Cystic meningioma in a 10-month-old infant

Case report

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The authors report a case of cystic meningioma in a 10-month-old boy diagnosed by metrizamide ventriculography and computerized tomography. Intracranial meningioma in infants under 1 year old is extremely rare. This case is only the 16th case reported in the world literature; the other 15 cases are reviewed.

KEY WORDS • meningioma in infancy • cystic meningioma • congenital tumor

INTRACRANIAL meningioma in infants under the age of 1 year old is extremely rare. Matson* reported only three cases of meningioma among 750 cases in his series of intracranial tumors in children. His three cases were in children aged 3, 7, and 13 years. Only 15 cases of meningioma in patients younger than 1 year old have previously been reported in the world literature.

Case Report

This 10-month-old baby boy was admitted to our Department of Neurosurgery on November 2, 1978, for evaluation of intermittent vomiting and weakness of his right arm. The child was delivered prematurely by cesarean section at 37 weeks. The body weight at birth was 2410 gm. His physical and mental development after birth was normal; he could raise his head at 4 months, and turn over at 6 months. His parents began to notice weakness of his right arm at 8 months old. At 9 months of age, he developed intermittent vomiting with progressive failure to thrive. There was no history of convulsive seizure.

Examination On admission, he was obtunded and unable to follow objects with his eyes. Head circumference was 49.5 cm. The anterior fontanel was 5 × 5 cm in size and very tense. Mild right hemiparesis was noted, more evident in the upper extremity than in the lower extremity. Abdominal skin reflex and cremaster reflex were absent on the right. Chest films, electrocardiogram, complete blood count, blood chemistry, blood-gas analysis, and urinalysis were within normal limits. Plain skull films revealed separation of the coronal suture.

The anteroposterior view of the left carotid angiogram showed deviation of the pericallosal artery to the right and inward deviation of the ascending branches of the middle cerebral artery (Fig. 1 left). Medial deviation of the medial branch of the left posterior cerebral artery was also noticed. There was an avascular area in the left midconvexity surface. The left middle meningeal artery was in its normal position. The lateral view of the left carotid angiogram revealed downward deviation of the superior Sylvian line (Fig. 1 right). The ascending branches of the left middle cerebral artery were stretched and separated; however, there was no abnormal vascularity indicative of meningioma in the left internal or external carotid system.

Non-contrast computerized tomography (CT) showed marked enlargement of the left lateral ventricle, particularly of the frontal horn and body of the ventricle. There was a round mass of low density outside the left lateral ventricle, suggesting the presence of a cyst (Fig. 2 left). A contrast-enhanced CT scan demonstrated an area of positive enhancement in the left parietotemporal region, indicating a solid tumor.
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FIG. 1. Left carotid angiogram. Left: Anteroposterior view showing 1) deviation of the pericallosal artery to the right; 2) inward deviation of the ascending branches of the middle cerebral artery (arrowheads); 3) avascular area at the left midconvexity surface; 4) medial deviation of the medial branch of the left posterior cerebral artery; and 5) the left middle meningeal artery in its normal position. Right: Lateral view showing 1) downward deviation of the superior Sylvian line; 2) stretching and separation of the ascending branches of the middle cerebral artery; and 3) no abnormal vascularity indicative of meningioma in the internal or external carotid system.

(Fig. 2 right). This tumor was located lateral to the cyst. Metrizamide ventriculography demonstrated a cystic mass protruding into the left lateral ventricle (Fig. 3). A CT scan performed immediately after administration of metrizamide into the left lateral ventricle showed a filling defect of the left lateral ventricle. Electroencephalography revealed a localized spike discharge in the left centroparietal leads, although the patient had no history of epileptic attacks. On the day of admission, a ventriculoperitoneal shunt was placed as an emergency procedure in an attempt to reduce the increasing intracranial pressure.

