASES

During the past 4 years, 1975 to 1978, 6 cases of "idiopathic" arachnoid cyst in the middle fossa were encountered. Two cases were associated with diffuse arachnoid cysts extending to the suprasellar, right middle fossa, clivus and further peripontine region (Cases 5, 6) (Fig. 1-a, b). One case was complicated with subdural hematoma, (Case 1). Further, two cases were incidentally found on the occasion of consultation due to head injury (Table 1).

1. Age, sex and site:

All cases were observed in patients younger than 15 years of age, their ages ranging from 3 months to 15 years, and four cases were males and three cases were in the left side.

2. Clinical symptoms and signs:

Two cases showed symptoms of increased intracranial pressure manifested by headache and double vision. Seizure in one case and dwarfism in another case were observed, and both cases were associated with diffuse arachnoid cyst extending to the suprasellar, middle fossa, clivus and posterior fossa. Besides, 2 cases showed no symptoms, and all cases showed no localizing signs such as motor paralysis and disturbance of speech.

3. Neuroradiologic studies:

1) Plain radiography of skull: In all cases, a thinning and bulging of the temporal squama coinciding with the cyst and an elevation of the lesser wing of the sphenoid (Fig. 2-a).

2) Cerebral angiography: Avacular clear space was seen in the temporal...
TABLE 1  
* Summary of 6 Cases of Arachnoid Cysts in the Middle Fossa

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Age</th>
<th>Sex</th>
<th>Side</th>
<th>Clinical* Symptoms</th>
<th>Radiographic Findings</th>
<th>Clinical Diagnosis</th>
<th>Associated Abnormalities</th>
<th>Treatment**</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15 y</td>
<td>M</td>
<td>L</td>
<td>HA, DV</td>
<td>Typical</td>
<td>L. subdural hematoma</td>
<td>Chr. subdural hematoma</td>
<td>Direct attack</td>
<td>Improved</td>
</tr>
<tr>
<td>2</td>
<td>13 y</td>
<td>M</td>
<td>L</td>
<td>HA</td>
<td>Typical</td>
<td>Arachnoid cyst</td>
<td>None</td>
<td>Direct attack</td>
<td>Improved</td>
</tr>
<tr>
<td>3</td>
<td>2 y</td>
<td>F</td>
<td>L</td>
<td>AS</td>
<td>Typical</td>
<td>Arachnoid cyst</td>
<td>None</td>
<td>None</td>
<td>Unchanged</td>
</tr>
<tr>
<td>4</td>
<td>7 y</td>
<td>M</td>
<td>R</td>
<td>AS</td>
<td>Typical</td>
<td>Arachnoid cyst</td>
<td>None</td>
<td>None</td>
<td>Unchanged</td>
</tr>
<tr>
<td>5</td>
<td>3 mo</td>
<td>F</td>
<td>R</td>
<td>S Z</td>
<td>Typical</td>
<td>Brain tumor</td>
<td>Diffuse arachnoid cyst</td>
<td>Direct attack</td>
<td>Improved</td>
</tr>
<tr>
<td>6</td>
<td>13 y</td>
<td>M</td>
<td>R</td>
<td>DW</td>
<td>Typical</td>
<td>Brain tumor</td>
<td>Diffuse arachnoid cyst</td>
<td>Direct attack</td>
<td>Improved</td>
</tr>
</tbody>
</table>

* HA: headache, DV: double vision, AS: asymptomatic, SZ: seizure, DW: dwarfism
** Direct attak: Resection of the cyst and fenestration of adjacent subarachnoid space by fronto-temporal craniotomy

Fig. 1-a

Fig. 1-b
area and the middle cerebral artery ran almost vertically from the horizontal portion to the squamous portion (Fig. 2-a). On the lateral view, no formation of the insular portion or opercular portion was observed in any case excepting diffuse arachnoid cysts in two cases (cases 5, 6) (Fig. 2-b). Besides, cases 3 and 4 were not performed cerebral angiography because of coinciding discovering by CT scan. On the venous phase, the middle cerebral vein was missed, Labbé vein was deviated posteriorly and superiorly, and Rosenthal vein was elevated (Fig. 2-c).

