

Image Report

Pathological correlation of Magnetic Resonance Imaging features in a classical case of lipomatous meningioma

Amey R. Savardekar, Abha Verma¹, Vinayak Narayan, Anita Mahadevan², Malla Bhaskar RaoDepartments of Neurosurgery, ¹Neuroradiology and ²Neuropathology, National Institute of Mental Health and Neurosciences, Bengaluru, Karnataka, IndiaE-mail: *Amey R. Savardekar - ameysavardekar@gmail.com; Abha Verma - drabha84@gmail.com; Vinayak Narayan - narayan.neuro33@gmail.com; Anita Mahadevan - anita_mahadevan@yahoo.com; Malla Bhaskar Rao - brmalla@gmail.com

*Corresponding author

Received: 18 January 16 Accepted: 19 February 16 Published: 07 April 16

Meningiomas are common tumors, constituting about 20% of all primary brain tumors.^[4] The histological subtype of lipomatous meningioma, resulting from lipid accumulation within meningeothelial cells, is a well-described but uncommon entity, representing approximately 0.3% of meningiomas.^[2,3] In the World Health Organization (WHO) classification of tumors of the nervous system (2000), meningiomas with lipomatous changes were classified as metaplastic meningiomas (WHO Grade 1), and it has been documented that the clinical features, surgical management, and prognosis of lipomatous meningiomas are no different from those of other WHO Grade 1 meningiomas.^[2] We report the case of a middle-aged women presenting with magnetic resonance imaging (MRI) features of a classical “lipomatous” meningioma and correlate the radiological findings with the histopathological features of this uncommon tumor.

A 44-year-old female presented with history of long-standing generalized tonic-clonic seizures of 9 years duration on antiepileptic medications. MRI of the brain revealed a well-demarcated, extra-axial, dural-based, right anterior one-third, parasagittal lesion with predominant areas of intrinsic T1- and T2-weighted hyperintensity [Figure 1a and b]. Hyperostosis of the overlying calvarium was evident. On fat-suppressed fluid attenuation inversion recovery (FLAIR) images, the areas of T1-weighted hyperintensity were suppressed that corresponded to the fat content [Figure 1c]. Moderate edema was evident in the underlying right frontal lobe. On susceptibility weighted imaging, extensive susceptibility (or blooming) was noted within the lesion [Figure 1d]. Postcontrast T1 magnetization prepared rapid gradient-echo axial and sagittal images revealed intense heterogeneous enhancement within the lesion with a dural tail [Figure 1e and f]. The patient underwent right frontal parasagittal craniotomy and Simpson Grade 1 excision of the tumor. The tumor on

gross appearance was bright yellow and greasy [Figure 2a]. Histopathology revealed large lobules of mature adipose tissue within which were nesting islands of meningeothelial cells forming whorls [Figure 2a-c], characteristic of a metaplastic (lipomatous) meningioma. Fine intracellular vacuolation was evident within meningeothelial cells [Figure 2d]. On close examination, these vacuolations were highlighted on Oil red O stain, confirming its neutral lipid nature [Figure 2d, inset]. At follow-up (1 year), patient is asymptomatic.

Lipomatous meningioma is a subtype of metaplastic meningioma, which was first described by Bailey and Bucy in 1931.^[4] On imaging, lipomatous meningiomas have characteristic MRI findings, which, if taken into consideration, can provide preoperative diagnosis of this uncommon entity.^[1,3,5] The tumor shows high intensity on T1- and T2-weighted MRI and the high-intensity area on T1-weighted MRI is changed to a low-intensity area

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

Access this article online

Quick Response Code:



Website:

www.surgicalneurologyint.com

DOI:

10.4103/2152-7806.179849

How to cite this article: Savardekar AR, Verma A, Narayan V, Mahadevan A, Rao MB. Pathological correlation of Magnetic Resonance Imaging features in a classical case of lipomatous meningioma. *Surg Neurol Int* 2016;7:32.
<http://surgicalneurologyint.com/Pathological-correlation-of-Magnetic-Resonance-Imaging-features-in-a-classical-case-of-lipomatous-meningioma/>

