

Dengue haemorrhagic encephalitis – Role of susceptibility weighted imaging (SWI)

Published on 23.10.2019

ISSN: 1563-4086

Section: Neuroradiology

Area of Interest: Neuroradiology brain

Procedure: Neuroradiology brain

Imaging Technique: MR

Special Focus: Neuroradiology brain Case Type: Clinical Cases

Authors: Dr. Shanmuga Jayanthan S

Patient: 29 years, male

Clinical History:

A 29-year-old male patient presented with history of fever, headache, abdominal pain and acute onset of altered sensorium. On neurological examination, patient had cognitive impairment and no evidence of neck rigidity. Cerebellar involvement could not be evaluated clinically, as the patient was in a state of altered sensorium. Lab values showed thrombocytopenia. The diagnosis of dengue was confirmed by positive serology for Ig-M antibody and NS- 1 antigen. There was no history of hypertension. Blood pressure was normal at the time of admission.

Imaging Findings:

Initial imaging with ultrasound (US) and computed tomography (CT) was done. USG abdomen showed gall bladder wall oedema, ascites and bilateral pleural effusion. Non-contrast CT brain showed hypodensity in bilateral capsuloganglionic regions (Fig. 1). MRI was advised with the suspicion of dengue encephalitis and it showed areas of T2/FLAIR hyperintensities in bilateral capsuloganglionic regions (Fig. 2 and Fig. 3). No significant diffusion restriction was seen. No evidence of haemorrhage seen in T2/FLAIR sequences. However, SWI sequence showed multiple tiny areas of blooming suggestive of microbleeds (Fig. 4). Contrast MRI was not performed in this patient as the consent could not be obtained from the patient attendants. However, CSF analysis did not show signs of meningitis. Follow-up imaging was obtained after three months. Patient had good clinical outcome and corresponding MRI showed complete resolution of hyperintensities (Fig. 5).

Discussion:

Dengue virus is a RNA virus of Flaviviridae family and spread by the vector Aedes mosquito. India belongs to the endemicity category A for dengue, as classified by the World Health Organisation (WHO) [1]. Headache, insomnia, altered sensorium and focal neurological deficit are the common presenting symptoms in patients with dengue encephalitis [2].

MRI is the preferred imaging modality of choice in the evaluation of dengue encephalitis [2]. Imaging findings include T2/FLAIR hyperintensities in thalami, midbrain and deep white matter regions with most of them showing areas of diffusion restriction. Cerebellar involvement can also occur [3]. Contrast MRI is useful in cases of

meningoencephalitis and show abnormal meningeal enhancement [1]. Some patients may also have cerebellar peduncle involvement and intraparenchymal haemorrhage [1,3]. Involvement of thalami, cerebellar peduncle with diffusion restriction and presence of haemorrhagic foci are associated with poor outcome [3]. Microhaemorrhages are rarely associated with dengue and SWI sequences are very helpful in identifying them and hence should be included in routine brain imaging for dengue encephalitis [6].

Microbleeds are chronic small haemorrhages that are rarely seen in dengue. They are more commonly seen in cerebral amyloid angiopathy and hypertensive vasculopathy [4]. Although changes in white matter or deep gray matter are easily picked up on routine T2/FLAIR imaging sequences, these microhaemorrhages are identified in SWI sequences, more often, as compared to other routine MRI sequences. These are responsible for vascular dementia and cognitive impairment [4,5,6].

Written informed patient consent was obtained for the publication.