3) Scinticisternography: Scinticisternography using $^{111}$In-DTPA was performed in one case (case 2) prior to operation. RI filled the cyst after 6 hours and remained until 48 hours. Further, convexity filling relatively poor on the cyst side (Fig. 3).

4) Conventional CT scan: A low density area which was not enhanced by an intravenous injection of contrast agent was observed in the temporal, and its CT number was equal to that of the cerebrospinal fluid (Fig. 4 left).
4. Treatment and clinical course:

Surgical treatment were given to 4 cases excepting the two cases incidentally found. In four cases, the cysts were resected by fronto-temporal craniotomy and were fenestrated between the cyst cavity and its adjacent subarachnoid space. Post-operative course was favorable in all cases.

DISCUSSION

Arachnoid cyst in the middle fossa is associated with some agenetic state of the temporal lobe and its adjacent brain tissue. There are two theories on the pathogenesis of this disease. One theory is that a localized defect of the temporal lobe is produced due to congenital anomaly in opercularization, and abnormal dilatation of the arachnoid space coinciding with the defective part occurs, which forms a cyst after its loculation (subarachnoid cyst: Robinson, 1971). The other theory is that an intraarachnoid cyst is formed due to anomaly in systemic genetic process of the subarachnoid space, and because of the disturbance of opercularization, a localized arrest of the development of the temporal lobe is caused (Starkman et al., 1958; Regachary et al., 1978).

The authors have experienced a case in which the cyst cavity markedly diminished on post-operative CT scan, but this findings is very interesting because of the fact that it suggests that the brain cosidered to be a congenital agenesis or in an arresting state of development can expand (Fig. 4).

The most frequent clinical complaint is headache (Aicardi and Bauman, 1975; Robinson, 1671; Hayashi et al., 1977). The cyst rarely shows localizing signs, and clinical symptoms and signs may not appear clearly unless there is intracystic hemorrhage, subdural hematoma or loculation (Robinson, 1971). As in our case, case 1, if there are typical symptoms of increased intracranial pressure such as severe headache and double vision, a complication with subdural hematoma should be considered. And sometimes, the cyst accompanies diffuse arachnoid cyst extending to the whole skull fossae (cases 5, 6). Besides, in juveniles, it is not rare that the cyst is found as a result of consultation motivated by an symmetrically enlarged head.

Neuroradiologically characteristic findings such as an asymmetry of the skull, thinning and outward bulging of the temporal bone, elevation of the lesser wing of the sphenoid and forward projection of the greater wing of the sphenoid are observed by plain skull radiography. These findings will show a direct mass effect due to the cyst. On cerebral angiography, slight shift of the anterior cerebral artery towards the other side and a marked upward displacement of the middle cerebral artery are observed; and the insular portion and the opercular portion of the middle cerebral artery are absent. On venous phase, there is defect of the middle cerebral vein and backward deviation of the Labbé vein with it running almost vertically. Thus, it is supposed that these findings are due to the fact that feeders and drainers are not needed because the insular and the operculum are absent. On scinticternography, in case 2, an early filling and delayed clearance in the cyst were observed (Fig. 3). Aicardi and Bauman (1975) reported one case in which no accumulation of RI in the cyst was observed; Seur and Kooman did one case which showed slow filling in the cyst and delayed clearance from it. Namely, some of the cyst are communicable and other are non-communicable between cyst and its adjacent subarachnoid space.

In the cases with the symptoms and
signs of increased intracranial hypertension, surgical treatment would be absolutely indicated. Resection of the cyst and establishing communication between the cyst cavity and adjacent subarachnoid space may be the best procedure of treatment. For the incidentally found arachnoid cyst with no symptoms, there are those who favor surgery and those who do not favor surgery. Some authors feel that the cyst should be positively resected, because skull changes such as thinning and outward bulging of the temporal bone, could be caused by the mass effect of the cyst. Others feel that, surgery should not be performed on patients with no symptoms. In any event, the findings obtained may suggest the applicability of the surgical treatment, but do not provide any definitive basis. Therefore, the decision to operate or not should be based on clinical symptoms.

REFERENCES