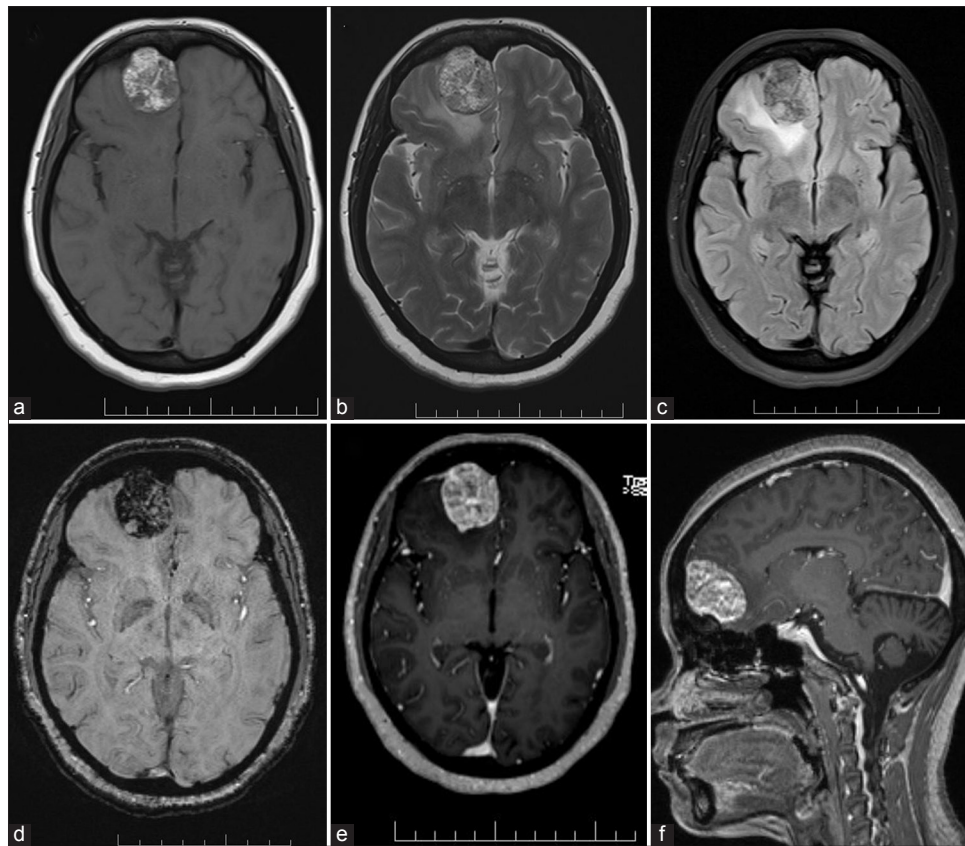


Figure 1: Magnetic resonance imaging findings in a classical case of lipomatous meningioma. (a) T1-axial, (b) T2-axial, (c) fluid attenuation inversion recovery-axial, (d) susceptibility weighted imaging-axial, (e) T1 magnetization prepared rapid gradient-echo-axial, and (f) T1 magnetization prepared rapid gradient-echo sagittal. The areas of hyperintensity on T1- and T2-weighted images are hypointense on fluid attenuation inversion recovery images, indicating the fat content of the tumor

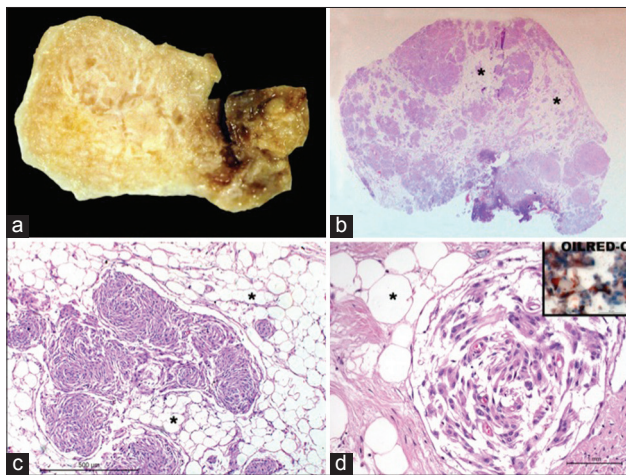


Figure 2: (a) Gross appearance of the tumor that is bright yellow and greasy; (b) scanner view of tumor reveals large lucent areas (*) separating islands of tumor cells; (c) microscopy reveals lobules of mature adipose tissue (*) separating whorls of meningothelial cells; (d) fine intracellular vacuolation seen within meningothelial cells that have intracytoplasmic Oil red O positive neutral lipid droplets (inset)

on fat-suppressed T1-weighted imaging. Despite this, in the majority of cases, lipomatous meningioma is not

diagnosed preoperatively and is often a histopathological diagnosis.^[4]

The preoperative differential diagnoses considered, in our case, were lipoma, dermoid cyst, teratoma, or xanthomatous meningioma. The classical “dural tail” sign, intense contrast enhancement of the lesion, and hyperostosis of the overlying calvarium were highly suggestive of meningioma; the suppression of T1-weighted hyperintense areas on FLAIR imaging indicated the lipomatous nature of the meningioma. Our report highlights the distinct MRI findings correlating with characteristic histopathological findings in a “classical case” of lipomatous meningioma.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Fitt GJ, Kalnins R, Mitchell LA. Lipomatous meningioma: Characteristic computed tomographic appearance. *Australas Radiol* 1996;40:84-7.

2. Jaiswal AK, Mehrotra A, Kumar B, Jaiswal S, Vij M, Behari S, et al. Lipomatous meningioma: A study of five cases with brief review of literature. *Neurol India* 2011;59:87-91.
3. LeRoux P, Hope A, Lofton S, Harris AB. Lipomatous meningioma – An uncommon tumor with distinct radiographic findings. *Surg Neurol* 1989;32:360-5.
4. Ohba S, Yoshida K, Akiyama T, Ikeda E, Kawase T. Lipomatous meningioma. *J Clin Neurosci* 2007;14:1003-6.
5. Withers T, Klevansky A, Weinstein SR. Lipomeningioma: Case report and review of the literature. *J Clin Neurosci* 2003;10:712-4.