# *Clinical Case Report*

## Cortical venous thrombosis due to acquired hyperhomocysteinaemia

P. K. SASIDHARAN, ASHIF MOHAMED

**ABSTRACT**

**A 20-year-old student presented with generalized tonic–clonic seizures and was diagnosed to have cortical venous thrombosis. Her dietary history and the clinical signs of vitamin deficiency prompted further investigations, which detected hyperhomocysteinaemia secondary to vitamin $B_{12}$ deficiency as a factor contributing to the hypercoagulable state. This case highlights the importance of a balanced diet, as well as the necessity for primordial prevention.**

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THE CASE

A 20-year-old student from an upper middle class family was referred to us for evaluation of anaemia. Her illness had started 4 months ago, when she started getting headaches. The episodes were stereotyped; the headaches lasted for 2–3 hours, were unilateral, over the right frontal area, and subsided with analgesics. The headache was not associated with visual aura, vomiting, disturbance in sleep, or sensory or motor complaints, and there was no history of early morning headache. Two months after the onset of the headaches, while watching television, she developed generalized tonic–clonic seizures. She was evaluated elsewhere for the seizures and a computed tomographic (CT) scan of the head was interpreted as showing an isodense-to-hypodense non-enhancing lesion, with a peripheral hypodense zone in the upper posterior part of the temporal lobe and adjacent parietal lobe, with minimal mass effect (Fig. 1). A differential diagnosis of low grade glioma/granuloma/focal infarction/resolving haematoma was considered and magnetic resonance imaging (MRI) was advised by the radiologist. The MRI showed a hypodense lesion on $T_1$- and a hyperdense lesion on $T_2$-weighted images in the left temporal lobe, supporting the diagnosis of a low grade glioma (Fig. 2).

The patient was then referred for surgery to another centre. Before the surgery, she underwent a repeat MRI, which showed focal hyperintensity in the region of the left posterior temporal gyrus on $T_1$-weighted images. The same areas showed signal intensification on $T_2$-weighted images. Hyperintensity was noted along the course of the vein of Labbe in F1 3D images, which suggested thrombosis of the vein of Labbe (Fig. 3). The lesion seen on the initial CT scan and MRI was a venous infarct, which had been misinterpreted as a mass lesion. With a diagnosis of cortical vein thrombosis made, she was evaluated further and found to have anaemia (haemoglobin 9.2 g/dl), with macrocytosis (mean corpuscular volume [MCV] 110 fl), mean corpuscular

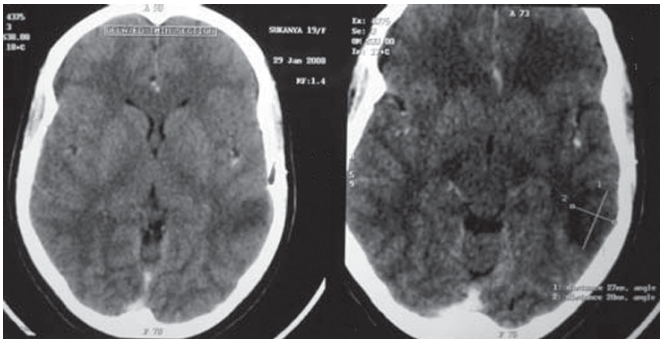

FIG 1. Plain CT scan of the head showing hypodense lesion (venous infarct) in the left temporal lobe

