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Intraventricular Hemorrhage Caused by Intraventricular Meningioma: CT Appearance

I. Lang, A. Jackson, and F. A. Strang

Summary: In a patient with intraventricular meningioma presenting with intraventricular hemorrhage, CT demonstrated a well-defined tumor mass in the trigone of the left lateral ventricle with extensive surrounding hematoma.

Index terms: Meninges, neoplasms; Brain, ventricles; Cerebral hemorrhage

Intraventricular meningioma is a rare tumor with approximately 170 previously reported cases (1–7). Despite this it is the most common intraventricular tumor in adults, in whom it is most often located in the trigone of the lateral ventricle (1, 2). Computed tomography (CT) features are similar to meningiomas elsewhere, and in most cases they appear as well-defined high-attenuation masses that show marked enhancement (1, 2). Presentation with subarachnoid hemorrhage is rare (9). We describe a case of intraventricular hemorrhage attributable to intraventricular meningioma and present the CT appearance.

Case Report

A 64-year-old man was admitted with sudden onset of severe occipital headache associated with loss of consciousness. There was a history of treated hypertension and angina. The patient also gave a history of a severe headache of sudden onset approximately 6 weeks previously. Physical examination demonstrated a dense right hemiparesis, a right homonymous hemianopia, and marked expressive nominative dysphasia. Fundoscopy revealed bilateral papilloedema.

A CT scan (Fig 1) showed a well-defined soft-tissue-attenuation lesion lying within the occipital horn of the left lateral ventricle. This mass was approximately $4 \times 5 \times 4$ cm in size and displaced the choroid plexus posteriorly. The mass showed a rim of high attenuation (120 HU),

which extended into the body of the lateral ventricle, through the foramen of Monro and into the third and fourth ventricles. On postcontrast CT (iohexol 340, 50 mL) the lesion showed homogeneous enhancement (Fig 2).

At surgery, the occipital pole of the left lateral ventricle was opened via a temporoparietal craniotomy. A “hard” avascular tumor surrounded by fresh clot was exposed. The tumor arose from a pedicle attached to the choroid plexus. It was removed without complication, and the associated hematoma was evacuated. Histologic examination confirmed the diagnosis of a fibroblastic meningioma. Postoperatively, there was a good recovery of the left hemiparesis, although there was some residual hemianopia and dysphasia.

Discussion

Meningiomas arising within the ventricular system are rare but well described, constituting approximately 0.5% to 2% of all intracranial meningiomas (4, 6) (Kaplan ES, *Parasagittal Meningiomas: A Clinico-pathological Study*, Rochester, Minn: University of Minnesota; 1964, thesis). In the Mayo Clinic series, Kaplan found only 7 intraventricular meningiomas in a series of 1454. Our survey reveals approximately 170 intraventricular meningiomas previously described in the literature (1–7). They most commonly arise in the trigone of the lateral ventricle as in the current case (1, 2, 5, 8). They are slightly more common on the left and show a female predominance of approximately 2:1. Although there is a wide age range, intraventricular meningiomas are most common over the age of 30 years, and the majority present in the third to the sixth decades (1, 4, 6). Meningiomas rarely may arise in the third ventricle, although this is more common in childhood (10, 11).

