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MR Imaging of Pineocytoma: Report of Two Cases

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Pineocytoma originating in the pineal parenchymal cell is a rare primary brain tumor [1]. At present, no MR studies on this disease have been reported. We present two cases of pineocytoma in which MR demonstrated its diagnostic value.

Case Reports

Case 1

The patient was a 36-year-old woman who manifested no remarkable abnormalities except headache, which suggested elevated intracranial pressure. Serum human chorionic gonadotropin and alpha-fetoprotein values were normal. CT and MR examinations were performed (Figs. 1A–1D). CT revealed a solid tumor with punctate calcification on the pineal region. MR distinctly marked the presence of the tumor on the pineal region extending to the posterior part of the third ventricle. By angiography, only a mass effect was seen without visualization of tumor vessels or tumor stain. As radiation therapy (30 Gy) had no effect in reducing the size of the tumor, surgery was performed. The tumor was solid. Light microscopy showed medullary cell proliferation with rosette formation and incomplete lobulation, which is identical histologically to pineocytoma. Electron microscopic examination (Fig. 1E) confirmed that this tumor was a pineocytoma with neuronal differentiation [2].

Case 2

The patient was a 45-year-old man with no neurologic evidence of abnormalities other than dizziness. CT and MR studies were performed (Figs. 2A–2D). CT revealed a low-density tumor in the pineal region (Figs. 2A and 2B). By MR, the tumor was visualized as an area of homogeneous low intensity on the T1-weighted image (Fig. 2C) and homogeneous high intensity on the T2-weighted image (Fig. 2D). By angiography, no tumor vessel or tumor stain was found. As radiation therapy (30 Gy) failed to reduce the tumor size, surgical excision was carried out. The tumor was a cystic one containing 2.5 ml of fluid that contained 3.5 g/dl of protein. It was a pineocytoma with astrocytomatous differentiation (Fig. 2E) [3].

Discussion

Pineocytoma is a benign tumor that develops in pineal parenchymal cells. It grows slowly, and rarely disseminates in the CSF space [1]. Since pineal tumors are rare (accounting for 0.4–1% of all intracranial brain tumors), the actual frequency of true pineocytoma is difficult to establish [1, 4, 5].

CT observations have been reported by some investigators. Ganti et al. [5] reported eight cases of pineocytoma that were isodense and hyperdense on unenhanced CT, and that showed homogeneous enhancement. These researchers stated that pineocytomas cannot be distinguished from non-calcified germinomas in males. Zimmerman et al. [6] reported two cases of pineocytoma that were characterized by abnormally large deposits of calcification at the site of the pineal gland; the surrounding tumor was of increased density and showed marked contrast enhancement. These investigators also reported cases of pineoblastoma and an embryonal cell carcinoma with CT appearance similar to pineocytoma. Futrell et al. [4] reported a case of pineocytoma with predominantly neural elements, which showed a well-marginated, isodense, particularly calcified mass lesion. Findings in case 1 of this report revealed an appearance almost identical to Futrell's case.

Pineal region tumors with a cystic component have been reported previously [5, 6]; one was a case of pineoblastoma with cystic degeneration [5] and the other was an embryonal cell carcinoma with endodermal sinus carcinoma change [6]. But the pineocytoma with a cystic appearance on CT, as our case 2, has not been reported previously.

We have not found any reports of MR examinations in cases of pineocytoma [7–9]. Mamourian et al. [9] reported pineal cysts with MR that showed high intensity as in our case 2. Kilgore et al. [8] reported cases of germinoma that showed almost the same intensity as the adjacent gray matter in short and long TR SE sequences on 1.5-T MR imaging. They also reported a case of germinoma containing embryonal cell elements that showed high intensity in the long TR sequence and low intensity in the short TR sequence, and a