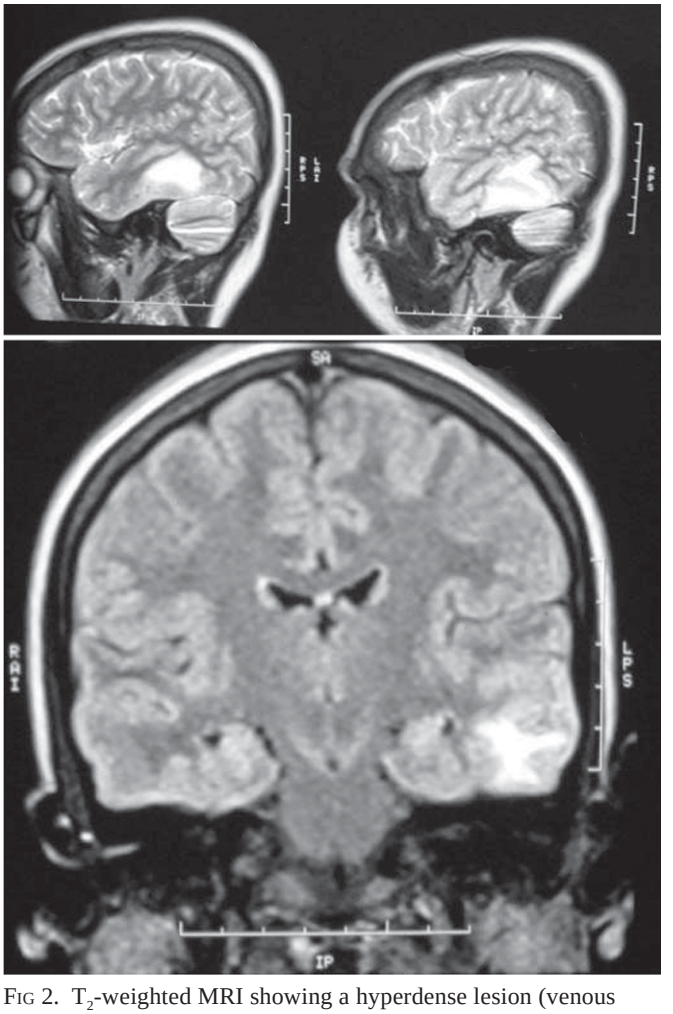


FIG 2. $T_2$-weighted MRI showing a hyperdense lesion (venous infarct) in the left temporal lobe

Calicut Government Medical College, University of Calicut, Calicut, Kerala, India

P. K. SASIDHARAN, ASHIF MOHAMED Department of Medicine and Division of Haematology

Correspondence to P. K. SASIDHARAN; *sasidharanpk@gmail.com*

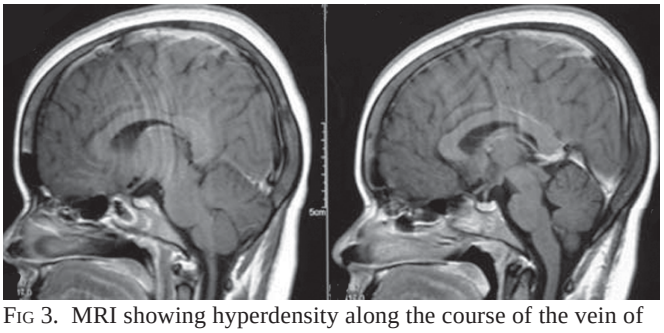

FIG 3. MRI showing hyperdensity along the course of the vein of Labbe, suggestive of cortical venous thrombosis

haemoglobin [MCH] 33.8 pg and mean corpuscular haemoglobin concentration [MCHC] 36 g/dl). The total and differential leucocyte counts were normal, there was mild thrombocytosis (510 000/cmm) and the red cell distribution width (RDW) was 18%. The erythrocyte sedimentation rate and reticulocyte count (0.6%) were normal. She tested negative for antinuclear antibody, anti-ds DNA and anti-phospholipid antibody. Examination of the cerebrospinal fluid (CSF) showed an opening pressure of 110 mm of CSF, 2 cells/cmm which were lymphocytes, a protein level of 41 mg/dl and a sugar level of 70 mg/dl (the corresponding blood sugar was 99 mg/dl). The chest X-ray, electrocardiogram and 2D echocardiogram were normal. The sleep electroencephalogram (EEG) showed a mild degree of focal non-specific electrophysiological dysfunction over the left posterior temporal region. No epileptiform abnormalities were seen. The striking abnormality was an elevated serum homocysteine level of 65 $\mu$mol/L (normal 5–15 $\mu$mol/L). The patient was treated with antiepileptics and given folate supplementation for the macrocytic anaemia and hyperhomocysteinaemia. She was referred to us for evaluation of the anaemia and procoagulant state.