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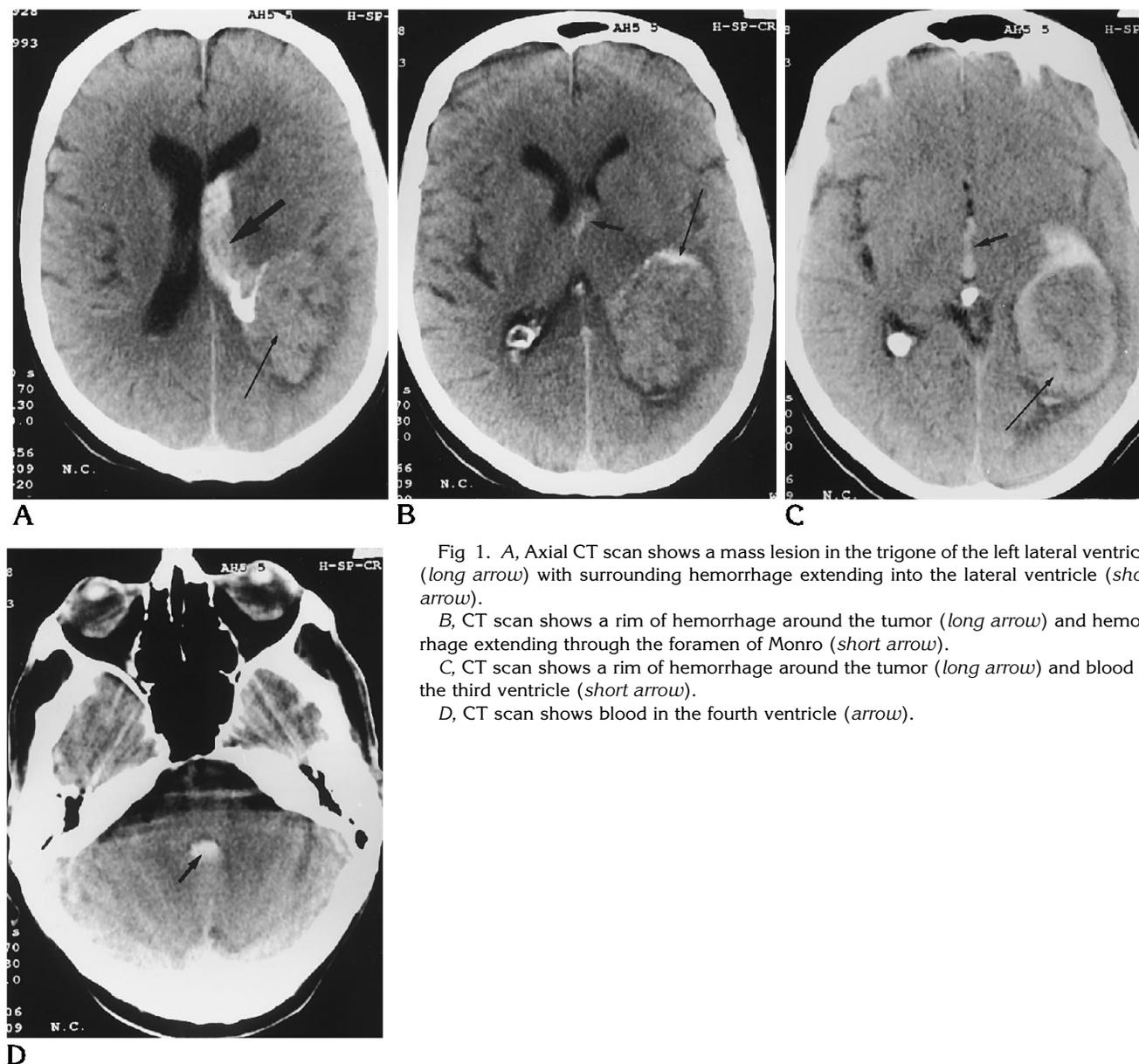


Fig 1. A, Axial CT scan shows a mass lesion in the trigone of the left lateral ventricle (*long arrow*) with surrounding hemorrhage extending into the lateral ventricle (*short arrow*).

B, CT scan shows a rim of hemorrhage around the tumor (*long arrow*) and hemorrhage extending through the foramen of Monro (*short arrow*).

C, CT scan shows a rim of hemorrhage around the tumor (*long arrow*) and blood in the third ventricle (*short arrow*).

D, CT scan shows blood in the fourth ventricle (*arrow*).

