

IMAGING HIGHLIGHT

Leptomeningeal glioblastoma multiforme presenting as cauda equina syndrome

¹Mei-Ling Sharon TAI, ²Kartini RAHMAT, ³Kean Hooi TEOH, ⁴Ravindran KARUPPIAH, ²Hazman MOHD NOR, ²Fatimah Kamila ABU BAKAR, ¹Chong Tin TAN

¹Division of Neurology, Department of Medicine, ²Department of Biomedical Imaging, ³Department of Pathology, ⁴Division of Neurosurgery, Department of Surgery, Faculty of Medicine, University Malaya, Kuala Lumpur, Malaysia

Glioblastoma multiforme (GBM) is the commonest primary cerebral malignancy consisting of 12-20% of intracranial brain tumours.¹ We report here a patient with GBM with very unusual marked and widespread leptomeningeal GBM.

CASE REPORT

The patient was a 49 years old ethnic Indian man who presented with two months' history of progressive weakness, numbness and pain at both lower limbs, which worsened two weeks before admission. He had one week history of headache and change of behaviour, but no fever or night sweats.

On examination, he was afebrile, alert and conscious. Neurological examination of the limbs showed that the tone was reduced at both lower limbs. There was severe weakness both lower limbs, proximal more than distal. The power was: both hip flexion (0/5), both hip extension (2/5), both knee flexion (3/5), both knee extension (4+/5), right ankle dorsiflexion (3/5), left ankle dorsiflexion (4/5), right ankle plantar flexion (4+/5), left ankle plantar flexion 5/5. Plantar response was upgoing on the left leg. Reflexes were absent bilaterally. There was no neck stiffness. The cranial nerve and systemic examination were normal.

Investigations showed that the erythrocyte sedimentation rate was 45 mm in 1 hour, C-reactive protein and HIV serology were normal or negative. Mantoux test was 20 mm. Plain CT brain on admission showed a small rounded hypodense lesion at right frontal area. Cerebrospinal fluid (CSF) performed two days after admission showed white blood cells (WBC) to be raised at 66/microliter (lymphocytes 82%, polymorphs 18%), protein was elevated at 7.55 g/L, and glucose was 3.5 mmol/L. Direct smear, PCR and culture for acid fast bacilli and cryptococcal antigen were all normal.

On day five of hospitalisation, MRI of the thoracolumbar spine showed heterogeneous swelling of the cauda equina and conus medullaris with nodular leptomeningeal and subarachnoid enhancement. (Figure 1 A, B) There were some non-enhancing intrinsic cord changes in the cervical cord as well. MRI brain showed irregular enhancing lesions at the right frontal, left occipital, left posterior periventricular, right middle cerebellar peduncle and left cerebellar vermis. There was also diffuse thin leptomeningeal enhancement of the basal cisterns and Sylvian fissure bilaterally. (Figure 1 C-F) Some of these lesions demonstrated restricted diffusion on DWI images. The patient was diagnosed as having tuberculous meningitis (TBM). He was treated with anti-tuberculous drugs and dexamethasone.

On the 25th day of admission, he had one generalised tonic-clonic seizure. On the 34th day of admission, repeat lumbar puncture showed that CSF WBC was 240/microliter (polymorph 75%, lymphocyte 25%), protein 38.19 g/L and glucose 1.3 mmol/L. There was deterioration of lower limb weakness on 44th day with hip flexion being 1/5 bilaterally and the rest of lower limbs were 0/5.

On 52nd day, repeat brain MRI revealed enlarging parenchymal lesions with worsening nodular leptomeningeal enhancement of the basal cisterns, interhemispheric area and Sylvian fissures bilaterally. (Figure 2 A-D) Clinically, he was able to recognise his wife intermittently and obey commands. He did not have headache.

