MR characteristics of a primary melanoma of the quadrigeminal plate.

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and (3) paresis, loss of sensation, and low levels of protein in the CSF are more common.

Unenhanced CT examinations can show an intramedullary mass with zones of low density suggestive of a cystic component; if the cord is collapsed, syringomyelia can reliably be assumed to be present. If the cord is not collapsed, which occurs more frequently, it is impossible to differentiate syringomyelia from a cystic intramedullary tumor [3].

Contrast-enhanced CT also can be used to confirm the existence of an intramedullary cyst. After intrathecal injection of metrizamide, opacification of a region of low density confirms the cystic component of the lesion. Sometimes, opacification occurs immediately because the cyst communicates directly with the subarachnoid space. In other cases, opacification occurs after several hours (up to 24 hr) when metrizamide arrives at the cyst by an indirect route (i.e., via the fourth ventricle or by diffusion across the cord).

Whether delayed or undelayed, the occurrence of opacification is not useful in differentiating syringomyelia from cystic tumor or tumor associated with syringomyelia. What does matter is verification of the presence of syringomyelic cavities at each level of cord enlargement because this rules out the existence of a tumor. Evidence of an enlarged cord zone without cavities in its interior strongly suggests formation of a tumor. This was true for our case in which an enlargement of the spinal cord from C3 to C7 was apparent, and the cavity from the inferior part of C4 as far as C7 was filled with contrast material.

When the diagnosis is doubtful despite the criteria mentioned, direct puncture of the cystic cavities and contrast filling (syringogram) may be helpful [8]. An irregular or nodular wall strongly suggests a tumor enclosing the syringomyelic cavity.

Intraoperative echography also can show the cystic nature of these lesions, and the superior and inferior contours are better identified and localized by this method than by CT. Large central cysts with smooth margins are more suggestive of syringomyelia, whereas tumoral cysts are much smaller and marked by eccentric localization and irregular contours [2, 5, 6, 9].

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MR Characteristics of a Primary Melanoma of the Quadrigeminal Plate

Primary CNS melanomas are extremely rare tumors, generally accepted as arising from melanoblasts within the pia-arachnoid [1–3]. Most of these tumors originate from the leptomeninges surrounding the spinal cord and base of the brain. Only four cases of primary melanomas arising in the pineal region have been reported in the literature [1]; all occurred before cross-sectional imaging techniques were available. Although the MR findings of choroidal melanomas [4–6] and of melanoma metastases to the brain [7, 8] have been described, this is the first description of the MR findings of a primary CNS melanoma.

Case Report

A 59-year-old man was admitted complaining of nausea, vomiting, and bilateral temporooccipital headaches of 2 weeks duration. Ophthalmologic examination showed bilateral papilledema.

Initial evaluation included CT examination of the brain, which showed noncommunicating hydrocephalus with obstruction produced by a small, noncalcified, heterogeneously enhancing lesion posterior to the third ventricle (Fig. 1A). The lesion was isodense on noncontrast CT scans (not shown).

MR imaging was performed with a 1.5-T superconducting GE Signa imaging system. Multislice, multiecho, spin-echo sequences provided T1-weighted (TR = 600 msec; TE = 20 msec), T2-weighted (TR = 2500 msec; TE = 80 msec), and balanced (TR = 2500 msec; TE = 20 msec) images in the axial and sagittal planes. A midline lesion, measuring approximately 9 mm in diameter, was shown in the region of the superior colliculus (Figs. 1B and 1C). The small mass caused anterior displacement and narrowing of the proximal aqueduct of Sylvius. The lesion was isointense to adjacent inferior mesencephalic parenchyma, with focal central hypointensity on T1-weighted images. Unlike most primary and secondary parenchymal CNS tumors [9], the lesion remained isointense on balanced and T2-weighted images.

Open biopsy of the lesion was performed, and a black arachnoid membrane was observed overlying a tectal mass. Examination of specimens of the arachnoid matter and tectal mass showed neoplastic cells, mainly in a perivascular distribution, filled with dark melanin and numerous melanosomes. Infiltration of tumor cells into CNS tissue was distinct. A diagnosis of primary CNS melanotic melanoma was made after careful dermatologic and ophthalmologic examinations revealed no evidence of cutaneous or choroidal melanoma.

Discussion

CNS metastases from cutaneous primary melanoma are much more frequent than primary CNS melanoma [3]; therefore, primary CNS melanoma is a diagnosis of exclusion [3].

