

The Key role of MRI modalities in En Plaque Meningioma

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ABSTRACT

En plaque meningioma is at frontal region is difficult to be differentiated from osteoma, based on CT scan only. En plaque meningioma represents in 2-9% of all meningioma cases. Usually en plaque meningioma grows on the sphenoid wing, whereas only 1 % grows on the frontal and temporal bone. This case is female 37 year- old who presents with chronic headache and huge lump on her right forehead that she believes it slowly enlarges for the last 5 years. The Computerized Tomography scan (CT scan) shows thickening of the right fronto-temporal bone (3-4 cm) with the diameter of 12 cm and bony hard. Initial impression suggests it could be osteoma or fibrous dysplasia. After the MRI (Magnetic Resonance Imaging) with contrast, it shows a carpet like tumor underline the thickening bone, and it suggest an en plaque meningioma. For en plaque meningioma, we have to remove the abnormal duramater. We suggest that for a case with a wide thickening calvarian bone, it's better to get the MRI of the head with contrast.

Keywords : *en plaque meningioma, CT scan, MRI, osteoma, fibrous dysplasia, Craniotomy*

ABSTRAK

Meningioma *en plaque* pada tulang frontal sulit dibedakan dengan osteoma pada pemeriksaan CT scan kepala. Meningioma *en plaque* mencakup prevalensi 2-9 % dari seluruh kasus meningioma. Umumnya lokasi meningioma *en plaque* pada tulang sphenoid, sedangkan pada tulang frontal dan temporal hanya pada 1% kasus. Kasus ini adalah wanita usia 37 tahun dengan benjolan pada dahi kanannya yang membesar secara perlahan sejak 5 tahun terakhir, kadang-kadang disertai sakit kepala. Hasil pemeriksaan CT (*Computerized Tomography*) Scan kepala non kontras memperlihatkan gambaran penebalan tulang (3-4 cm) pada regio fronto-temporal kanan dengan diameter lebih kurang 12 cm. Diagnosis banding awal adalah osteoma atau fibrous dysplasia. Sedangkan pada pemeriksaan MRI (*Magnetic Resonance Imaging*) kepala kontras memperlihatkan gambaran massa tumor ekstraaksial menyengat kontras tepat dibawah penebalan tulang frontal tersebut sehingga sesuai dengan gambaran meningioma *en plaque*. Perbedaan hasil dari CT dengan MRI menunjukkan bahwa, selalu harus dipikirkan meningioma *en plaque* untuk differensial diagnosis osteoma maupun fibrous dysplasia. Jika terbukti meningioma, maka operasinya harus melibatkan pengangkatan duramater yang terlibat. Kami sarankan, kasus dengan penebalan tulang kepala yang luas, harus selalu dilakukan pemeriksaan MRI kepala dengan kontras.

Keywords : *plak meningioma, CT scan, MRI, osteoma, fibrous displasia, kraniotomi*

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INTRODUCTION

En plaque meningioma is a rare type of meningioma and characterized by a carpet or sheet like lesion that infiltrates the dura mater and sometimes invades the bone or so called hyperostosis.¹ En plaque meningioma is mainly located in the sphenoid wing, juxtaorbital, fronto-parietal and rarely spinal region.²

In meningioma, hyperostosis is a well-known sign of tumor, but is more frequently present in en plaque meningioma. However, hyperostosis of the bone in en plaque meningioma is often confused with other disease such as fibrous dysplasia or osteoma.³ Some cases, such as this case report, the hyperostosis bone could be such significant with minimal intracranial pathology and often be missed on regular CT Scan. MRI with contrast would be able to visualize the pathologic duramater underneath the overgrowth bone. We report a case of En plaque meningiomas that located in the fronto-

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temporal bone, who initially was considered as osteoma but the contrast MRI suggest En plaque meningioma.

CASE REPORT

A 37 year old woman came with a five years history of intermittent headache and a mass on her right forehead. She usually took pain-killer to relieve the pain, but the symptoms worsened and the mass slowly grow bigger. She concerns about her performance.

On physical examination revealed a hard mass in the right fronto-temporal region. The Size of

the mass was about 12 cm in diameter. There is no evidence of neurological deficit. Laboratory study on blood was normal. CT Scan findings from previous hospital showed a thickening of the right fronto-temporal bone (figure 1) that suggest an osteoma. Then we arrange her for further investigation with contrast MRI. After the contrast admission, it showed a sheet like (carpet like) lesion underneath the thickening bone (Figure 2&3). The feature is suitable for en plaque meningioma.