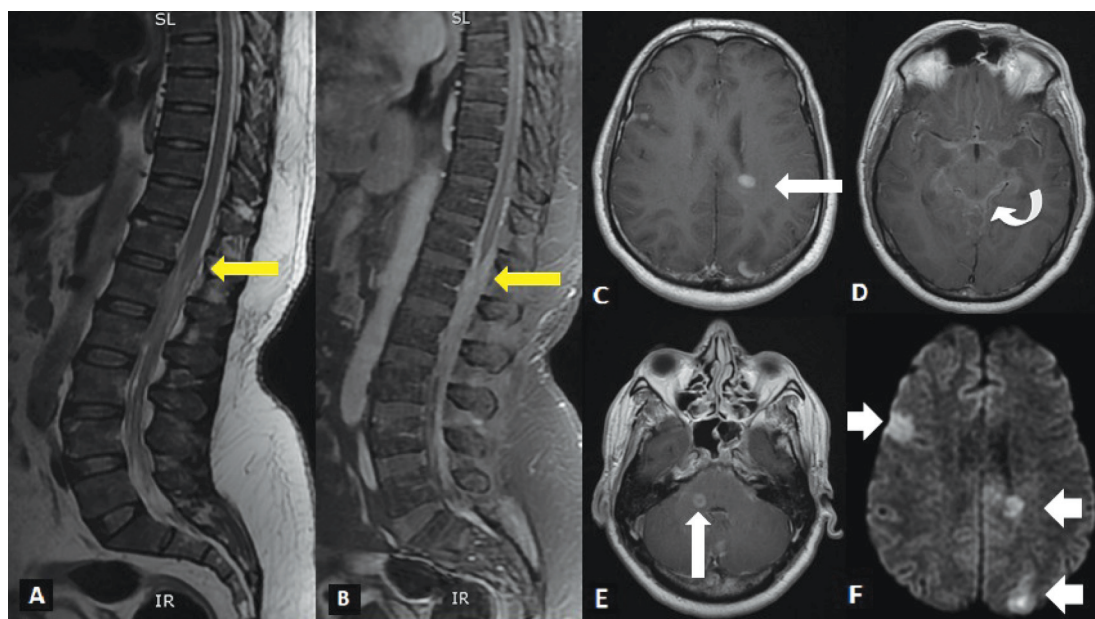


Figure 1 (A, B). MRI of lumbar spine done on admission (T2 W and post contrast T1 sagittal) showing thickening of the conus medullaris and cauda equina with high signal intensity changes and associated nodular leptomeningeal and subarachnoid enhancement (yellow arrows). (C-E). Post contrast MRI brain showing multiple enhancing lesions in the left occipital lobe, left posterior periventricular (arrow), right middle cerebellar peduncle (vertical arrow) and left vermis with associated diffuse thin leptomeningeal enhancement in the basal cisterns and Sylvian fissures (curved arrow). These lesions demonstrate restricted diffusion on DWI sequence (short arrows) (F).

In view of the clinical progression of disease despite anti-tuberculous treatment, a biopsy of the right frontal mass was performed. The biopsy showed highly cellular glial neoplasm, confirmed immunohistochemically by glial fibrillary acidic protein, compatible with glioblastoma multiforme. There was nuclear pleomorphism, nuclear hyperchromatism and mitotic activity. Tumour necrosis was observed in focal areas. Proliferative index based on Ki-67 staining was 40-50%. (Figures 3 A, B)

After two months in the hospital, neurological examination showed power of 0/5 in the lower limbs bilaterally. The tone was increased at the left lower limb. He also had right third cranial nerve palsy with partial ptosis, limited adduction and dilated pupil. Two weeks later, he developed a few episodes of generalized tonic clonic seizures. He continued to deteriorate and passed away due to sepsis after 74 days in the ward.

DISCUSSION

We present here an unusual case of GBM with diffuse leptomeningeal disease demonstrated by MRI. The diagnosis of GBM was confirmed by histology.

This patient with clinical, imaging and CSF features of meningitis was initially diagnosed and treated as TBM, because TBM was a common and treatable cause of chronic meningitis. The other primary tumours causing leptomeningeal disease are pinealoma, ependymoma and medulloblastoma.^{2,3} TBM was later thought to be unlikely because the patient had relatively preserved cognitive and neurological function, with little headache and neck stiffness, for such a widespread leptomeningeal tuberculosis. He also did not respond to anti-TB drugs.

Our review shows that there were 18 adult cases of leptomeningeal GBM previously reported in the medical literature.^{2,4-8} There was a patient involving the pons⁶, several cases involving the cervical spine^{2,7,8}, and four cases involving the cerebellum.⁴ As far as we are aware, this is the only case where the leptomeningeal disease presents as cauda equina syndrome.

In conclusion, we present here the first case of diffuse leptomeningeal GBM presenting as cauda equina syndrome.