Differential Diagnosis List: Haemorrhagic dengue encephalitis, Cerebral amyloid angiopathy, Diffuse axonal injury, Cavernoma and hypertensive vasculopathy

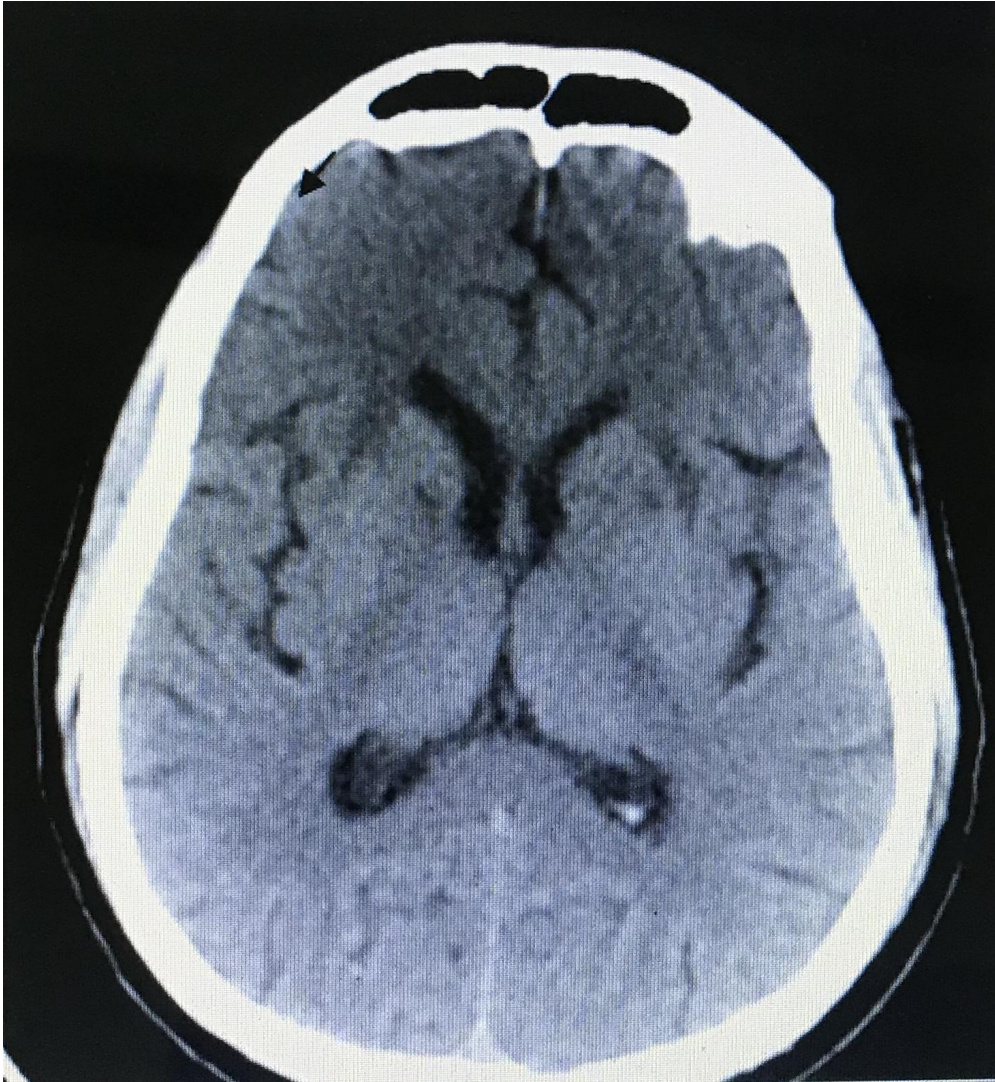
Final Diagnosis: Haemorrhagic dengue encephalitis

References:

