MR Spectroscopy-Aided Differentiation: "Giant" Extra-Axial Tuberculoma Masquerading as Meningioma

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SUMMARY: Tuberculosis is common in the developing world and in developed nations secondary to increasing immunocompromise in the population. It commonly causes meningitis and parenchymal tuberculomas. We present a case of an unusual masslike “giant” extra-axial tuberculoma during pregnancy. Unusual morphology and size at imaging made meningioma a close differential. MR spectroscopy served to complement MR imaging, providing diagnostic confirmation and depicted findings characteristic of a tuberculoma.

CASE REPORT

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MR spectroscopy was used to confirm the diagnosis of giant extra-axial tuberculoma. Based on imaging, spectroscopic, and clinical features, a diagnosis of giant extra-axial tuberculoma was made. Surgical excision biopsy confirmed the diagnosis.

Discussion

Although intraparenchymal tuberculomas are common, solid extra-axial tuberculomas are extremely uncommon. We believe our case is unique in that our patient was pregnant and immunocompetent, MR findings mimicked those of a similarly located isolated meningioma, and we were able to successfully use spectroscopy to confirm our diagnosis.

Extra-axial tuberculomas simulating meningiomas may be located in the frontoparietal areas and pontine, pericallosal, and suprasellar cisterns. Cystic en-plaque meningioma mimics and those caused by Mycobacterium avium (noted in patients with systemic lupus erythematosus) can be encountered. Most appear hypointense to isointense to gray matter on T2WI and variable on DWI, often with a hyperintense rim; those with hyperintense centers on T2WI are usually hyperintense on DWI. Meningiomas typically appear isointense to gray matter on T1WI and T2WI and variable on DWI, unless atypical or aggressive. Signal intensity is a function of intraleansal lipids, macrophages, fibrosis, and cellular infiltrates.

In vivo proton MR spectroscopy has been studied extensively in this context. Tuberculomas are characterized by a prominent decrease in NAA/Cr and slight decrease in NAA/Cho. Lipid-lactate peaks are usually elevated (86% of tuberculomas). Paradoxically, lipid/Cho may occasionally be decreased relative to normal cerebral parenchyma, probably resulting from small dimensions of most tuberculomas.
tive to voxel volume. 3D multivoxel proton spectroscopy with 2D chemical shift imaging interrogates relatively small voxel volumes and overcomes this paradox. Meningiomas invariably have elevated alanine. A high lipid/Cr ratio may also be noted. “Finger-printing” of *M. tuberculosis* cell-wall biochemicals in tuberculomas is now possible, facilitating their detection. T1-weighted magnetization transfer MR imaging is a useful adjunct to MR spectroscopy and shows promise in tissue characterization of CNS tuberculomas.

**Conclusions**

When diagnostic dilemmas present themselves, MR spectroscopy considered in perspective with MR imaging and clinicopathologic features can be useful in certain situations. Rare as
they are, extra-axial tuberculomas may masquerade as meningiomas. To our knowledge, ours is the first report of an extra-axial “giant” tuberculoma that bore a striking resemblance to meningioma and in which diagnostic confirmation was obtained using proton MR spectroscopy that was later corroborated by surgical biopsy and histopathology.

References