In humans, melanocytes are found in the skin, mucous membranes, uveal tract, and pia-arachnoid [3]. Precursor melanocytes (melanoblasts), derived from the neural crest, are the cells of origin for both

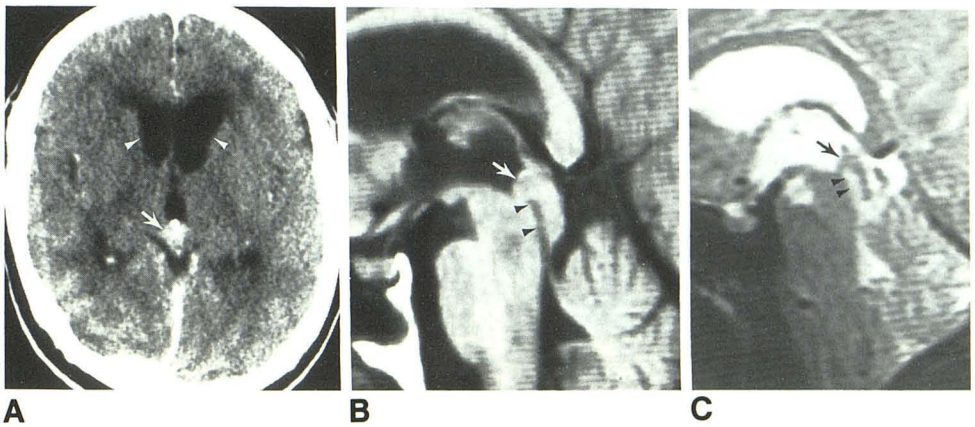

Fig. 1.—Primary melanoma of the quadrigeminal plate.

***A*, Postcontrast axial CT scan shows small contrast-enhancing mass posterior to third ventricle (*arrow*), causing obstructive hydrocephalus (*arrowheads*).**

***B* and *C*, Midline sagittal MR images show isointense mass located within superior aspect of quadrigeminal plate (*arrows*), causing obstruction of proximal aqueduct of Sylvius (*arrowheads*). B = T1-weighted (TR 600 msec/TE 20 msec, 5 mm thick, 2.5-mm gap); C = T2-weighted (TR 2500 msec/TE 80 msec, 3 mm thick, 1.5-mm gap).**

benign melanosis of the leptomeninges and primary CNS melanomas [1–3]. Primary meningeal melanomas have a peak incidence in the fourth decade, are relatively radioresistant, and carry a poor prognosis; most patients die within 1 year of diagnosis. Hydrocephalus is often present, principally because of preponderant involvement of the basal leptomeninges. In the few previously described cases of primary melanoma of the pineal region, noncommunicating hydrocephalus was due to obstruction of the aqueduct [1], as was seen in our patient.

The MR characteristics of primary CNS melanoma have not been described previously. The relatively isointense signal on T1- and T2-weighted images of this melanotic melanoma of the quadrigeminal plate differs from most CNS tumors, which appear isointense to hypointense on T1-weighted images and hyperintense on T2-weighted images [9].

The cause of the peculiar MR characteristics of melanoma within the CNS [7, 8] and within the globe [4–7] is a subject of debate. A preliminary report [7] described the signal intensities of melanoma metastatic to the brain as "highly variable." Five lesions had high signal intensity on T1-weighted images; five other lesions had low signal intensity on T2-weighted images. When six lesions were evaluated histologically, the MR signal intensities correlated best with the presence of acute or chronic hemorrhage within the lesion [7]. Gomori et al. [5] correlated the melanin content of six choroidal melanomas with their MR appearance. A trend toward shorter T1 and T2 with increasing melanin content was attributed to the paramagnetic free radicals in melanin. Melanotic choroidal melanomas appeared hyperintense on T1-weighted images and hypointense on T2-weighted images in their study [5].

MR characteristics of the normal and abnormal mesencephalic tectum have been described recently [10]. On midline sagittal T1-weighted images, the average anteroposterior diameter of the superior and inferior colliculi was 5 mm (range, 2–7 mm). The superior aspect of the quadrigeminal plate measured in this manner in our patient was 9 mm, exceeding the upper limits of normal.

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Reversible CT Changes in Uremic Encephalopathy

CNS involvement is observed occasionally in patients with renal failure. Its causes are thought to be metabolic abnormalities and organic changes [1–4]. Only a few reports have described cranial CT changes in uremic encephalopathy [3, 4]. We present a case of major uremic encephalopathy in which serial CT scans showed a return to normal.

Case Report

A 16-year-old girl who was in shock was admitted to the hospital after a traffic accident. The only obvious injury was a fracture of the left humerus. She had mild abdominal tenderness and gross hematuria and was semicomatose, but no focal neurologic deficit was present. Her WBC count, SGOT, SGPT, and serum levels of lactic dehydrogenase and fibrin degradation products were elevated slightly, but serum levels of blood urea nitrogen and creatinine were normal. Abdominal echography and CT showed injury to the right kidney, but a cranial CT scan was normal.