

# In Front of Ischemic Stroke: Think about Pernicious Anemia

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**Abstract** Pernicious anemia can cause several neurologic impairment. Ischemic stroke has been reported as a rare complication of pernicious anemia. We report a case of 51-year-old woman, who presented with ischemic stroke. Hyperhomocysteinemia due to pernicious anemia was diagnosed while looking for secondary causes of the cerebral event. She was treated with vitamin B12 that improved her anemia but not her neurological impairment.

**Keywords:** pernicious anemia, stroke, vitamine B12, homocysteine

**Cite This Article:** Ines Kechaou, Eya Cherif, Imene Boukhris, Samira Azzabi, Chékib Kooli, Lamia Ben Hassine, and Narjes Khalfallah, "In Front of Ischemic Stroke: Think about Pernicious Anemia." *American Journal of Medical Case Reports*, vol. 4, no. 5 (2016): 158-159. doi: 10.12691/ajmcr-4-5-3.

## 1. Introduction

Pernicious anemia is an autoimmune disorder characterized by atrophic gastritis causing vitamin B12 deficiency via malabsorption. Generally, it is diagnosed on the occasion of anemic syndrome leading to discover non regenerative macrocytic anemia. The bone marrow aspiration confirms megaloblastosis. The final diagnosis of Biermer's disease is based on the vitamin B12 deficiency, the atrophic gastritis, antibodies against intrinsic factor and parietal cells. Vitamin B 12 deficiency can lead to several neurologic complications such as subacute combined degeneration of the spinal cord in combination with spinocerebellar tract, brain pyramidal lesions, peripheral neuropathy and psychiatric symptoms [1].

Ischemic stroke have been reported as a rare complication of pernicious anemia due to hyperhomocysteinemia [2,3]. It seems useful to sensitize all clinicians to this complication of pernicious anemia by reporting a case observed in our institution.

## 2. Case Report

A 51-year-old woman with long history of type 1 diabetes since 35 years and hypothyroidism since 30 years was admitted in our Internal Medicine department with sudden weakness in her left arm and leg. Neurologic examination showed left hemiplegia, areflexia in the lower left leg and no extensor left plantar response. She had deep sensitivity disorders noted by the position of the big toe. Also, she had skin pallor. No atrophic glossitis was noted in our patient. The remainder of the physical examination was normal.

Head CT showed a right para median hypodensity in the frontal lobe. This lesion was focal without any compression of the surrounding structures. The CT aspect

was in favor of a semi recent ischemic stroke in the territory of the left anterior cerebral artery.

Brain MRI revealed a right porencephalic cavity related to stroke (Figure 1). T1-weighted dynamic sequences after gadolinium administration showed multiple hypointense lesions involving the fronto-parietal area and semi oval center. The medullary area was normal.

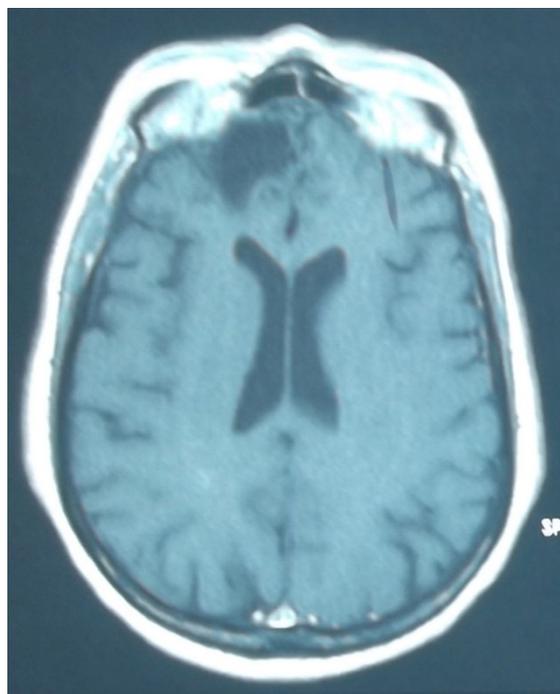


Figure 1. a right porencephalic cavity in the brain MRI.

The Doppler ultrasound of the supra-aortic trunks showed no significant stenosis. The ECG showed sinus rhythm. Echocardiography was normal.

Laboratory findings on admission revealed macrocytic non-regenerative anemia (Hemoglobin 6.1 of g/dL, mean corpuscular volume: 120 fL and reticulocytes count: 37

000), a normal white cell count ( $5000/\text{mm}^3$ ) and normal platelet count ( $265000/\text{mm}^3$ ). Cobalamin (vitamin B12) level was low: 70 pM/L (normal: 118-716 pM/L). Folate levels were within normal limits. Homocystein level was high 153.16  $\mu\text{mol/l}$  (normal  $<15.2\mu\text{mol/l}$ ). The intrinsic factor antibodies were present. The myelogram confirms megaloblastic anemia. The thyroid function tests were normal.

Video gastroscopy revealed atrophic gastritis.

The diagnosis of hyperhomocysteinemia secondary to pernicious anemia and leading to ischemic stroke was made.

The patient was treated by vitamin B12 and physiotherapy.

The patient exhibited a rapid response to the cobalamin therapy, with steady improvement in hemoglobin (10.9g/dl) after one month of therapy with vitamin B12.

She noted a little improvement of the weakness of her legs after cobalamin therapy and physiotherapy.

### 3. Discussion

Many studies demonstrate the role of hyperhomocysteinemia as a vascular risk factor via atherogenic and thrombotic mechanisms. Hyperhomocysteinemia can affect endothelial function through reduction of nitric oxide bioavailability, increasing of platelets aggregation and coagulation factors, reducing fibrinolysis and alteration of endothelial white blood cells adhesion. Fragmentations in internal elastic lamina can also lead to endothelial dysfunction. All these factors have been incriminated to cause precocious atherosclerosis and thrombotic events [4,5,6].

Several etiologies can cause hyperhomocysteinemia like vitamin B12 deficiency as in our observation, vitamin B6 and folic acid deficiency [3]. Therefore, pernicious anemia can be complicated by ischemic stroke due to hyperhomocysteinemia as described in our observation.

Treatment of pernicious anemia is based mainly on intramuscular vitamin B12 administration. This treatment is essential to improve anemia and hyperhomocysteinemia.

Six months to one year of vitamin B12 therapy is necessary to evaluate the efficiency of the treatment on the neurological impairment. But, its effect remains inconstant and is depending to long evolution of the disease. [7]. In our observation, short evolution is not sufficient to evaluate the neurological improvement.

Improvement of hyperhomocysteinemia under vitamin B12 therapy could protect against the recurrence of

ischemic events. Studies in the context of secondary prevention after normalization of hyperhomocysteinemia should be done to strengthen this hypothesis.

In the literature, the association between pernicious anemia and type 1 diabetes is well known [8]. The pernicious anemia can occur a long time after diabetes mellitus type 1 and or autoimmune thyroid disease as was the case of our patient.

### 4. Conclusion

In front of ischemic stroke pernicious anemia must be sought especially when macrocytic anemia is found.

The diagnosis of vitamin B12 deficiency should be done early in order to prevent neurologic impairment because its recovery is not systematic.

The recurrence of ischemic stroke could be reduced by the correction of hyper homocysteinemia via vitamin B12 therapy.

### Conflict of Interests

No conflict of interest.

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