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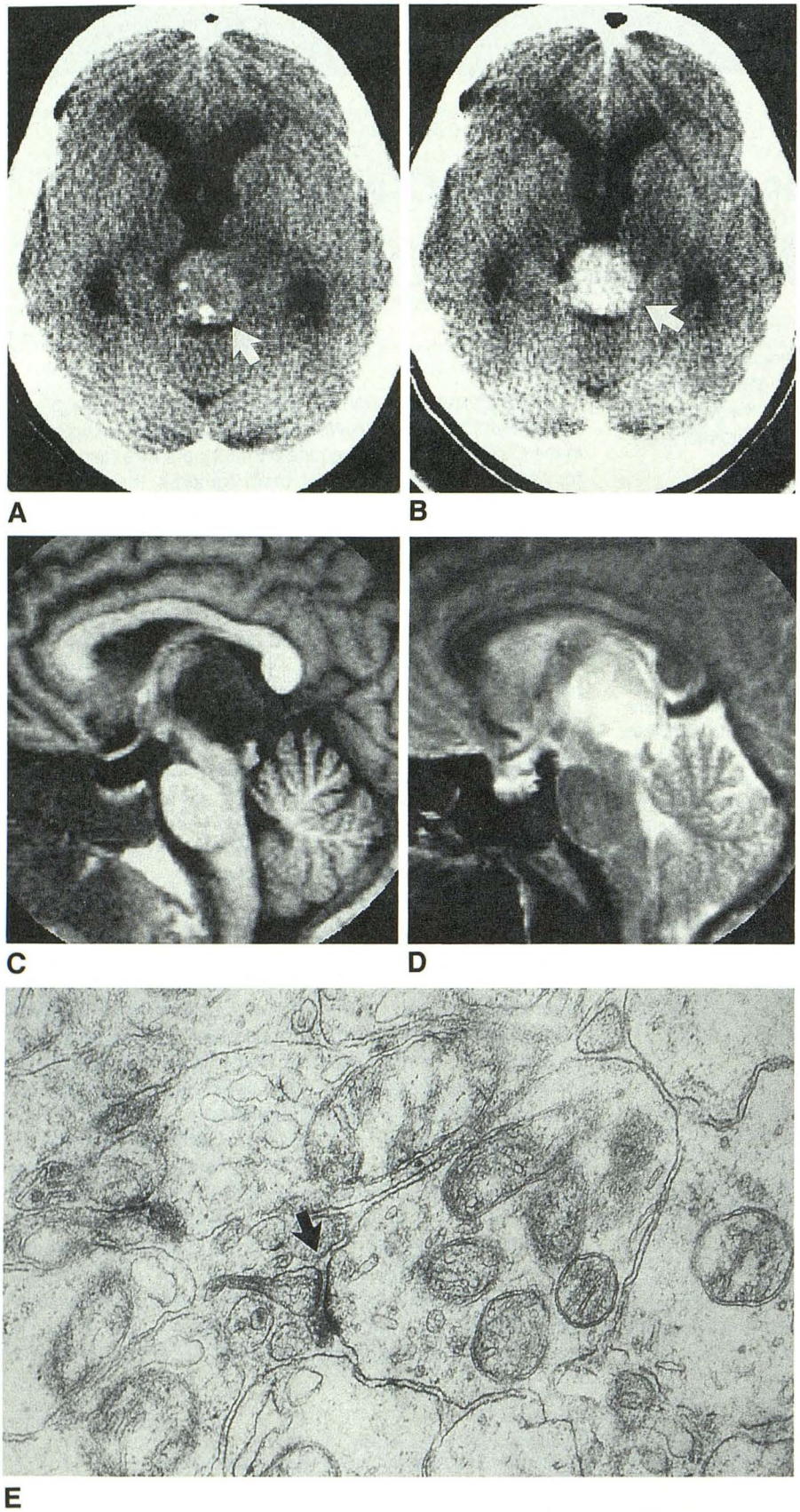

Fig. 1.—Case 1: Pineocytoma with neuronal differentiation.

***A* and *B*, Noncontrast (*A*) and contrast-enhanced (*B*) CT scans reveal a solid tumor with punctate calcification on the pineal region extending to posterior part of third ventricle (*arrow*). Tumor enhances homogeneously and is accompanied by a moderate degree of hydrocephalus.**

***C* and *D*, Sagittal MR images on a 0.5-T superconducting system, IR 2000/500/40 (*C*) and SE 2000/120 (*D*), reveal that the tumor compresses and displaces the fornix anteriorly, the superior colliculus inferiorly, and the internal cerebral vein superiorly. Tumor intensity is rather nonhomogeneous, between the intensity of gray matter and CSF.**

