ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
Index Copernicus Value: 49. 23
PubMed - National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 3, Issue – 6, November - 2018, Page No. :108 - 113

A case series of Reversible Cerebellar Nutritional Demyelination (Atypical Wernicke's encephalopathy)

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Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Wernicke encephalopathy is an acute neurological condition that is caused by the deficiency of micronutrient thiamine. Thiamine is essential part of various metabolic pathway [(1)]

- It's deficiency leads to neuronal damage due to production of reactive oxygen species[(2)] and damage to blood brain barrier. The clinical hallmark of disease are ataxia of gait, ophthalmoplegia and encephalopathy [(3)]
- WE is mostly associated with chronic alcoholism.[(4)] However it can be due to other causes like recurrent vomiting, infectious, gastrointestinal and post gastrectomy procedures[(5)]

Introduction

We report three cases of Wernicke's encephalopathy. All the three patients were males with age over 45 years. The diagnosis was based on clinical and MR imaging. All the three patients improved clinically after treatment with thiamine and brain imagining findings resolved in all the three patients on follow up.

Case report

- **Case 1**

A 45 years old male presented with low grade fever, decreased appetite, slurring of speech and gait instability. The history revealed that the patient did not have any previous comorbidities. There was no history of alcohol intake. General and systemic examination revealed the patient to be stable hemodynamically. The neurological examination showed mental sluggishness, disorientation and signs of nystagmus, ataxia and ophthalmoplegia. Lab investigations revealed most of the biochemical and haematological parameters to be within normal range expect with a blood sugar of 167 and Hba1c of 9.1 . Detailed CSF was normal Brain imagining was done. C.T head was normal with MRI brain showing hyperintensities in vermis, thalami and cerebellar hemispheres. The diagnosis of Wernicke's encephalopathy was made and patient was treated with injectable thiamine. Subsequently after treatment patient improved clinically and MR findings were resolved after four weeks

