



## Co-Existence of Atypical Meningioma, Intratumoral Lipometaplasia and Extensive Hyperostosis of Calvarium: A Rare Entity

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### Key words

- Atypical meningioma
- Hyperostosis
- Lipometaplasia

### Abbreviations and Acronyms

**MRI:** Magnetic resonance imaging

**WHO:** World Health Organization

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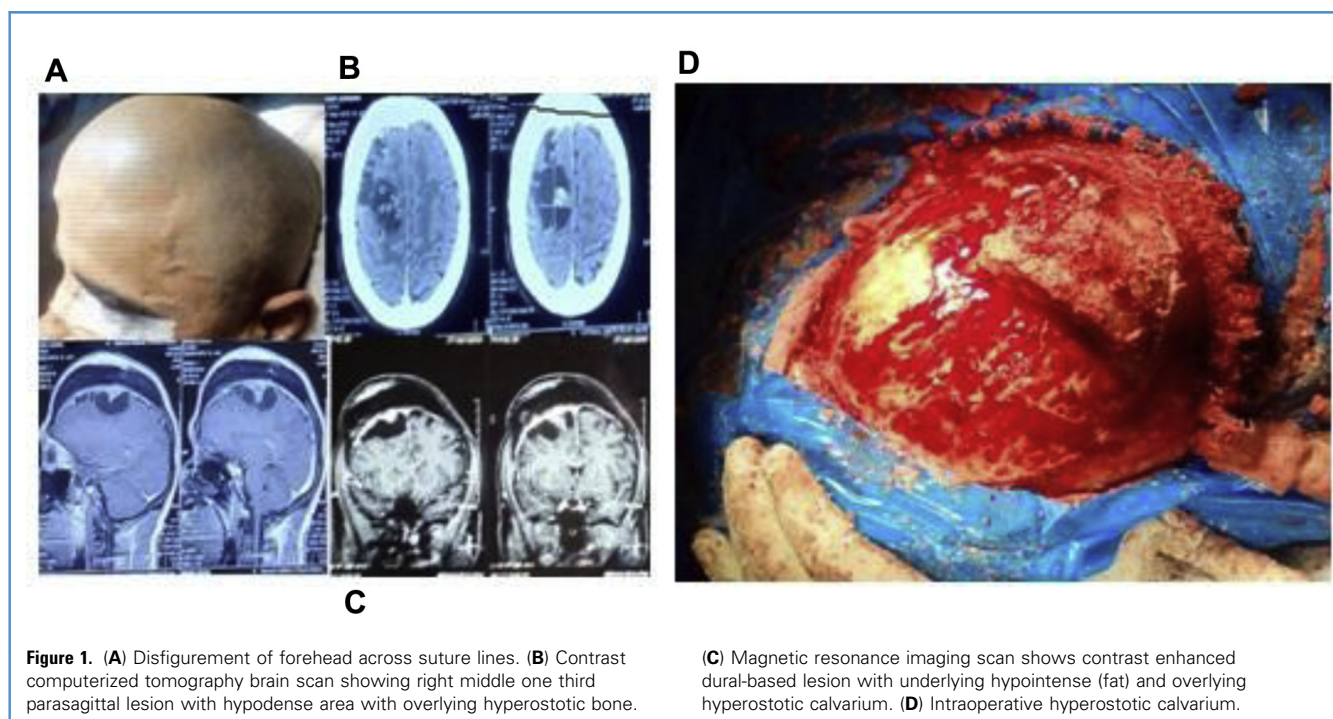
### INTRODUCTION

Lipomatous meningiomas are a rare variety of meningioma in which fat storage occurs in adipocytes and lipoblasts are

■ **BACKGROUND:** Lipomatous meningiomas are a rare variety of meningioma, in which fat storage occurs in adipocytes and lipoblasts are found within the tumor. World Health Organization grade II atypical meningiomas with lipometaplasia and extensive hyperostosis of calvarium is a rare type with a good prognosis after complete removal.

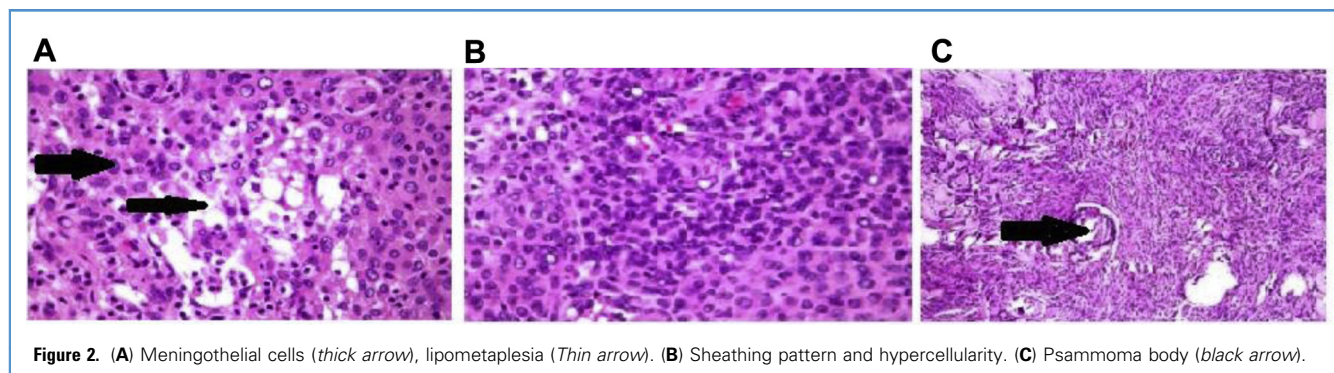
■ **CASE DESCRIPTION:** Here we report a case of intracranial atypical meningioma with lipometaplasia and disproportionately large hyperostosis of overlying calvarium in a 40-year-old man. His computed tomography and magnetic resonance imaging scans showed right frontotemporoparietal homogenous bony swelling with an underlying diffusely enhancing extra-axial, dural-based lesion with areas of hyperintensity on T1 and isointensity on T2 with perilesional edema. Microscopically, it revealed a meningeal neoplasm with hypercellularity, small cell changes, sheathing pattern, and extensive lipomatous metaplasia.