- Soni BK, Das DSR, George RA, Agarwal R, Sivasankar R. MRI features in dengue encephalitis: a case series in south indian tertiary care hospital. *Indian J Radiol Imaging*. 2017;27(2):125-128. doi: 10.4103/ijri.IJRI_322_16. (PMID: [28744070](#))
- Reddy R, Sarkar PS, Hajari D, Phillip B. MRI findings in dengue encephalitis: a case report. *Natl J Med Res*. 2016;6(2):215-216.
- Vanjare HA, Mannam P, Mishra AK, Karuppusami R, Carey RAB et al. Brain imaging in cases with positive serology for dengue with neurologic symptoms: a clinikoradiologic correlation. *AJNR Am J Neuroradiol*. 2018;39(4):699-703. doi: 10.3174/ajnr.A5544 (PMID: [29439121](#))
- Martinez-Ramirez S, Greenberg SM, Viswanathan A. Cerebral microbleeds: overview and implications in cognitive impairment. *Alzheimers Res Ther*. 2014;6(3):33. doi: 10.1186/alzrt263. (PMID: [24987468](#))
- Li X, Yuan J, Yang L, Qin W, Yang S, Li Y, et al. (2017) The significant effects of cerebral microbleeds on cognitive dysfunction: An updated meta-analysis. *PLoS ONE* 2017;12(9):e0185145. <https://doi.org/10.1371/journal.pone.0185145>. (PMID: [28934304](#))
- Ayaz M, Boikov AS, Haacke EM, Kido DK, Kirsch WM. Imaging cerebral microbleeds using susceptibility weighted imaging: one step toward detecting vascular dementia. *J Magn Reson Imaging*. 2010;31(1):142-148. doi: 10.1002/jmri.22001. (PMID: [20027582](#))