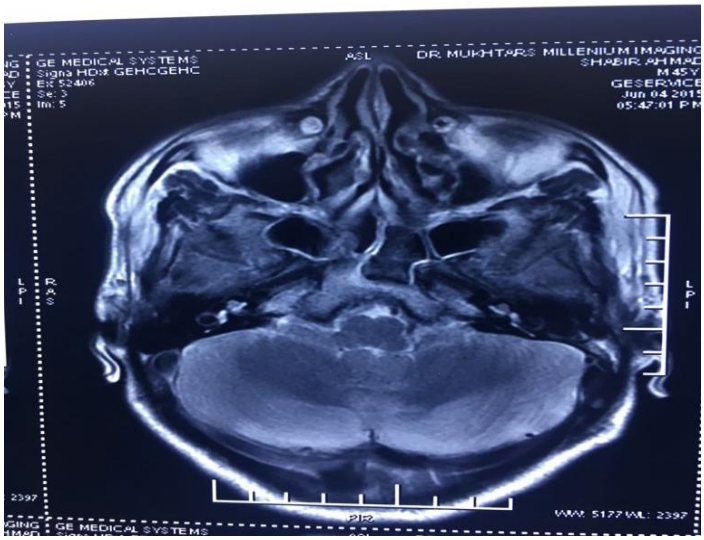

Image 1 A

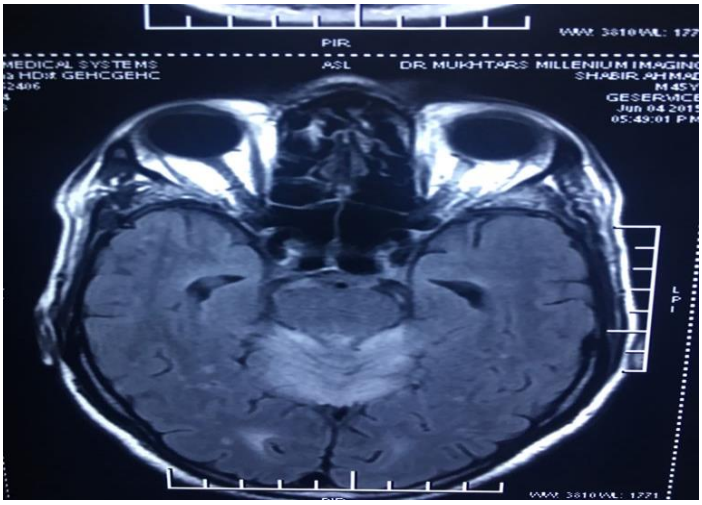

Image 1 B

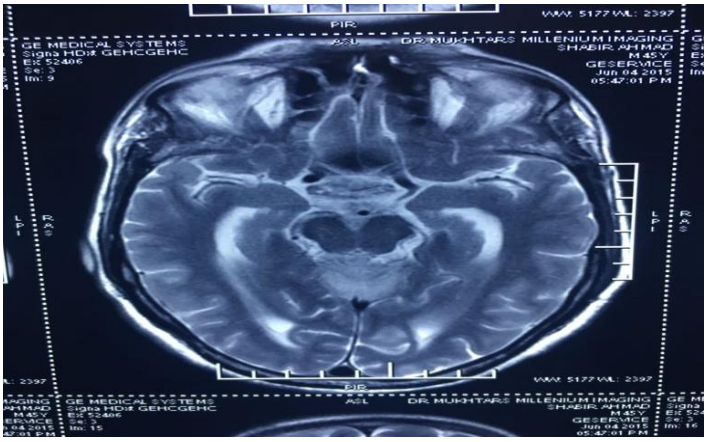

Image 1 C

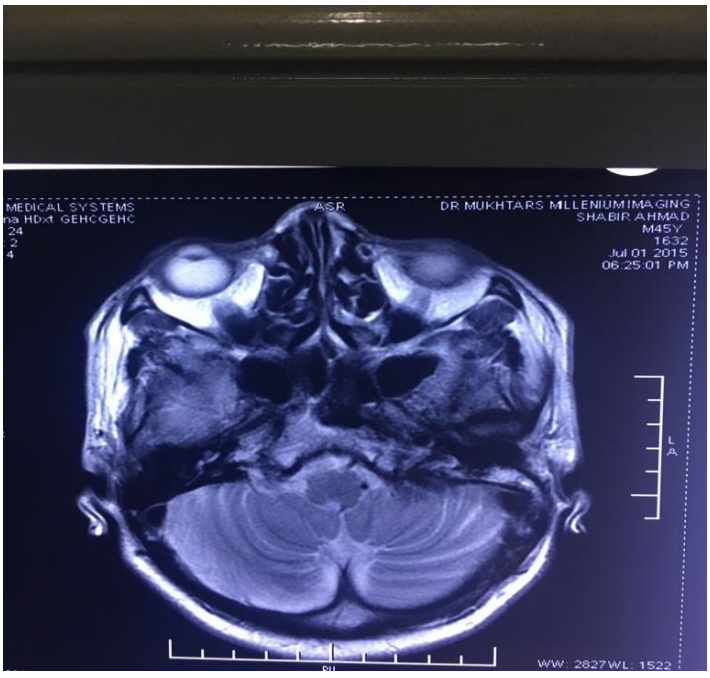

Image 1 D

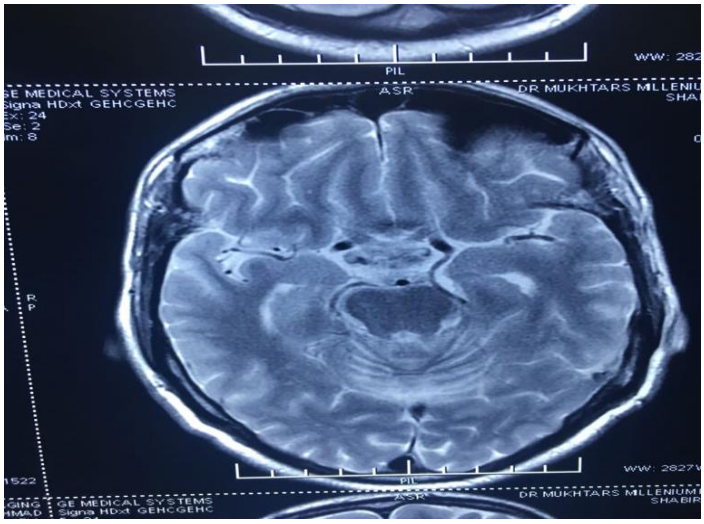

Image 1 E

In Image 1A and 1B the MRI shows hyperintensities in both cerebellar hemespheres and vermis. The repeat MRI (figure 1D & 1E) taken one month later showed the resolved MRI findings.

CASE 2

- A 56 year male underlying cholelithiasis with no evidence of cholecystits with persistent vomiting was admitted with slurring of speech, truncal ataxia and altered mentation. On history the patient did not have any comorbid illness and was non-alcoholic.