■ **CONCLUSIONS:** World Health Organization grade II atypical meningiomas with lipometaplasia and extensive hyperostosis of calvarium is a rare type with a good prognosis after complete removal. Clinical features in patients are similar to those of conventional meningioma; however, radiologic features depend on the amount of fat present in the tumor. To the best of our knowledge, there are no case reports in the current literature regarding this. Every new case will widen our horizon. Meningothelial cells exhibit lipomatous changes as a result of metabolic abnormalities.



**Figure 1.** (A) Disfigurement of forehead across suture lines. (B) Contrast computerized tomography brain scan showing right middle one third parasagittal lesion with hypodense area with overlying hyperostotic bone.

(C) Magnetic resonance imaging scan shows contrast enhanced dural-based lesion with underlying hypointense (fat) and overlying hyperostotic calvarium. (D) Intraoperative hyperostotic calvarium.



**Figure 2.** (A) Meningothelial cells (*thick arrow*), lipometaplasia (*Thin arrow*). (B) Sheathing pattern and hypercellularity. (C) Psammoma body (*black arrow*).

found within the tumor. The mean age for lipomatous meningioma presentation is 50 years old, with a range from 22–74 years old reported in the literature.<sup>1</sup> Characteristic of lipomatous meningiomas are intratumoral fat accumulations, which are easily observed on computerized tomography as hypodense and on T1-weighted magnetic resonance imaging (MRI) as hyperintense lesions.<sup>2</sup> The patient is a 40-year-old man who noticed stony hard swelling over the right side of his head since the age of 20. Swelling was hard, nonpainful, nontender, nonpulsatile, and gradually increasing in size causing disfigurement of his forehead. His computerized tomography brain scan showed “ground glass opacities with homogenous sclerosis of bilateral frontotemporoparietal bone on the right, more than the left, and a right frontoparietal extra-axial mass lesion with areas of hypodensity.” An MRI brain scan revealed “an ill-defined lobulated solid-cystic lesion in the right frontoparietal parasagittal region with contrast enhancement of solid component with dense calcification and dural tail with thickening of overlying calvarium.” Hyperostosis of calvarium was disproportionately larger than the underlying dural-based lesion. He underwent “drilling and remodeling of the frontotemporoparietal hyperostotic bone, right frontoparietal craniotomy, and a Simpson grade-I excision of a right frontoparietal lesion.” Histopathology revealed a meningeal neoplasm with hypercellularity, small cell changes, sheathing pattern suggestive of atypical meningioma (World Health Organization [WHO] grade

II), along with psammoma bodies, and extensive lipomatous metaplasia (Figure 1).

### DISCUSSION

Our PubMed search showed only lipometaplasia in meningioma that are WHO grade I. To our knowledge, this could be the first reported WHO grade II meningioma associated with disproportionately extensive hyperostosis of overlying calvarium and lipometaplasia. Clinical presentation for atypical lipomatous meningiomas is similar to the other types of meningiomas and depends on the size and location of the tumor. The majority of lipomatous meningiomas reported in past studies have been frontal or frontotemporal in location with only a few being parietal. Seizure was the most common symptom for frontal and frontotemporal tumors, however headaches were more common for parietal tumors.<sup>3</sup> Complete resection of the meningioma is obtainable in the vast majority of cases when identified with appropriate imaging.<sup>1</sup> A Simpson grade I excision was achieved in our patient. He did not receive any adjuvant therapy. There was no recurrence of the lesion in his close follow-up for 1 year. It is known that after gross total resection of lipomatous meningiomas, they exhibit a lower recurrence rate. Only 17% of lipomatous meningiomas recurred in the study by Roncaroli et al.<sup>1</sup> The pathophysiology of lipomatous meningiomas has always been under debate. Several authors believe that owing to disrupted metabolism within

meningothelial cells,<sup>4</sup> they start accumulating fat within and cells undergo metaplastic changes to adipocytes.<sup>5</sup> Savardekar et al.<sup>6</sup> reported that intratumoral lipomatous areas can be easily seen with standard MRI sequences. In our case, MRI brain scan showed intratumoral hyperintensity on T1-weighted images, suggestive of fat, along with a dural-tail sign on contrast that is not unusual, as dural-tail signs are present in 52%–78% of lipomatous meningiomas (Figure 2).<sup>7</sup>

### CONCLUSIONS

WHO grade II, atypical meningiomas with lipometaplasia and extensive hyperostosis of calvarium is rare, but with a good prognosis after complete removal. Clinical features in patients are similar to those of conventional meningioma; however, radiologic features depend on the amount of fat present in the tumor. As far as we know, there are no case reports in the current literature. Every new case will widen our horizon. Meningothelial cells exhibit lipomatous changes as a result of metabolic abnormalities, and we present 1 such case.

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