Figure 1

a

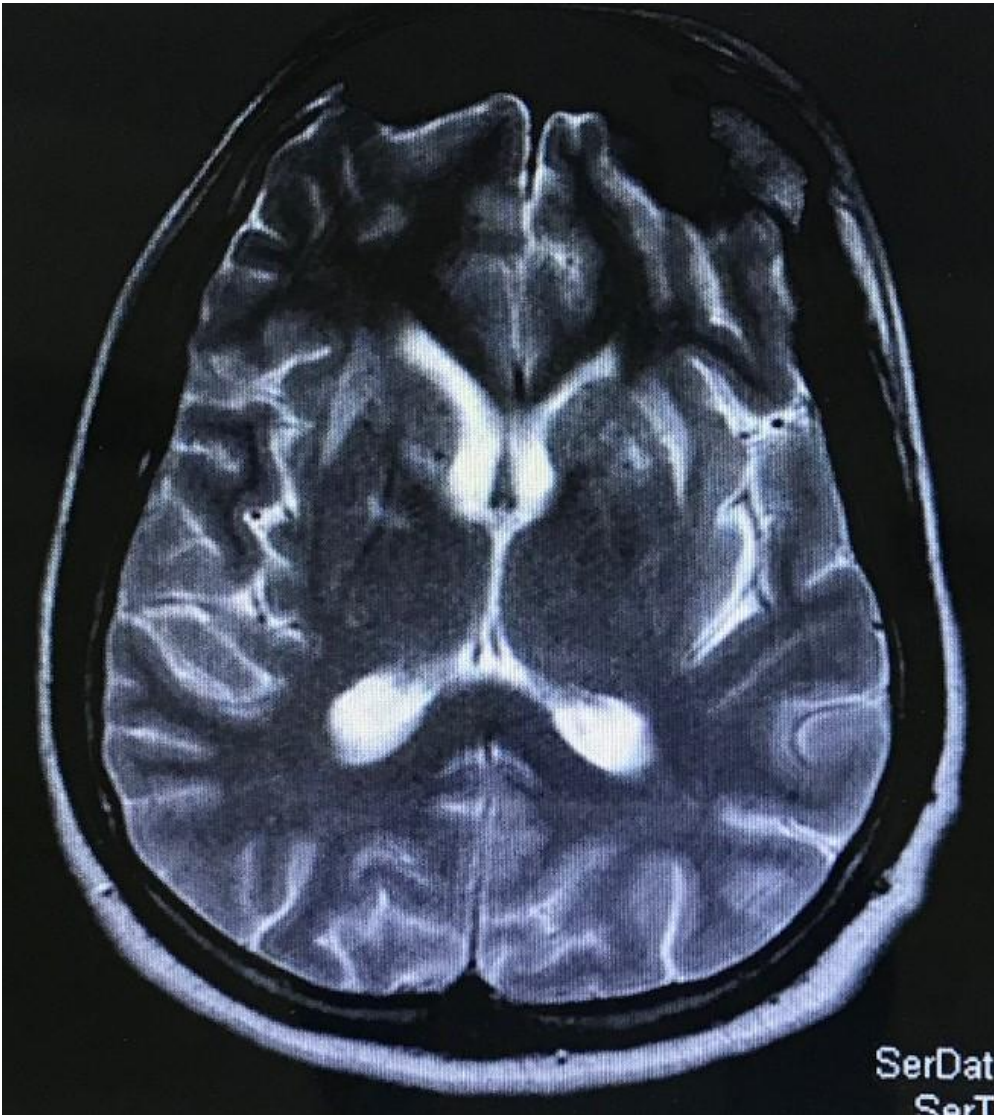


Description: Non-contrast CT brain shows subtle hypodensity in bilateral capsuloganglionic regions

Origin: Department of Radiology and Imaging Sciences, Meenakshi hospital, Tanjore, India.

