The use of computerized tomography in the diagnosis of cerebral hydatid cysts

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Eleven cases of cerebral hydatid cyst, diagnosed by computerized tomography (CT), are presented. The importance of CT in minimizing the possibility of accidentally tapping or tearing the cyst membrane is stressed. Repeat CT scanning after removal of the cyst revealed atrophy in the affected hemisphere.

Key Words - cerebral hydatid cyst • Echinococcus • atrophy • computerized tomography

For many years it has been emphasized that tapping an intracerebral hydatid cyst or tearing the membrane of a cyst during an operation is extremely detrimental. Neurosurgeons, especially in countries where the incidence of hydatidosis is relatively high, are constantly aware of this complication when dealing with intracranial and intraspinal mass lesions. Unfortunately, before computerized tomography (CT) became available, the diagnosis often remained in doubt even after skull films and angiography were done. Although sometimes clinical information and skull x-ray studies do suggest the possibility of intracranial hydatid cyst, it is not always possible to arrive at the correct diagnosis, even with the help of angiography.

Eleven cases of hydatid cyst were diagnosed in 1977 by CT scanning. It is believed that this is the first report dealing with the diagnosis of cranial hydatid cyst using this technique.

Summary of Cases

Five of the 11 patients in this series were 6 years old; the ages ranged from 5 to 23 years. This distribution, with a high predominance in the younger ages, is in agreement with previously reported studies. No significant difference between the sexes was found.

All the patients except one were admitted with symptoms of increased intracranial pressure (ICP); the duration of symptoms was between 2 and 6 months. One patient was admitted with left-sided exophthalmos. All but two patients were conscious. On neurological examination, deficits varied from mild to moderate. Severe papilledema was a constant finding; skull films consistently demonstrated evidence of chronically elevated ICP. The calvaria was markedly enlarged on the side of the cyst in eight patients. No pathological calcifications were found.

Angiography was performed in only two of these cases. In our first patient angiography was carried out after CT in order to compare the two studies (Fig. 1). In another case, angiography revealed a cystic lesion in the posterior parietal area, and CT was done to further delineate the nature of the lesion (Fig. 2). In one patient who had an extradurally located hydatid cyst, the dura forming the inner boundary of the cyst was especially well seen on varying window levels on the monitor of the diagnostic console (Fig. 3). In all cases there was a huge cystic lesion with a Hounsfield unit value similar to that of water or cerebrospinal fluid (CSF). Capsule formation or particles inside the cyst could not be demonstrated even with enhancement, which was achieved by administering iodothalamate solutions intravenously. Ventricular displacement and the obstruction of the adjacent horn was obvious (Fig. 4). In the patient with left-sided exophthalmos, CT revealed a cystic lesion with a Hounsfield unit value similar to that of water or CSF, in the left orbit situated posterior and medial to the ocular bulb (Fig. 5).

After the CT diagnosis, surgical intervention was performed by turning a large bone flap. The arachnoid was opened and the cortical incision was made over the most superficial part of the cyst, as determined by the CT scan. The cyst was removed in toto by hydro-
static expulsion, that is, by forcing saline solution around and beneath the cyst. Postoperative CT scans were obtained 2, 6, and 24 weeks postoperatively, in order to monitor the expansion of the brain (Fig. 6). In the patient with intraorbital hydatid cyst, a left frontotemporal craniotomy was performed and the orbital roof was rongeured in order to allow extrusion of the cyst.

In only one case in this series was there evidence of hydatidosis elsewhere in the body. In that patient, multiple intracranial cysts were associated with three other cysts in the lungs.

All patients survived the surgical intervention with slow resolution of their neurological deficits. In spite of the return to normal motor function, the CT demonstrated a residual brain atrophy (Fig. 6).

Fig. 1. Left: Angiography reveals an avascular mass in the temporoparietal area. Right: Computerized tomography of the same case showing the localization and nature of the spherical mass, which has the same density as cerebrospinal fluid.

Fig. 2. Left: Angiography reveals a cystic lesion in the posterior parietal area. Right: Computerized tomography clearly demonstrates the localization and the nature of the cystic lesion.
CT scanning in hydatid cyst

These 11 patients with intracranial hydatid cyst make up 2.3% of the 480 cases of intracranial mass lesions operated on in 1 year in our department. In the past 10 years, 95 cerebral hydatid cysts have been treated, from a total of 3300 intracranial mass lesions — an incidence of 2.9%.

Although the duration of symptoms is between 2 and 6 months, we share the general belief that no generalization can be made on this point, because the duration will depend greatly on the awareness of the parents, the availability of informed doctors, and the rate of onset of symptoms. In areas where hydatid infection is common, it can be said that a patient with a chronic history of severely increased ICP and relatively little neurological deficit must be considered suspect of harboring a cerebral hydatid cyst.

Several papers point out the abnormal findings on plain skull films in these cases. Some of these findings have been accepted as diagnostic by some authors. We believe that the degree of unilateral skull enlargement is dependent upon the depth of the cyst within the hemisphere. Other slow-growing lesions, such as subarachnoid cyst, may have the same appearance. It has been emphasized in the literature that angiographic findings provide the most informative means of diagnosis of intracerebral hydatid cyst. However, we have only been able to find correct preoperative diagnosis by angiography in 35% to 60% of reported cases. It should also be mentioned that some of these cases were diagnosed by cystography, when the cyst was accidentally tapped during ventriculography and the fertile daughter cysts and scolices were spilled into the brain substance and into the subarachnoid space.

By CT scanning, not only can a diagnosis be obtained with a high degree of accuracy, but also the most superficial part of the cyst can be identified for a cortical incision, thus minimizing the risk of rupturing the cyst at operation, and spilling its contents. Previously when the cyst membrane was torn, the area of spillage was irrigated with hypertonic saline solu-
FIG. 6. Computerized tomography (CT) in a 6-year-old boy. Left: Preoperative CT scan showing a huge hydatid cyst. Center: Follow-up CT scan, 2 weeks after expulsion of the cyst demonstrates a space, with the same density as cerebrospinal fluid (CSF), around the left hemisphere and also within the hemisphere where the cyst was previously located. Right: Scan 24 weeks postoperatively shows a ventricular shift to the affected side as the CSF around the hemisphere dissipates.

Compartment (3%). As yet, no recurrence has been seen in these patients, although scolices were prominent on pathological examination.

Computerized tomography scans, repeated 2, 6, and 24 weeks postoperatively, showed that the expansion of the brain substance was limited. The low-density area in the affected hemisphere, with the same Hounsfield unit value as that of CSF, resembles hydrocephalus ex vacuo; this area becomes indistinguishable within months, as the ventricles shift to the affected side (Fig. 6). A low-density space persists where the cyst was located, however, although much smaller than the cyst itself. This area, again, has the same radioabsorption value as CSF.

References

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