NEGATIVE DEFECT IN AN INTRACRANIAL TERATOMA

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Negative defects or areas of reduced activity on brain scans have been reported occasionally in patients with arachnoid and porencephalic cysts. Mishkin and Truska have concluded that a negative defect is suggestive evidence for an intracranial cyst (*1*). This case report documents a negative defect in a patient with an intracerebral teratoma.

The patient, a 13-month-old male, was admitted to Children's Hospital Medical Center because of left hemiparesis. He weighed 10 lb 4 oz at birth following a normal delivery. Fifteen days prior to admission, he began vomiting and developed weakness in his left arm and dragging of his left leg.

On physical examination, he was an obese infant with a blood pressure of 160/110 in the upper extremity. The head circumference was 49.5 cm and did not transilluminate. The fontanelles were widely opened, soft, and pulsatile. He was alert with a clear sensorium. The disc margins were sharp. There was equivocal left facial weakness but definite weakness on the left side of the body. The plantar reflex was extensor on the left.

There was no evidence of increased intracranial pressure or intracranial calcification on skull x-rays. Electroencephalography showed a diffusely abnormal pattern with suppression of activity in the right hemisphere during the sleep state. There were some spiked discharges in the right anterior quadrant.

The brain scan performed after the intravenous injection of 10 mCi of ^{99m}Tc-pertechnetate demonstrated an elliptical area measuring 5 × 7 cm of decreased activity in the left frontal region seen on both the left lateral and anterior view. The findings were those of a large cystic lesion in the left cerebral hemisphere (Fig. 1).

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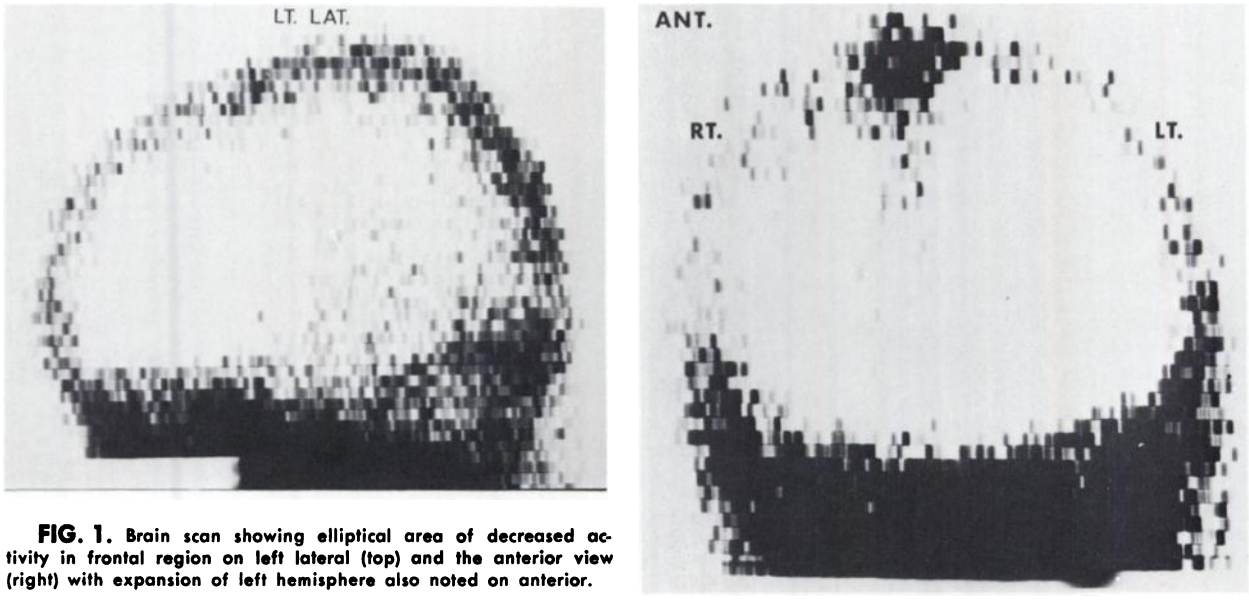

FIG. 1. Brain scan showing elliptical area of decreased activity in frontal region on left lateral (top) and the anterior view (right) with expansion of left hemisphere also noted on anterior.