Figure 2

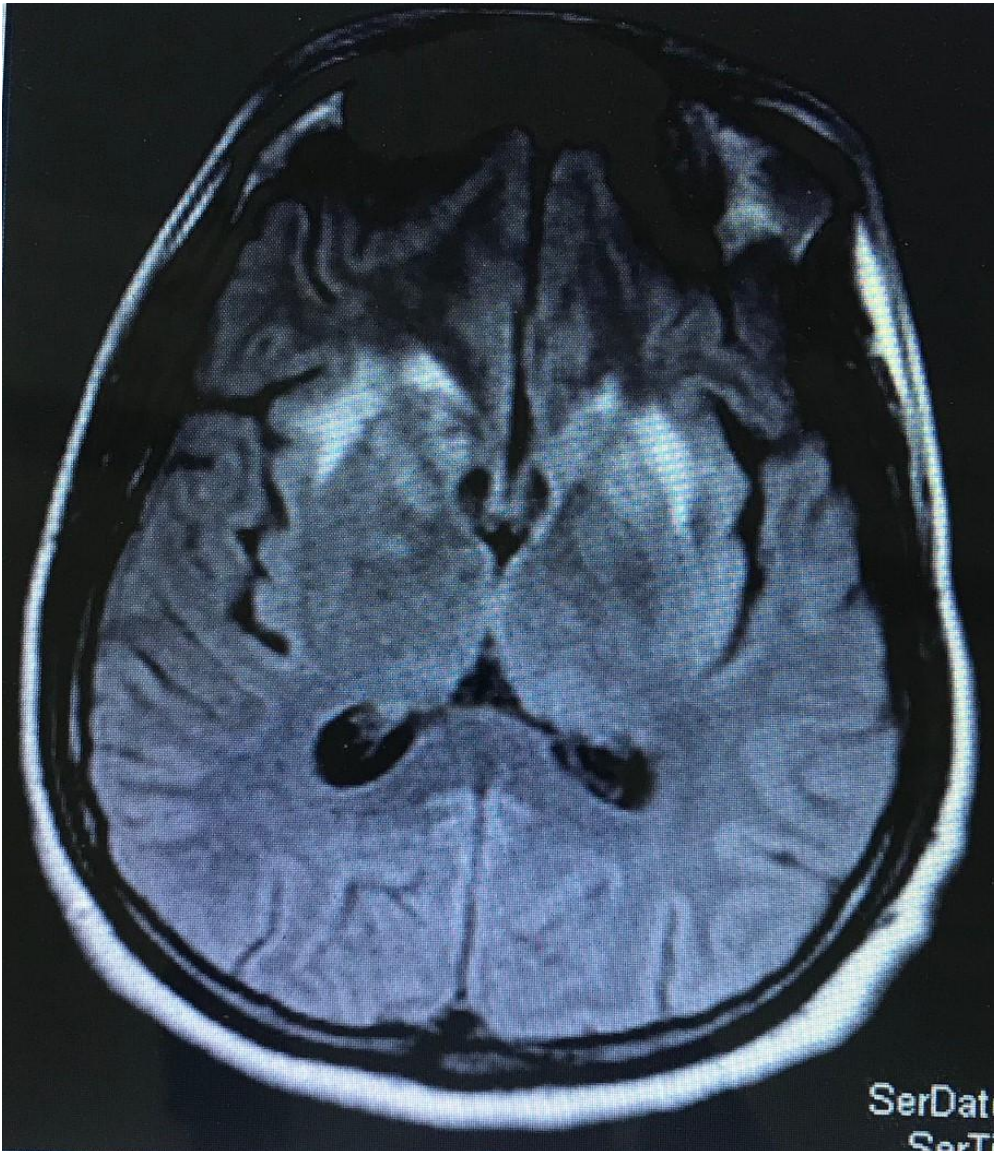
a



Description: T2-weighted image shows bilateral anterior capsuloganglionic hyperintensities **Origin:** Department of Radiology and Imaging Sciences, Meenakshi hospital, Tanjore, India.

Figure 3

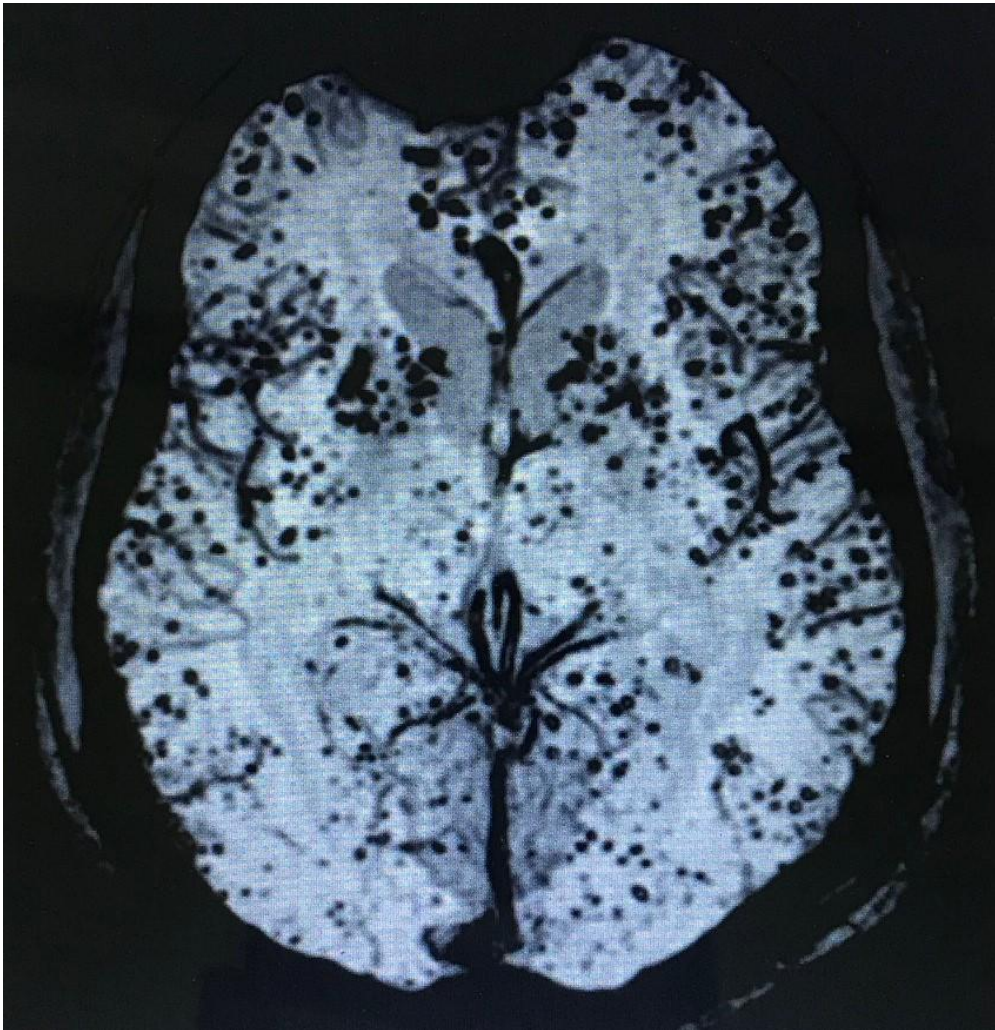
a



Description: FLAIR image shows bilateral anterior capsuloganglionic hyperintensities **Origin:** Department of Radiology and Imaging Sciences, Meenakshi hospital, Tanjore, India.