Operation. A left temporoparietal craniotomy was performed on November 29, 1978. When the dura was opened, a solid mass, 6 × 5 × 1 cm in size, was seen attached to the dura. This tumor was well demarcated from the surrounding cortex in the left temporoparietal region (Fig. 4), and was totally removed. A cyst was found lying underneath the solid tumor and medial to it, separated from the left lateral ventricle by ependymal tissue. It was evacuated of 40 ml of greenish-yellow fluid.

Postoperative Course. The patient was discharged 3 weeks after the craniotomy. Postoperative follow-up review at 2 months showed almost complete recovery of his right hemiparesis.

Pathological Examination. Analysis of the cyst fluid revealed specific gravity 1.021 and pH 7.2; cells 4/3; Nonne-Apelt test +++; Pandy's test +++; tryptophan +; total protein 2 gm/dl; albumin/globulin ratio 3.5 (albumin 78.2%, alpha-1 2.3%; alpha-2 3.4%, beta 8.9%, gamma 7.2%); alpha lipoprotein 92%; beta lipoprotein 8%; sugar 34 mg/dl; urea N 7.5 mg/dl;
Meningiomas in infancy

![Image of meningioma](image1)

**FIG. 3.** Left lateral ventriculograms with metrizamide, anteroposterior view, demonstrating a cystic mass with a smooth surface protruding into the ventricle (straight arrow). There is medial downward deviation of the trigonum as well as the occipital horn of the left lateral ventricle (curved arrow).

lactic dehydrogenase 354 units; Na 142 mEq/liter; Cl 122 mEq/liter; total cholesterol 21 mg/dl; triglyceride 12 mg/dl; immunoglobulin (Ig) G 240 mg/dl; IgA trace; and IgM trace.

The excised tumor weighed 20 gm. Histological examination revealed fibroblastic meningioma with some myxomatous change (Fig. 5).

![Image of meningioma](image2)

**FIG. 4.** Operative view showing the tumor, well demarcated from the surrounding cortex, in the left temporoparietal region. A cyst was found underneath the solid tumor.

![Image of meningioma](image3)

**FIG. 5.** Photomicrograph of the tumor illustrating fibroblastic meningioma with some myxomatous change. H & E, × 100.

**Discussion**

Meningioma in infants under 1 year old is extremely rare. Only 15 such cases have been reported previously in the world literature\(^8\)\(^{10}\)\(^-\)\(^{17}\) (Table 1). These 16 cases of intracranial meningioma in infancy show a characteristic predominance in males (11 of 16 cases), a high incidence of cyst formation (eight of 16 cases), and predominance of a fibroblastic type on histological examination (11 of 16 cases).

The etiology of cyst formation in these cases of congenital meningioma remains unknown. The cyst fluid in the present case had a high protein content, which indicates that the cyst content was not the break-down product of hematoma as seen in the case reported by French.\(^6\)\(^7\) Histological examination of the cyst wall as well as the solid part of the tumor in the present case did not show any evidence of hemorrhage within the tumor, such as hemosiderin deposit. A cyst may be formed as a result of hemorrhage within the tumor that may occur during delivery of a child with a congenital tumor. One could also speculate that these congenital meningiomas might have the potential of producing fluid to form a cyst. The histological predominance of a fibroblastic type and the predominance in males of these congenital meningiomas is interesting. The unilateral ventricular dilatation on the side of the tumor in the present case could be explained by the mass effect causing intermittent obstruction of the foramen of Monro, or by unilateral dysgenesis of the cerebral hemisphere as a direct result.
### TABLE 1

