A BRAIN TUMOR DETECTED BY THE NUCLEAR CEREBRAL ANGIOGRAM

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A brain tumor was detected by the nuclear cerebral angiogram as an area of increased activity. Static brain images failed to show the neoplasm.

The nuclear cerebral angiogram has not increased the detection rate of primary and secondary intracranial neoplasms (*1,2*). In two recent series, no patients with a brain tumor had an abnormal cerebral dynamic study in the presence of a normal conventional brain scan (*2,3*). Rarely an intracranial neoplasm may be visualized only on the radionuclide cerebral angiogram as a region of decreased perfusion due to a mass effect with vascular displacement (*4*).

This case reports an intracranial neoplasm that was also detected by the dynamic study alone, but this tumor produced a transient increase in activity on the nuclear cerebral angiogram rather than decreased perfusion. The lesion failed to produce a definite abnormality on static brain scans.

CASE REPORT

A 52-year-old woman was admitted to the hospital with severe left parietal headaches, blurring of vision, and gradual loss of memory for approximately 6–8 weeks. The patient had refused to walk for several days prior to hospitalization. Neurologic examination was normal but an echoencephalogram showed a 5-mm, left-to-right shift of the midline. A nuclear cerebral angiogram and a

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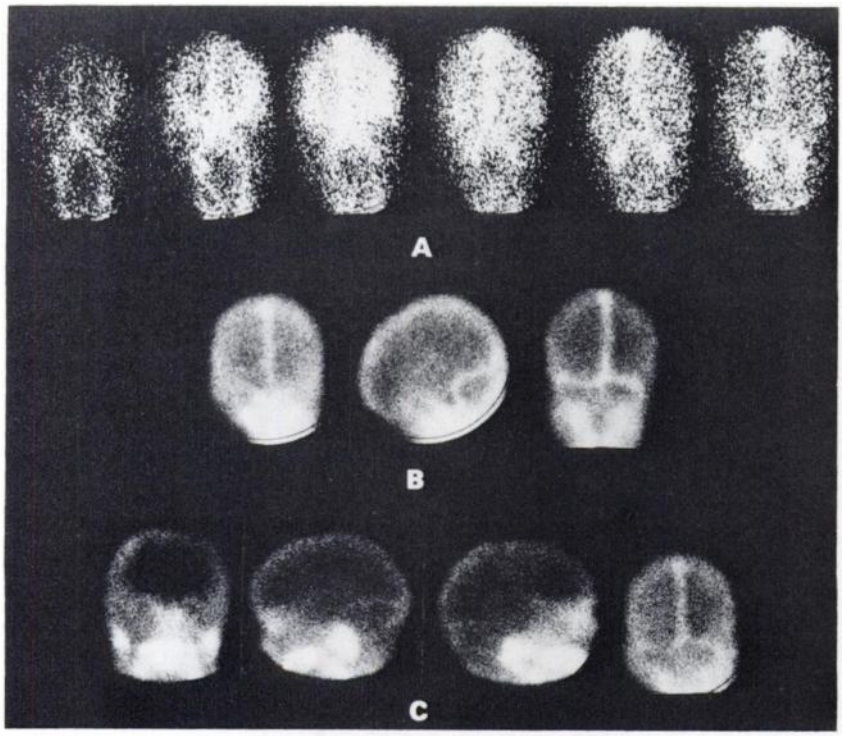

FIG. 1. Series A is nuclear cerebral angiogram. Series B is immediate post-injection static view. Series C is 4-hr delayed static scintiphoto.

brain scan were performed the day after admission on the Anger camera. The studies were obtained after intravenous injection of ^{99m}Tc-pertechnetate preceded by an oral choroid plexus blocking dose of 200 mg of potassium perchlorate.

The dynamic study (Fig. 1A) was performed with the patient in the anterior position. Serial images were obtained every 1–2 sec, synchronizing hand-pulled films with the timer on the camera. The nuclear cerebral angiogram showed an immediate increase in activity in the convexity region supplied by the left middle cerebral artery. This left hemisphere abnormality persisted through the arterial, capillary, and venous phases. By the late venous phase, the asymmetry was less marked. This rapid appearance and washout of activity appeared to represent arteriovenous shunting on or near the surface of the left hemisphere above the temporal region. Immediate postinjection anterior, left lateral, and posterior scintiphotos (Fig. 1B) were normal. One-hour scintiphotos were also normal.

Four-hour delayed scans (Fig. 1C) showed a questionable ill-defined increase in activity in the left hemisphere on the posterior view. Other projections appeared entirely normal.

The rapid appearance and washout of activity suggested an arteriovenous malformation but static views were negative. Immediate postinjection static views usually show the abnormally large arteries and veins when a patient has an arteriovenous malformation.

Because these images and the later scintiphotos were normal, we considered the possibility of a vascular neoplasm in the left hemisphere.

An electroencephalogram showed periodic delta and sharp wave activity in the left hemisphere, most likely arising from deep midline structures. The interpreter felt this was most compatible with cerebral vascular disease in the patient's age group.

The following day right brachial and left carotid angiography were performed. An 8-mm left-to-right displacement of the internal cerebral vein was present. There was early filling of a cortical vein (Fig. 2) in the left parietal area. Early filling of the left transverse sinus by another superficial vein was also present. The posterior portion of the left sylvian triangle appeared displaced anteriorly. Convexity vessels appeared to be splayed over the left parieto-occipital area. No actual neovasculature was seen but the findings were most suggestive of an infiltrating glioma in the left temperoparietal region. The right brachial angiogram was normal.

At surgery a left parieto-occipital tumor was visible on the surface of the brain. The neoplasm did not appear to extend deeply into the hemisphere. Biopsy showed an astrocytoma, Grade III. Abnormal arteriovenous communications were present in a portion of the biopsy specimen.

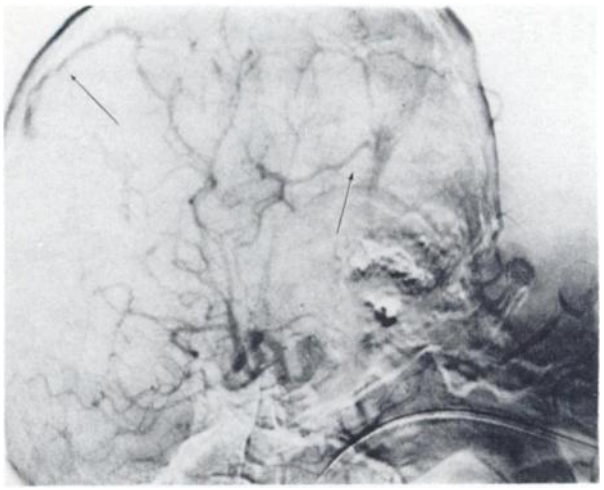

FIG. 2. Subtraction study of left carotid angiography. Draining veins in left parietal and temporal lobes (arrows).

DISCUSSION

Malignant brain tumors often show a local increase in the speed of circulation on carotid arteriography. This is presumably due to the presence of new or enlarged arterioles with incomplete walls. Draining veins, usually on the surface of the brain, are visualized in the majority of these neoplasms (*5*).

We believe this brain tumor was detected by the nuclear cerebral angiogram because of abnormal arteriovenous communications in the glioma and the accompanying large draining vein. No definite alteration of the blood-brain barrier was shown even though delayed scans were performed.

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