***E*, Electron micrograph reveals premature synapselike structure indicative of neuronal differentiation (*arrow*).**

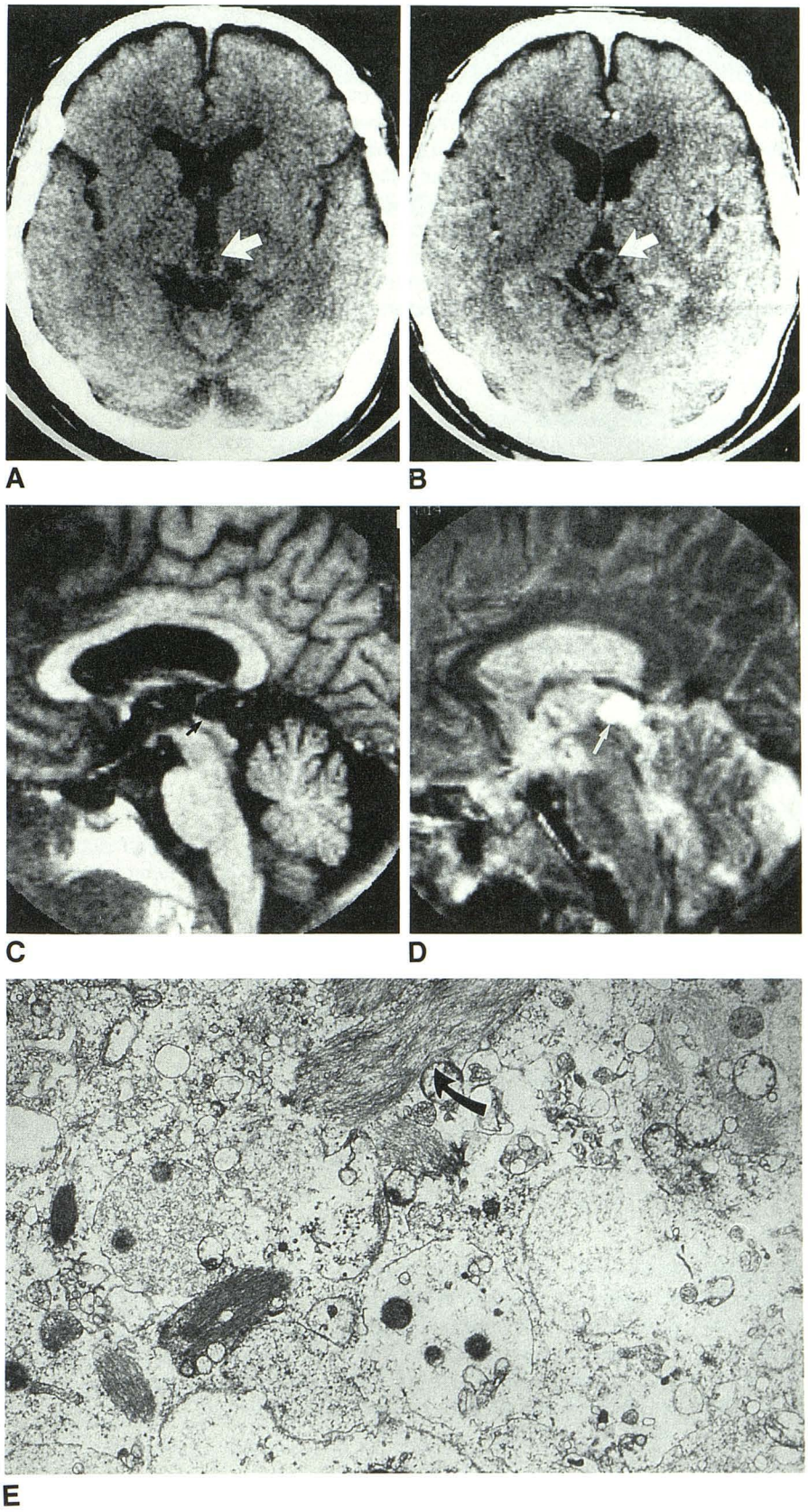

Fig. 2.—Case 2: Pineocytoma with astrocytomatous differentiation.

***A* and *B*, Noncontrast (*A*) and contrast-enhanced (*B*) CT scans reveal a low-density tumor surrounded by a thin enhancing ring in pineal region (*arrow*).**

***C* and *D*, On sagittal MR images, IR 2000/500/40 (*C*) and SE 2000/120 (*D*), it is clearly seen that the tumor compresses and displaces the internal cerebral vein superiorly and the superior colliculus anteriorly (*arrow* in *C*). Intensity of tumor is almost the same as CSF on T1-weighted image, and is higher than CSF on T2-weighted image (*arrow* in *D*).**

***E*, Electron micrograph reveals bundles of glial microfilaments indicative of astrocytomatous differentiation (*arrow*).**

case of pineoblastoma that showed faintly low intensity in the short TR sequence [8]. Our case 1, a pineocytoma with neuronal differentiation, was a solid tumor and showed mottled intensity between gray matter and CSF on MR imaging. The signal intensity of our case 1 was different from that of germinoma, but was similar to that of a germinoma containing embryonal cell elements [8]. The signal intensity of our case 2 was indicative of a cyst, but it was indistinguishable from other cystic lesions, such as the pineal cyst [8].

The signal intensity of our cases can in no way be said to be specific, but MR provided useful information as to the site of origin, its relationship to adjacent structures, and the extent of tumor in the pineal region.

REFERENCES

1. Rubinstein LJ. Cytogenesis and differentiation of pineal neoplasms. *Hum Pathol* **1981**;12:441–448
2. Okeda R, Song S, Nakajima T, Matsutani M. Pineocytoma: observation of an autopsy case by electron microscopy and cell markers. *Acta Pathol Jpn* **1984**;34:911–918
3. Blackwood W. Pineocytoma with astrocytomatous differentiation. *J Neuropathol Exp Neurol* **1979**;38:253–258
4. Futrell NN, Osborn AG, Cheson BD. Pineal region tumors: computed tomographic-pathologic spectrum. *AJR* **1981**;137:951–956
5. Ganti SR, Hial SK, Stein BM, Silver AJ, Mawad M, Sane P. CT of pineal region tumors. *AJR* **1986**;146:451–458
6. Zimmerman RA, Bilaniuk LT, Wood JH, Bruce DA, Schut L. Computed tomography of pineal, parapineal, and histologically related tumors. *Radiology* **1980**;137:669–677
7. Peterman SB, Steiner RE, Bydder GM. Magnetic resonance imaging of intracranial tumors in children and adolescents. *AJNR* **1984**;5:703–709
8. Kilgore DP, Strother CM, Starshak RJ, Haughton VM. Pineal germinoma: MR imaging. *Radiology* **1986**;158:435–438
9. Mamourian AC, Towfighi J. Pineal cysts: MR imaging. *AJNR* **1986**;7:1081–1086