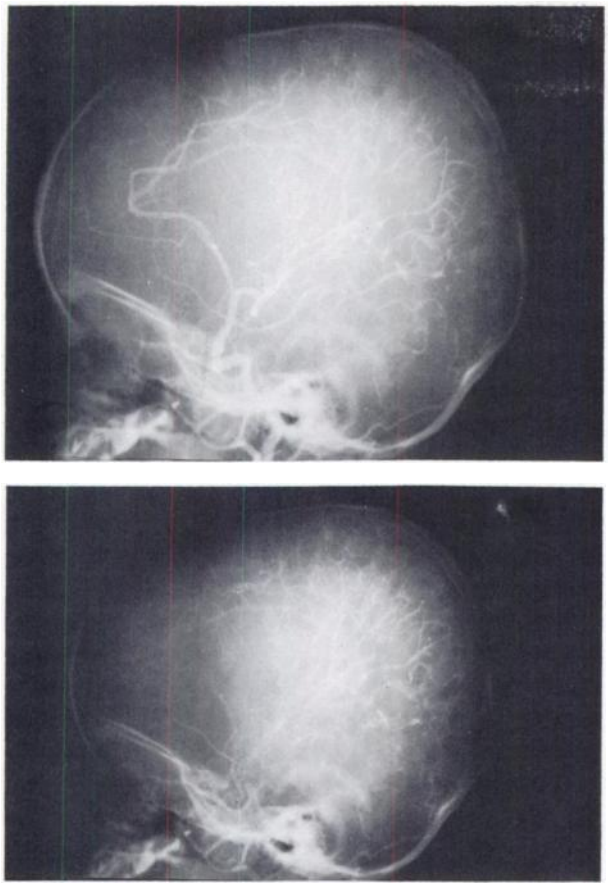

FIG. 2. Carotid arteriogram showing upward displacement of anterior cerebral and pericallosal arteries by avascular frontal lobe mass (top). In venous phase, this area remains avascular without evidence of tumor blush or early venous filling (bottom).

On carotid arteriography, the pericallosal artery and internal cerebral vein were shifted to the right. The internal cerebral vein was bowed posteriorly at the venous angle. The study of the left circulation indicated a lifting and shift to the right of the anterior cerebral and pericallosal arteries by an avascular mass measuring 7.5 cm. The findings were interpreted as a large avascular mass replacing the left frontal lobe and producing considerable distortion of the lateral ventricles shifting them posteriorly and to the right (Fig. 2).

At surgery a large left frontal cystic neoplasm was found and biopsied. Six days later, the entire mass was removed.

Gross examination demonstrated a cystic neoplasm. On microscopic examination, the tissue consisted of hypercellular glial elements with an increased number of astrocytic nuclei. The solid tumor mass contained a fair amount of adipose tissue with scattered bits of calcium, apocrine glands, and bone completely surrounded by periostium, findings consistent with an intracranial teratoma.

The patient was discharged on the 20th postoperative day after an uncomplicated postoperative course. Three months after surgery the child was doing well with return of motor function of the left side.

DISCUSSION

Intracranial teratomas are rare, accounting for only 2% of brain tumors in children and 0.5% of brain tumors in all age groups (*2*). They are most frequently found near the pineal but may occasionally occur close to the pituitary or in the posterior fossa. They are always polycystic, are filled with whitish fluid from desquamated lining cells, and may contain fat.

Scintigraphic findings in teratoma have not been described previously. In reports discussing intracranial tumors in children, neoplastic tissue is described as producing either increased activity or no change from the normal background (*3–6*). To our knowledge, this is the first reported case in which neoplastic tissues produced an area of decreased radioactivity on brain scintigraphy.

The lack of activity is probably related to the characteristic cystic nature of this tumor. Focal areas of decreased activity are uncommon findings on brain scans and have been described in only eight patients with either arachnoid or porencephalic cysts (*1,3,7,8*). DiChiro has shown that the fluid in porencephalic cyst has less radioactivity than surrounding cerebral tissue (*8*). Avascular lesions such as colloid cysts (two cases) or cysts of septum pellucidium (two cases) had neither greater nor lesser uptake of radioactivity than normal brain (*9*). Bucy reported two cases of epidermoid cysts, both recurrent and filled with caseous debris which did not produce scintigraphic abnormalities (*10*). Overton et al also reported one case of a 4 × 6 cm epidermoid cyst which was diagnosed by contrast studies but had a normal brain scan (*11*). They felt that the avascularity of the lesion accounted for the fact that there was no increase in radionuclide uptake. The vertex view has been recommended to demonstrate a shift of the superior sagittal sinus away from the area of decreased uptake (*1,7*); however, in our case we were able to demonstrate the shift satisfactorily on the anterior view.

SUMMARY

Although an area of decreased intracerebral activity may be useful in the scintigraphic diagnosis of cystic lesions, a cystic neoplasm must be included in the differential diagnosis along with porencephalic or arachnoid cysts.

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