Computerized tomography in hydatid cyst of the brain

KAZEM ABBASSIOUN, M.D., HAMID RAHMAT, M.D.,
NOSRAT O. AMELI, CH.M., F.R.C.S., AND MANSOUR TAFAZOLI, M.D.

Departments of Neurological Surgery and Radiology, Dariush Kabir Medical School, Tehran University, Tehran, Iran

From among 1500 patients who underwent computerized tomography (CT) during an 18-month period, five cases of hydatid disease of the brain were diagnosed. The preoperative diagnosis is of paramount importance as the cyst has to be removed unruptured. The CT features of this condition are practically pathognomonic. The authors discuss the CT findings in these cases and differential diagnosis with other cystic lesions of the brain. The help that this safe and sure method of investigation gives to attain preoperative diagnosis is emphasized.

KEY WORDS • Echinococcus • cerebral cyst • cerebellar cyst • hydatid cyst • computerized tomography scan

About 2% of cases of hydatid disease involve the central nervous system (CNS). This localization can be associated with involvement of other organs, such as liver and lung, or may be an isolated infestation of the brain or spinal column. Preoperative diagnosis of this intracranial lesion is crucial, since intentional puncture of the cyst, or its inadvertent rupture at the time of surgery causing dissemination of scolices, turns a relatively benign condition into a malignant process. It is also of great importance for the proper planning of the operation to know the exact size and location of the cyst.

The Casoni skin test and other serological tests that are frequently positive with the involvement of other organs of the body are usually negative and of no help in diagnosis of the isolated infestation of the CNS. In intracranial hydatid cysts, skull radiographs may show signs of raised intracranial pressure, asymmetrical growth of the involved hemicranium, or thinning of overlying bone, none of which are pathognomonic changes. Radioisotope scanning is of limited value. Angiography indicates an avascular mass with circular arrangement of vessels surrounding the lesion which are nonspecific. Air and other contrast ventricular studies are usually not advisable, and if performed do not reveal any pathognomonic changes.

We have found computerized tomography (CT) to be of great assistance in preoperative diagnosis and determination of the size and location of hydatid cysts of the brain. The purpose of this communication is to present our experience with five such cases.

Summary of Cases

Clinical Material

Among the first 1500 consecutive CT scans performed at Dariush Kabir Hospital, we have come across five cases where a diagnosis of hydatid cyst of the brain was made. Of these, three were supratentorial and two in-
TABLE 1
Summary of the course in five patients with hydatid cyst of the brain*

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Age (yrs), Sex</th>
<th>Clinical Findings</th>
<th>Paraclinical Findings</th>
<th>CT Findings</th>
<th>Operative Findings</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7, F</td>
<td>raised ICP, lt hemiparesis, hydatidosis of lung, heart, &amp; liver</td>
<td>mild separation of sutures; Casoni skin test positive</td>
<td>large cystic mass in rt hemisphere &amp; hydrocephalus; no rim enhancement</td>
<td>huge cyst covered by thin cortex, plus a small cyst, removed unruptured</td>
<td>recovery</td>
</tr>
<tr>
<td>2</td>
<td>40, F</td>
<td>headache, lt hemiparesis for 7 mos</td>
<td>skull &amp; chest films normal; angiogram; avascular rt frontoparietal area</td>
<td>cystic mass in rt frontoparietal region; no rim enhancement</td>
<td>6.5-cm diameter cyst; thinnest area of covering cortex in the midline; removed unruptured</td>
<td>complete recovery</td>
</tr>
<tr>
<td>3</td>
<td>7, M</td>
<td>raised ICP, failing vision, bilateral 6th nerve palsy, nystagmus, &amp; ataxia</td>
<td>mild separation of sutures; radioisotope scan negative</td>
<td>large cystic mass in lt cerebellar hemisphere; no rim enhancement</td>
<td>7-cm diameter cyst, complete recovery thin cortex covering the cyst; removed unruptured</td>
<td>recovery</td>
</tr>
<tr>
<td>4</td>
<td>7, M</td>
<td>grand mal epilepsy 3 yrs; raised ICP 2 yrs; lt hemiparesis 1 yr; head circumference: 56 cm; lt corporal hemiatrophy; bilateral secondary optic atrophy; lt homonymous hemianopsia</td>
<td>opening sutures; erosion posterior clinoids; thinning of rt frontoparietal calvaria</td>
<td>huge cyst occupying major part of rt hemisphere with fine rim enhancement; large lt ventricle</td>
<td>meningeal adhesion &amp; foreign-body reaction around cyst, 12-cm diameter cyst, removed unruptured; 500 cc in volume</td>
<td>recovery</td>
</tr>
<tr>
<td>5</td>
<td>18, M</td>
<td>raised ICP; lt cerebellar signs; post fossa exploration before CT: no extracerebellar mass found; aspiration of cerebellum not done due to possible hydatid cyst</td>
<td>skull films normal; ventriculogram; hydrocephalus</td>
<td>fairly large cyst in lt superior cerebellar region; no rim enhancement</td>
<td>condition much improved following post fossa decompression, 2nd operation not yet agreed to</td>
<td>—</td>
</tr>
</tbody>
</table>

*ICP = intracranial pressure; CT = computerized tomography.

The usual CT finding is that of a huge intraparenchymal cystic lesion that is spherical, with a clearly defined border, containing fluid with an absorption value similar to, or slightly more than that of cerebrospinal fluid (Fig. 2). There is usually a significant shift of the ventricular system to the opposite side and hydrocephalus due to partial obstruction of cerebrospinal fluid pathway. There is generally no rim enhancement; however, in Case 4, where at operation significant meningeal adhesion was present and biopsy of the surrounding brain tissue disclosed severe inflammatory changes compatible with foreign-body reaction, a fine rim enhancement was seen. Our experience in Iran shows that this kind of reaction is comparatively rare.

In three cases of supratentorial cysts, CT scans performed within 1 month following the operation revealed a substantial subdural...
ular enlargement similar to changes noted in postsurgical porencephalies and postinfarction scans.

Discussion

We have found CT of great assistance in the preoperative diagnosis of hydatid cyst of the brain. Changes noted on CT are highly characteristic and almost pathognomonic. The scans show a cystic lesion, spherical in shape, with sharply defined border and absorption value similar to that of cerebrospinal fluid. There is usually no perifocal edema. These lesions usually cause significant ventricular distortion and shift of the midline structures to the opposite side.

These cysts can be differentiated from brain abscesses by their lack of significant rim enhancement and perifocal edema, and from cystic tumors by the absence of a solid portion and perifocal edema. Arachnoidal cysts are not completely spherical in shape and the presence of one or more straight borders is of great importance in the differential diagnosis.

As hydatidosis is more commonly seen in children than adults and air studies are not advisable, angiography remains the most important diagnostic tool apart from CT; however, this procedure is time-consuming.
CT scan in hydatid cyst

and not absolutely free of risk. Therefore, we believe that CT is the most reliable and safe method of investigation for diagnosis of hydatid cysts of the brain. It would be interesting to submit patients with known hydatidosis without signs of CNS involvement to regular CT examination of the brain in the hope of preclinical diagnosis of such lesions.

References


Address reprint requests to: K. Abbassioun, M.D., Dariush Kabir Medical School, Tehran University, Tehran, Iran.