A complete review of the patient's history and progression of the disease was done. A detailed personal and dietary history was taken. She was on a strictly vegetarian diet and did not consume eggs or dairy products. Her diet was unbalanced, and lacked essential nutrients and trace elements. On examination, she was moderately built and nourished, and had mild pallor. Her hair had greyed prematurely and there was knuckle pigmentation. She also had a positive Romberg sign, suggesting mild subacute combined degeneration of the spinal cord. Folate supplementation alone, prescribed in the previous centre, in the presence of severe vitamin $B_{12}$ deficiency might have precipitated the neurological signs. We made a clinical diagnosis of vitamin $B_{12}$ deficiency and investigated her further. Her peripheral smear showed moderate anisopoikilocytosis with normochromic normocytic cells, macro-ovalocytes, teardrop cells and a few microcytes, suggestive of dimorphic anaemia. The serum vitamin $B_{12}$ level was 293 pg/ml (211–911 pg/ml) and the serum ferritin was decreased. The peripheral smear and lower limit of vitamin $B_{12}$ in the serum supported our clinical diagnosis. The hyperhomocysteinaemia was secondary to the vitamin $B_{12}$ deficiency and resulted in a hypercoagulable state. The patient was treated with vitamin $B_{12}$ and folate and improved clinically. She remained asymptomatic at 3 months' follow up and was adhering to the advised balanced diet. A review of the diagnosis as a part of the preoperative work-up led to the correct diagnosis (cortical venous thrombosis) and helped avoid an unnecessary surgical procedure.

## DISCUSSION

Hyperhomocysteinaemia can lead to vascular events such as acute coronary syndromes, recurrent coronary events, stroke and venous thrombosis.[1,2] It can be familial or due to deficiency of vitamin $B_{12}$, folate and pyridoxine (Fig. 4). Randomized controlled trials support treating patients with hyperhomocysteinaemia and hypercogulable state with folic acid (1 mg/day), vitamin $B_6$ (10 mg/day) and vitamin $B_{12}$ (0.4 mg/day).[3] All patients should receive vitamin B complex to guard against peripheral neuropathy.[3–5] Normalization of the homocysteine concentration has been reported within 2 weeks, but further lowering of homocysteine levels occurs by 6 weeks.[1] Above all, the importance of adhering to a balanced diet should be impressed upon all patients to prevent life-threatening thrombotic events.[6]

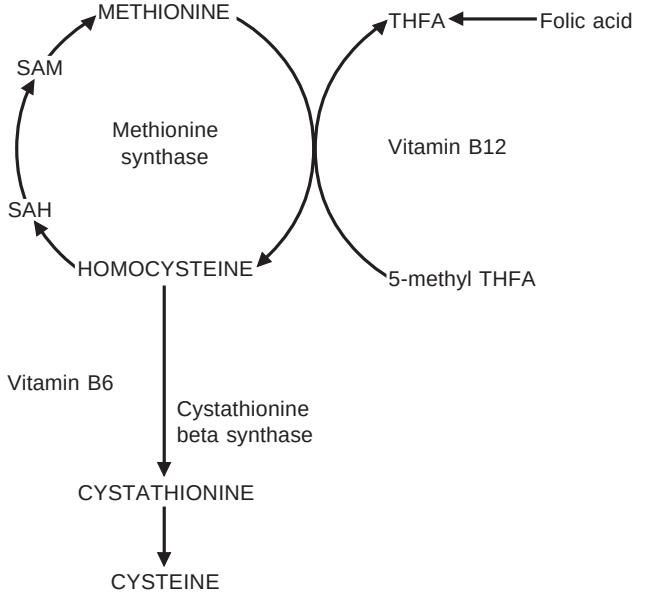


FIG 4. Homocysteine is metabolized either by trans-sulphuration to cystathionine (in a reaction catalysed by cystathionine-synthase [CBS]), the reaction is dependent upon vitamin $B_6$ in its biological active form, i.e. pyridoxal 5'-phosphate, or by remethylation to methionine. The latter reaction is dependent upon cobalamin (vitamin $B_{12}$) and folate. SAM S adenosyl methionine SAH S adenosyl homocysteine THFA tetra hydrofolic acid

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