Mystery Case:

Central neurocytoma

Characterization by MRI and MRS

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Figure Brain MRI, magnetic resonance spectroscopy, and pathologic image of central neurocytoma

The mass in the lateral ventricles with attachment to the septum pellucidum caused hydrocephalus and showed heterogeneous signal intensity on axial T2-weighted imaging (A) and heterogeneous enhancement on coronal gadolinium-enhanced T1-weighted imaging (B). Magnetic resonance spectroscopy (C) at long echo time shows elevated choline (Cho), decreased *N*-acetylaspartate (NAA), and a specific peak in 3.55 ppm, representing elevated glycine (Gly). The histologic analysis (D) showed a picture of central neurocytoma, consisting of uniform round cells showing neuroepithelial features.

A 29-year-old man presented with dizziness and headache for 2 months. MRI revealed a mass in the lateral ventricle with attachment of septum pellucidum (figure, A and B). Magnetic resonance spectroscopy (MRS) (repetition time 1,600 ms, echo time [TE] 135 ms) showed high glycine, decreased *N*-acetylaspartate, and increased choline (figure, C). Central neurocytoma was diagnosed by histologic examination (figure, D).

Central neurocytoma is a neoplasm of the CNS and arises from the septum pellucidum or the ventricular

wall.¹ MRS revealed a specific peak in 3.55 ppm at long TE, representing elevated glycine, and other metabolites including elevated choline and decreased *N*-acetylaspartate. Because central neurocytomas are formed from immature neurons, it is possible that the glycine observed in central neurocytomas arises from these glycinergic synapses, which become functional in immature neurons.² MRI and MRS with elevated glycine may help us diagnose central neurocytoma.²

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AUTHOR CONTRIBUTIONS

Dr. Jung H. Hsu: concept, drafting, and revision of article. Dr. Shu S. Hsu: clinical examination of the patient. Dr. Jui H. Fu: interpretation of imaging study. Dr. Ping H. Lai: concept, drafting, and revision of article.

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MYSTERY CASE RESPONSES The Mystery Case series was initiated by the *Neurology*[®] Resident & Fellow Section to develop the clinical reasoning skills of trainees. Residency programs, medical student preceptors, and individuals were invited to use this Mystery Case as an educational tool. Responses were solicited through a group e-mail sent to the American Academy of Neurology Consortium of Neurology Residents and Fellows and through social media.

All the answers that we received came from individual residents rather than groups and most of the

respondents (73%) correctly identified the neuroimaging features of a central neurocytoma. The most complete answer came from Dr. Soham Dilip Desai (India). In his response, he pointed out that a lateral ventricular mass with attachment to the septum pellucidum, which is isointense to gray matter on T1/T2 images and shows mild to moderate heterogeneous enhancement postcontrast, has high likelihood of being a central neurocytoma. Furthermore, MRS has been found to show characteristic features of increased glycine and choline peaks with reduced *N*-acetylaspartate in central neurocytomas.

All other respondents considered in their answers one of the differential diagnoses of central neurocytoma: ependymoma, subependymoma, subependymal giant cell astrocytoma, intraventricular meningioma, choroid plexus papilloma, or oligodendroglioma.

This case illustrates how MRS can contribute to the presurgical diagnosis of central neurocytomas among patients with intraventricular tumors.

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