
En Plaque Meningioma of the Basilar Meninges and Meckel's Cave: MR Appearance

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Summary: We report the MR appearance and histopathologic features of a case of en plaque meningioma that presented as a basal meningeal process with bilateral cranial nerve dysfunction.

Index terms: Meninges, neoplasms; Skull, base

The magnetic resonance (MR) appearance of intracranial meningioma typically is of an extraaxial mass that enhances intensely after contrast injection (1–3). However, difficulty in differentiating a meningioma from other processes can occur because of the tumor's location or other features (1–5). En plaque meningioma can be difficult to image and can simulate other lesions, especially when near the skull base or cerebellopontine angle. We report a case of en plaque meningioma consisting of multiple linear areas of basilar and meningeal enhancement without associated mass extending into Meckel's caves and the internal auditory canals.

Case Report

A 40-year-old woman presented with an insidious change in her behavior. She had noted progressive hearing loss over the previous 2 years, and increasing tinnitus had developed over the last 3 months. She also experienced periodic right hemifacial spasm, burning sensations in the right side of her face, and chronic headache. On physical examination, there were no signs of meningeal irritation. Bilateral dense hearing impairment and right peripheral seventh-nerve palsy were noted. Brain-stem auditory evoked responses to clicking noises monitored by electrodes to the eighth cranial nerves confirmed bilateral sensorineural hearing loss with normal bilateral seventh-nerve electromyograms. Lumbar puncture revealed a white blood cell count of 9000/mm³ with 100% lymphocytes. Peripheral white blood cell count was 11 600/mm³ with a normal differentiation. MR examination (Fig 1) showed linear hyperintense signal on T1-weighted images surrounding the 7th through 11th nerve complexes bilaterally,

Meckel's caves, and adjacent meninges. These areas were isointense on T2-weighted images but showed marked enhancement on T1-weighted images after injection of contrast material.

At surgery, the dura of the middle cranial fossa was found to have a sugar-coated appearance with irregular bulges. Sheaths of tumors were dissected from around the internal carotid arteries and the third nerve. The process was seen to enter Meckel's caves to intermingle with the fifth nerve. Histopathologic examination of the surgical specimens taken from Meckel's caves, around the 7th through 11th nerve complexes and adjacent regions of the cerebellopontine angle cistern, demonstrated meningothelial whorls with occasional psammoma bodies confirming the diagnosis of meningioma (Fig 2). A large number of lymphocytes and polyclonal plasma cells were also found in the specimens.

Discussion

Atypical meningiomas, especially the purely en plaque type without associated mass, can create a diagnostic challenge. These atypical cases are usually associated with a subtle mass or osseous thickening (5). The lack of data on en plaque meningioma may be because it is rare or because the diagnosis is a difficult one to make. On plain radiographs the only clue might be hyperostosis, which can be seen on computed tomography but not so easily on MR. In our case, the only MR evidence of en plaque meningioma was the subtle increase in T1-weighted linear signal, which became more apparent after enhancement of meninges around the 7th through 11th nerve complexes and Meckel's caves.

Meningeal enhancement of meningioma has been discussed in various articles. Tokumaru et al (6) described several cases of meningeal enhancement adjacent to the meningioma. They suggested that these findings resulted from re-