**Summary of 16 meningiomas in infants younger than 1 year old**

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Authors, Year</th>
<th>Age, Sex</th>
<th>Location</th>
<th>Size (cm)</th>
<th>Cyst Formation</th>
<th>Histology</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cuneo &amp; Rand, 1952</td>
<td>3 mos, F</td>
<td>parieto-occipital, convexity</td>
<td>8 x 7.5 x 5</td>
<td>no</td>
<td>angioblastic</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>French, 1959</td>
<td>6 mos, M</td>
<td>parietal, convexity</td>
<td>3 x 3 x 5</td>
<td>yes</td>
<td>sarcomatous</td>
<td>cyst filled with hematoma</td>
</tr>
<tr>
<td>3</td>
<td>Florin &amp; Reid, 1961</td>
<td>birth, M</td>
<td>temporal, convexity</td>
<td>3 x 3 x 5</td>
<td>yes</td>
<td>angioblastic</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Taptas, 1961</td>
<td>4 mos, M</td>
<td>temporoparietal, convexity</td>
<td>5 x 3 x 1.5 x 20</td>
<td>yes</td>
<td>fibroblastic</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Vigouroux, et al., 1964</td>
<td>7 mos, F</td>
<td>temporoparietal, convexity</td>
<td>size of a cherry</td>
<td>yes</td>
<td>meningioma</td>
<td>benign</td>
</tr>
<tr>
<td>6</td>
<td>Solitare &amp; Krigman, 1964</td>
<td>32-wk fetus, M</td>
<td>skull base</td>
<td>3.5 x 2 x 4</td>
<td>no</td>
<td>hemangiopericytoma &amp; fibroma</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Mendiratta, et al., 1967</td>
<td>6 mos, M</td>
<td>temporal, convexity</td>
<td>size of a golf ball</td>
<td>yes</td>
<td>meningothelial &amp; fibroblastic</td>
<td>subdural effusion</td>
</tr>
<tr>
<td>8</td>
<td>Fessard, 1968</td>
<td>8 mos, M</td>
<td>temporoparietal convexity</td>
<td>5 x 5 x 7</td>
<td>yes</td>
<td>fibroblastic</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Koos &amp; Miller, 1971</td>
<td>11 mos, M</td>
<td>frontal, intracerebral</td>
<td>5 x 4 x 3</td>
<td>yes</td>
<td>fibroblastic</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Sošnik &amp; Wrzeszcyński, 1972</td>
<td>3 days, F</td>
<td>frontal, midline, skull base</td>
<td>size of an orange</td>
<td>no</td>
<td>fibroblastic</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Suematsu, et al., 1974</td>
<td>5 mos, M</td>
<td>temporoparietal, convexity</td>
<td>5 x 5 x 7</td>
<td>yes, 60 ml</td>
<td>fibroblastic</td>
<td></td>
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<tr>
<td>12</td>
<td>Aihara, et al., 1975</td>
<td>4 mos, F</td>
<td>falx</td>
<td>25 x 15 x 10</td>
<td>yes</td>
<td>fibroblastic</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Satyanarayana, et al., 1975</td>
<td>6 mos, M</td>
<td>frontoparietal, intracerebral</td>
<td>3 x 2 x 1.5</td>
<td>yes</td>
<td>fibroblastic</td>
<td>subdural effusion</td>
</tr>
<tr>
<td>14</td>
<td>Bueno, et al., 1977</td>
<td>8 mos, M</td>
<td>tentorial</td>
<td>6 x 4 x 3</td>
<td>yes</td>
<td>fibroblastic</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Numaguchi, et al., 1978</td>
<td>6 mos, M</td>
<td>frontotemporal, convexity</td>
<td>5 x 7</td>
<td>yes</td>
<td>fibroblastic</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Amano, et al., 1980</td>
<td>10 mos, M</td>
<td>temporoparietal, convexity</td>
<td>6 x 5 x 1.5</td>
<td>yes, 40 ml</td>
<td>fibroblastic with myxomatous change</td>
<td></td>
</tr>
</tbody>
</table>

of the mechanical compression of the cerebral tissue, or as an indirect result of insufficient blood supply to the developing brain secondary to the presence of a large congenital intracranial mass lesion.

**Acknowledgment**

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