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High-Signal Intraventricular Cysticercosis on T1-Weighted MR Imaging

We recently encountered a case of intraventricular cysticercosis in which the cyst had an unusually high signal on T1-weighted MR imaging. Pathologic studies showed cyst degeneration. Since the surgical management of these patients partly depends on the physiologic state of the cyst [1, 2], the radiologist should recognize MR's ability to depict those life-cycle stages.

Case Report

A previously healthy 24-year-old woman was found disoriented but responsive to pain, without decorticate or rigid posturing. Evidence for Parinaud syndrome (gaze paresis, hydrocephalus, and poorly reactive and dilated pupils) was present. A CT scan performed at the time (Fig. 1A) showed marked hydrocephalus, with the fourth ventricle appearing normal. A small focus of calcium was present in the posterior third ventricle, and a 2-cm, low-density cyst was in the right perimedial frontal lobe.

An MR scan was obtained (Fig. 1B). The right frontal lobe cystic structure had an appearance typical of a cysticercosis lesion. However, in the posterior third ventricle, the ill-defined density seen on CT scanning appeared as a rounded structure with high signal both on T1- and T2-weighted images. The cystic structure was located in the pineal recess, compressing the tectum and causing apparent obstruction of the cerebral aqueduct.

A midline, supratentorial, transcallosal approach was used. When the tela choroidea of the third ventricular roof was opened, a 2-cm cysticercal cyst erupted into the surgical field and was removed intact. Examination of the ventricle showed no evidence of ependymitis. The appearance of the fluid component of the cyst was more turbid than usual and was typical of degenerating cysticerci. We thought that this was related to increased proteinaceous components, although a quantitative analysis was not performed.

Discussion

Approximately 17% of patients with neurocysticercosis have cysts within their ventricular system [1]. When these cysts are alive, they do not adhere to the ependyma and can migrate through the ventricular system causing mechanical obstruction at foramina narrowings. On degeneration or death of intraventricular larvae, focal ependymitis can occur, with larvae adhering to the ependyma, causing focal ependymitis and ventriculitis, making surgical excision more difficult and less indicated [2]. In this final stage, the fluid component of the cyst becomes turbid and gelled. Imaging with MR will show increased signal on T2-weighted images in the surrounding tissues due to the local edema and inflammation [3, 4]. However, signal changes within the larvae themselves representing the clouding of cyst fluid have not been described previously.

In our particular case, the lesion in the frontal lobe was characteristic for intraparenchymal cysticercosis (low signal on T1, and high

signal on T2, paralleling CSF), but the lesion in the posterior third ventricle presented high signal on T1-weighted images. Lesions known to have high signal on T1-weighted images in the posterior third ventricle include lipoma and lipomatous germ cell tumors, simple cysts with high protein contents, and hemorrhagic neoplasms [5].

No fat or blood was present within the cyst. However, the larvae harvested from the posterior third ventricle did show a more turbid and gelled cystic component than seen in normal live cysts, suggesting degeneration or death. The opacification of the cyst associated with degeneration probably relates to increased debris and proteinaceous material within it. Water hydrogen bonding with small molecular entities causes a decrease in the spin relaxation time, which is associated with increased signal on T1-weighted imaging [6]. This could explain the increased signal in our patient's cyst.

The ability to recognize live vs degenerating intraventricular neurocysticercosis with MR has important implications for management of such patients. Acute hydrocephalus associated with migrating live intraventricular cysts is potentially fatal. Since medical therapy with praziquantel is not effective in these situations, appropriate surgical intervention based on cyst viability is necessary. MR has already shown higher sensitivity and specificity than CT in detecting cysts [7]. Additional pathophysiologic information available through MR makes possible more timely and appropriate surgical planning.

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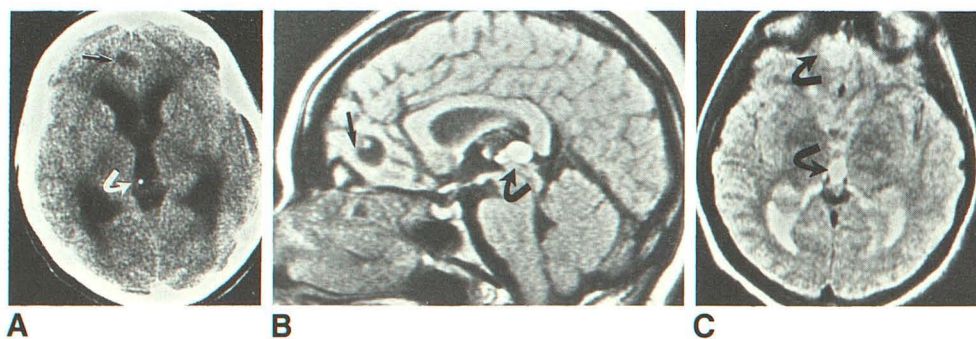


Fig. 1.—A, Noncontrast CT scan shows evidence of obstruction at cerebral aqueduct. A 2-cm low-density cyst is present on the right (straight arrow). A small focus of calcium can be seen in third ventricle (curved arrow).

B, T1-weighted (SE 500/30/1) sagittal MR image. A typical-appearing cysticercal cyst with low-signal fluid and mural scolex can be seen anteriorly (straight arrow). Rounded high-signal lesion in posterior third ventricle appears different (curved arrow).

C, T2-weighted (SE 2000/85/1) axial MR image. Both cysts show high signal (arrows).