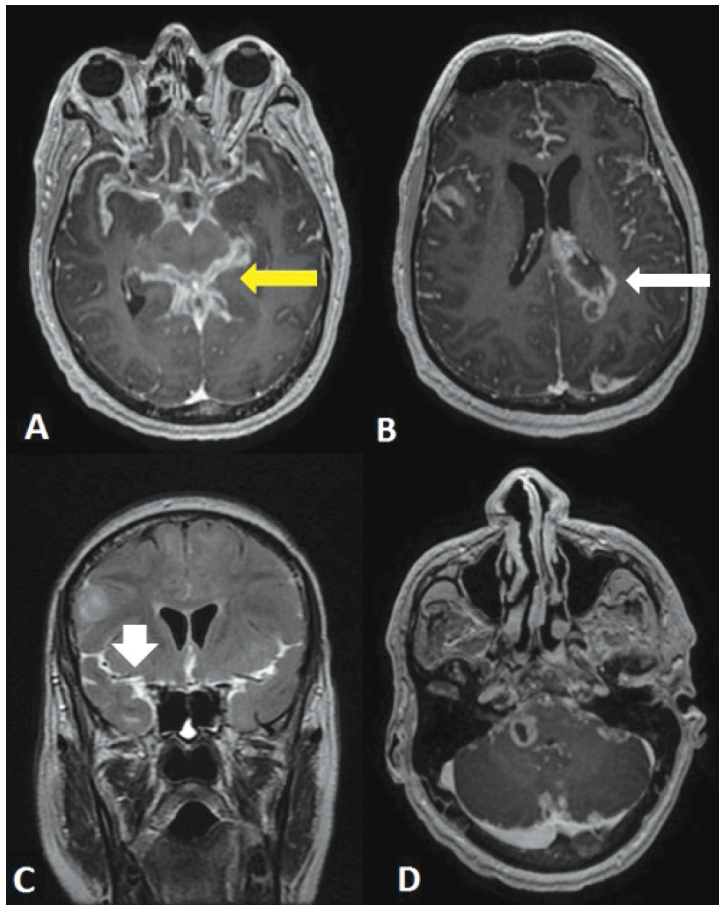


Figure 2 (A-D). Follow up MRI brain post contrast axial T1 (A, B, D) showing progressive enlargement of the previously seen enhancing lesions and increasing ependymal enhancement at the left lateral ventricle (arrow). There is now more extensive and florid leptomeningeal enhancement at the Sylvian fissures and basal cisterns (yellow arrow) which demonstrate abnormal hyperintense subarachnoid spaces on coronal FLAIR (short arrow)(C).

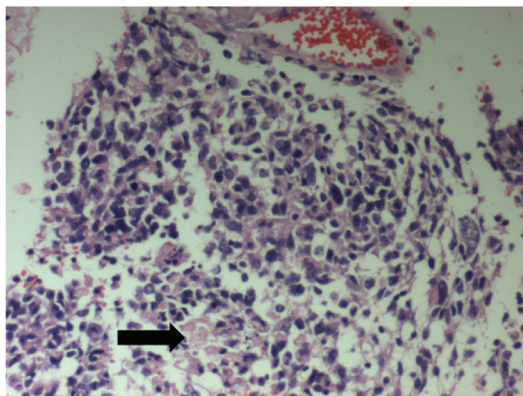


Figure 3A. The cellular neoplasm contains neoplastic cells which exhibit nuclear pleomorphism, nuclear hyperchromatism and focal tumour necrosis [black arrow] [H&E, 100x magnification].

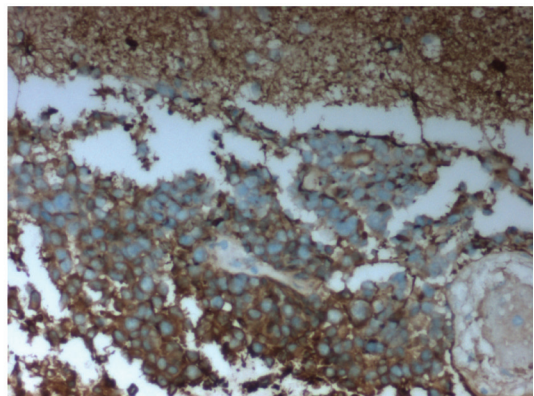


Figure 3B. The neoplasm shows a strong and distinct cytoplasmic staining with glial fibrillary acidic protein [GFAP stain, 100 x magnifications].

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