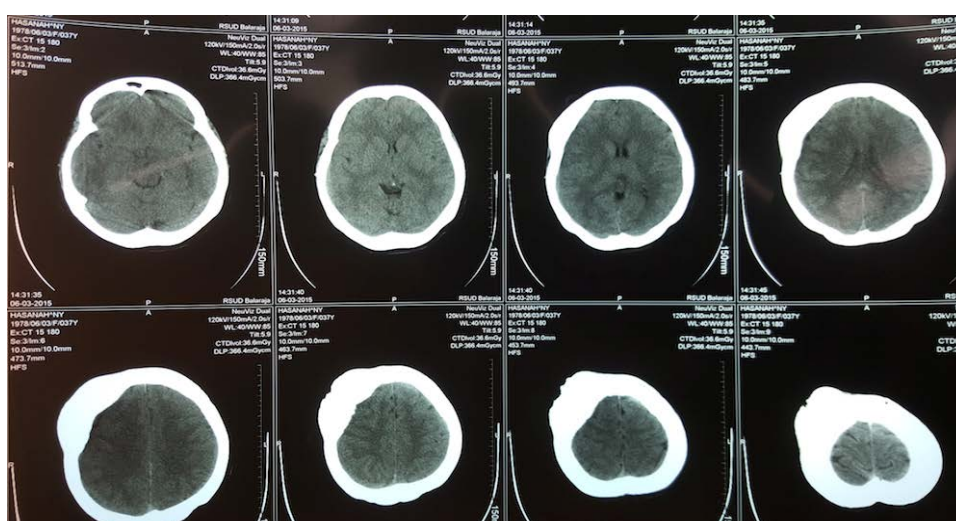


Figure 1. Plain CT Scan of head shows a thickening of the right fronto-temporal bone.

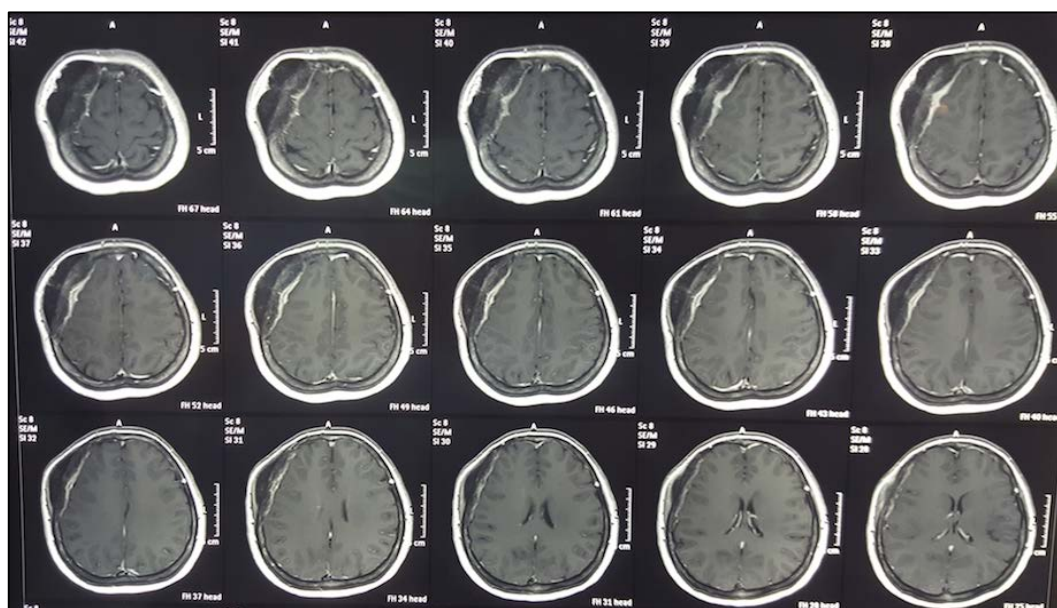


Figure 2. T1-MRI Brain with contrast (axial) shows an extra axial carpet like lesion with enhancement in the right frontal (size : 6 x 0,6 x 0,8 cm), just underneath the hyperostosis and compressing the frontal lobe.