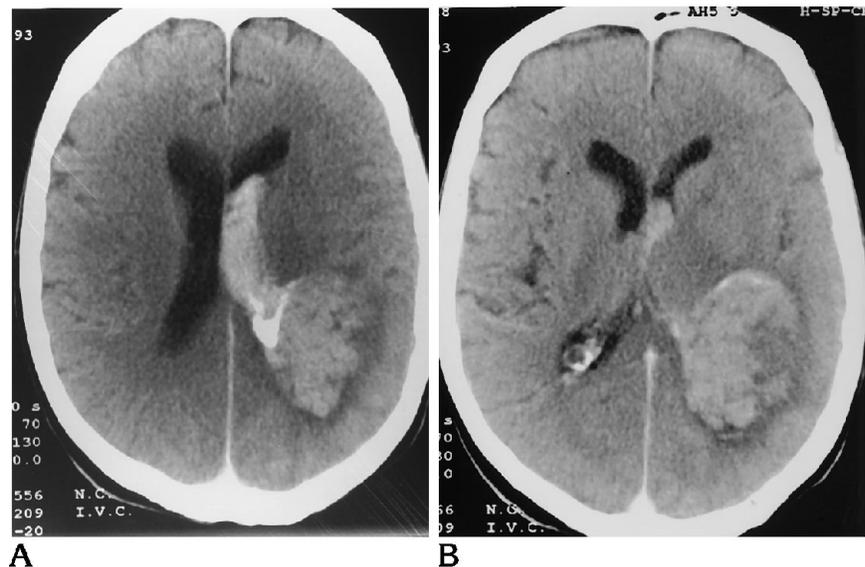
The origin of intraventricular meningiomas is uncertain, although they appear to arise either from the stroma of the choroid plexus or from rests of arachnoid tissue within the choroid (4). This explains their frequent occurrence in the trigone, and at postmortem, they can be seen to arise from the choroid plexus via a vascular pedicle.

The CT appearances are similar to those of meningiomas elsewhere (1, 2). In most cases, they appear as well-defined mass lesions that show marked enhancement after intravenous contrast. Calcification is seen in as many as 50%. On T1- and T2-weighted MR images, the

lesions are usually isointense to normal brain, although the signal intensity may be markedly reduced in the presence of calcification (12). Angiographic appearances have been well described (1, 6).

The clinical presentation is variable and usually occurs when the tumors are very large (1, 4). Symptoms related to obstruction of cerebrospinal fluid flow and pressure on the surrounding brain are the most common and include postural headache, nausea, vomiting, tinnitus, syncope, hemiparesis, and focal epilepsy. Presentation with subarachnoid hemorrhage has been described (9). The clinical presentation is

Fig 2. Postcontrast CT scans correspond to Figure 1A and B. Both images show significant enhancement within the tumor.



indistinguishable from aneurysmal subarachnoid hemorrhage. In the present case and in three previous reports, there was a history of similar but less severe episodes, suggesting that repeated small bleeds may be a common feature.

Intraventricular meningioma is the most common intraventricular tumor of the trigone in adults (2, 5). The differential diagnosis must include metastatic deposits in the choroid plexus, which also may give rise to hemorrhage, although it is unusual for metastases to become so large before presentation. Primary gliomas may arise in the ventricles, although they have not been associated with hemorrhage, are rarer than meningiomas, and are more commonly found in the body of the ventricle (2, 5). Other intraventricular tumors include ependymomas, which are much more common in the ventricular body, rarely calcify, have not been associated with hemorrhage, and have a prominent cystic component in the majority of cases (2). Ventricular hemorrhage is a recognized complication of choroid plexus papilloma, which may be indistinguishable from meningioma on CT. However, these tumors are rare after adolescence, and the patients age allows a clear distinction in most cases (9). Cavernous hemangiomas rarely occur in a ventricle, may present with hemorrhage, and on CT are often round and well demarcated and of slightly uneven high density in the calcification range, but show minimal or no enhancement (13, 14). Neurocytomas are uncommon intraventricular tumors

and rarely bleed (15). Hemangioblastomas are extremely rare in a supratentorial site but have been reported in the third ventricle (16).

In conclusion, we present an intraventricular hemorrhage arising from a meningioma in the trigone of the lateral ventricle. The most common entities in the differential diagnosis of hemorrhage from intraventricular tumors in this site are choroid plexus metastasis in adults and choroid plexus papillomas in children.

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