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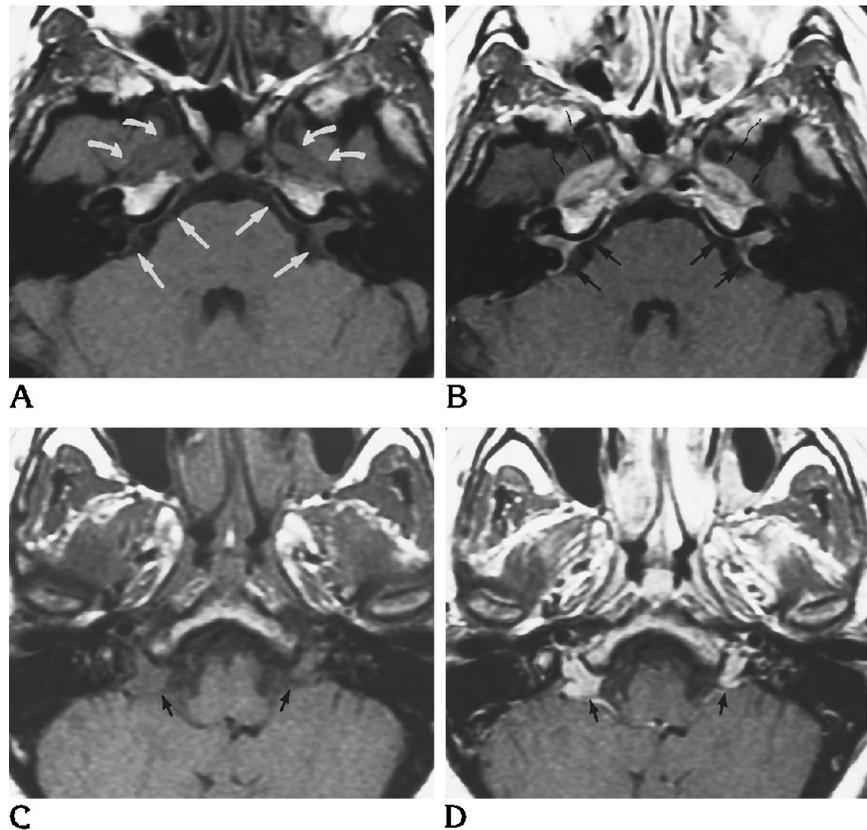
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Fig 1. Axial T1-weighted (600/25/4 [repetition time/echo time/excitations]) MR images before (A) and after (B) contrast administration. Areas of high signal intensity (straight white arrows) surround the seventh and eighth nerve complexes bilaterally extending along the cerebellopontine angles. These areas enhance after contrast injection (straight black arrows). Also note the bilateral enhancement of Meckel's cave (curved arrows, wavy arrows).

Axial T1-weighted (600/25) images before (C) and after (D) contrast administration. The 9th, 10th, and 11th nerve complexes (arrows) enhance markedly after injection of contrast material.



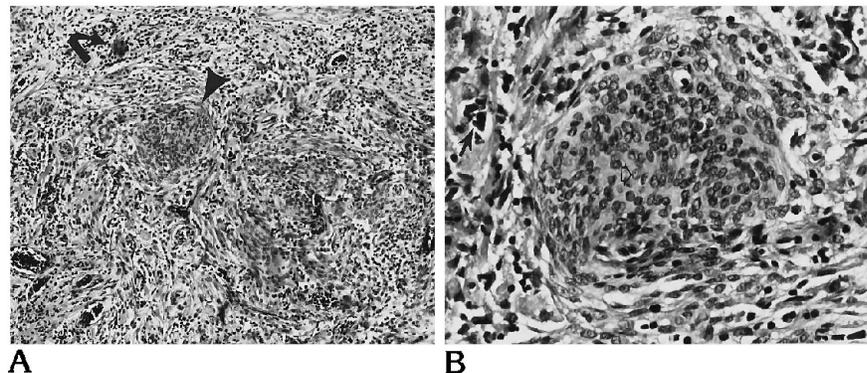
active changes such as loose connective tissue, hypervascularity, or dilated vessels seen on histopathology. In other reports, surrounding meningeal enhancement has been attributed to tumor cells (3, 7). In our case, the enhancement was a result of both the presence of tumor sheets and chronic inflammatory processes. However, Tien et al (8) mentioned that the tail sign appearance is highly suggestive but not specific for meningioma in patients who did not have surgery or irradiation.

The differential diagnosis of abnormal dural thickening and enhancement includes a wide variety of diseases ranging from sarcoid, bacterial infection, granulomatous infection, lymphomas, glioma, postradiation changes, and meningeal carcinomatosis.

In summary, the diagnosis of en plaque meningioma remains problematic but should be considered when linear dural thickening and enhancement are seen. Histopathologic analysis is still the key to ultimate diagnosis.

Fig 2. Hematoxylin and eosin-stained histopathologic sections of the surgical specimen. A, Image at lower magnification shows the overall pattern of meningothelial whorls (arrowhead) interspersed with occasional psammoma bodies (arrow).

B, Image at higher magnification demonstrates the plump, oval nuclei of meningothelial cells (open arrow), and also a large number of polyclonal plasma cells (solid arrow).



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