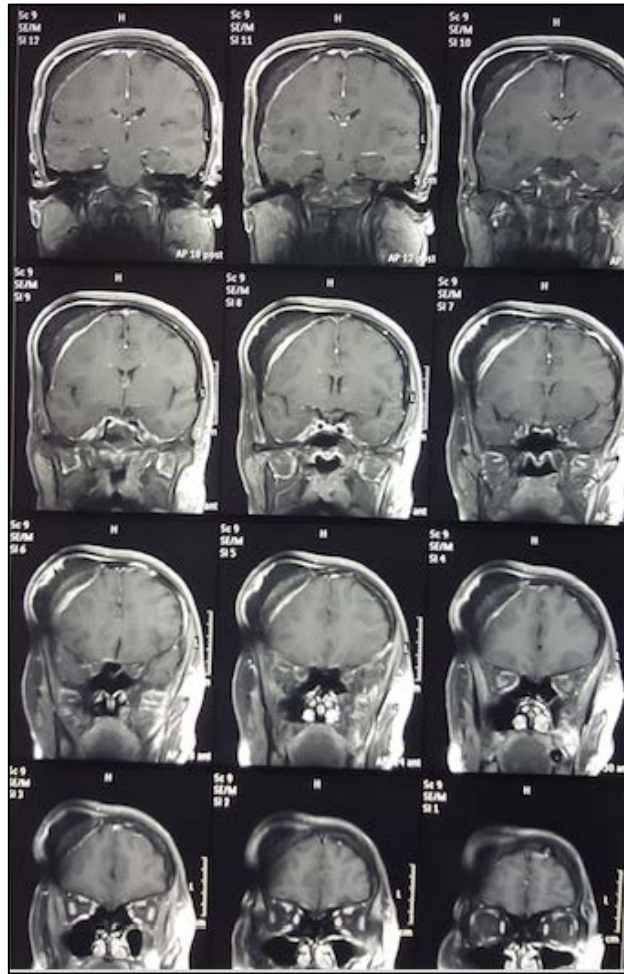


Figure 3. T1-MRI Brain with contrast coronal view

Surgery was performed by removing all the thickening bone and the infiltrated duramater (Figure 4). The duramater is replaced with synthetic duramater. The bone is replaced with titanium mesh and covered with the bone

cement. The en plaque meningioma was completely removed (figure 4). She did very well after the surgery and make a good recovery without any deficit.

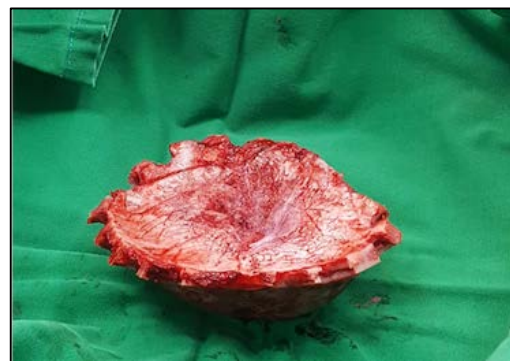


Figure 4. Meningioma en plaque (gross findings). Macroscopically. Left: showing the thickening part of the bone and the surface is filled up with many small little hole with tumor invasion. Right: inner surface of the bone, and duramater that is attached firmly to the inner table. It is very difficult to separate the dura from the bone.

DISCUSSION

Meningioma en plaque is a rare biological type of meningioma, which infiltrates the dura and associated with hyperostosis of the bone. En plaque meningioma mainly located in the sphenoid wing.⁴ It is three to six times more frequent in females than in males and more common in the sixth to seventh decade of life.⁵ All types of meningioma usually develop after high dose irradiation of glioma, lymphoma, leukemia or metastases.⁶

The development of en plaque meningioma or hyperostosis still remains unclear, but Cushing's conclusion proposed that infiltration of the bone by meningioma cells stimulates osteoblastic activity. The tumor invasion will stimulate periosteal to grow a new bone. On the histopathological examination of hyperostotic bone showed that tumor cells apparently invading the Haversian system of the overlying bone.⁷

The clinical manifestations are defined by the en plaque meningioma's location which compressing the adjacent structures. Generally the symptoms consist of proptosis, declined visual acuity, visual field deficits, headache, temporal swelling, diplopia, seizures and blindness. Diagnosis of en plaque meningioma determined by radiological and clinical features rather than histological appearance.⁷

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CT Scan and MRI are chosen when it comes to diagnosing meningioma en plaque. But unfortunately, relying on CT Scan alone can sometimes poses diagnostic problems. En plaque meningioma can be easily confused with fibrous dysplasia, osteoma, Paget's disease, chronic osteomyelitis and sclerotic metastases of the skull. Therefore, MRI must be done if there is any suspicion to en plaque meningioma.⁴ MRI features of en plaque meningioma will show linear dural thickening and enhancing soft tissue around the affected bone. Although CT shows better details of the bone, MRI precisely demonstrates dural enhancement and soft tissue components of the tumor.⁸ In this patient the early diagnosis was osteoma or fibrous dysplasia, but after the MRI results was seen, the diagnosis was changed.

Total removal of the tumor is the treatment of choice for en plaque meningioma. In some cases, total removal is not an easy thing to do because of its extensive bone and dural involvement, also the chances of recurrence rates is high.⁹ But in this patient, craniotomy tumor removal and cranioplasty with titanium mesh have been performed successfully and The pathology review confirm the diagnosis of meningioma.

CONCLUSION

A wide thickening calvarian bone should be further investigated with contrast MRI.