Figure 4

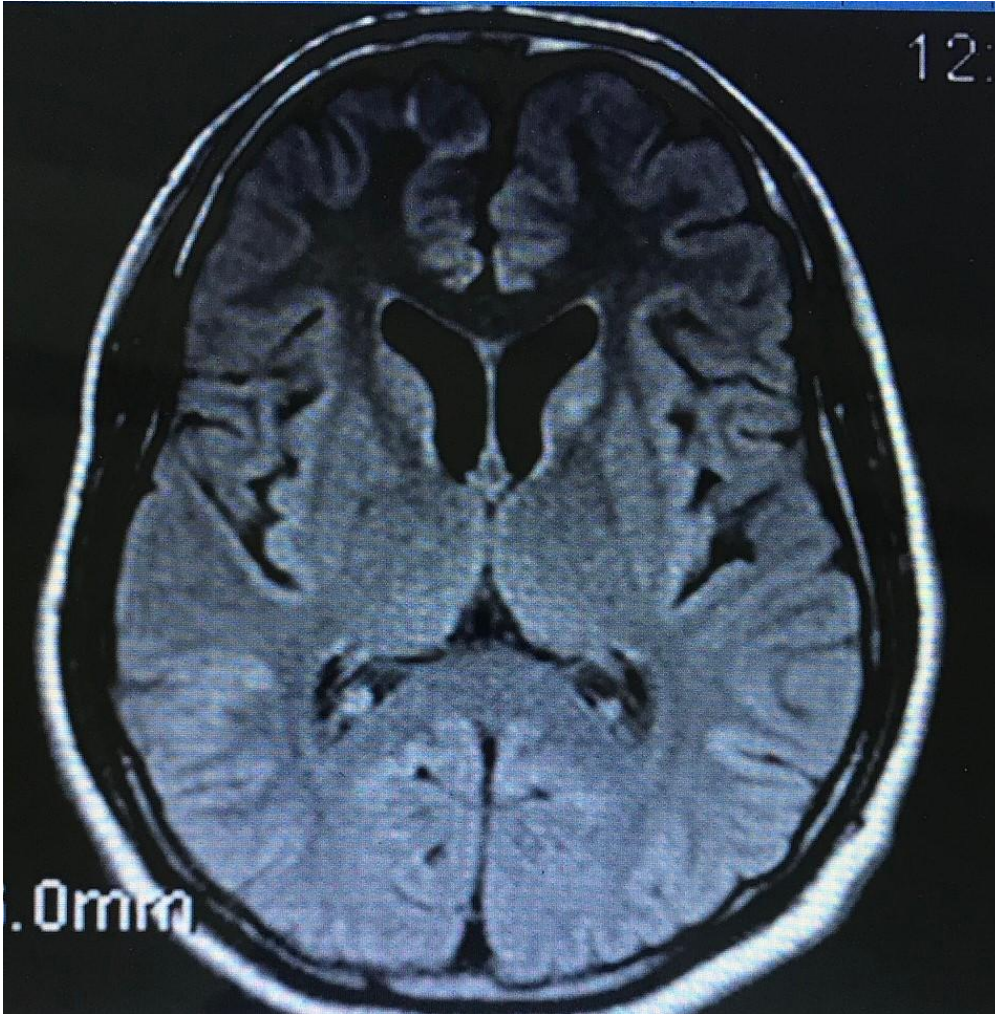
a



Description: SWI image show multiple areas of blooming in cortical and deep grey matter suggestive of microhaemorrhages **Origin:** Department of Radiology and Imaging Sciences, Meenakshi hospital, Tanjore, India.

Figure 5

a



Description: Resolved FLAIR hyperintensities in the follow up MRI (after 3 months) **Origin:** Department of Radiology and Imaging Sciences, Meenakshi hospital, Tanjore, India.