- General examination revealed that patient was hemodynamically stable. Systemic examination was normal except neurological findings having truncal ataxia nystagmus, stepping gait and pendular knee jerk
- Lab parameters were normal. CSF was within normal range. Nerve conduction velocity revealed axonal demyelinating polyneuropathy. Imaging was done with CT showing hypodense cerebellar lesion. MR brain showed symmetrical cerebellar and vermian lesion with no diffusion. The patient was treated with parenteral Thiamine and improved clinically with repeat MRI brain showing resolved lesions.

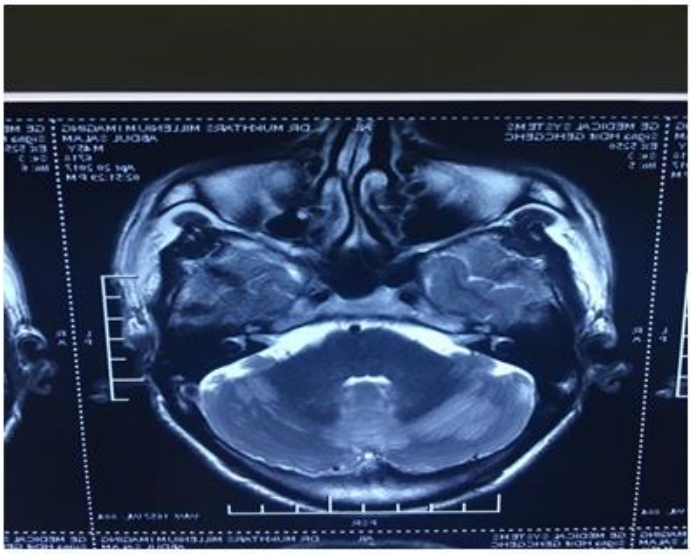

Image 2 A

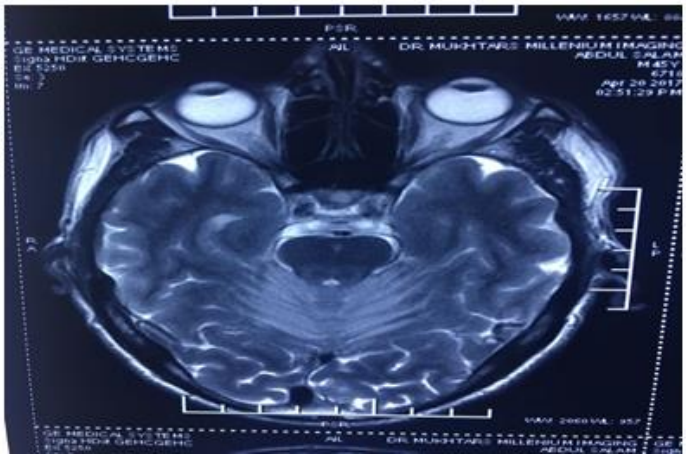

Image 2 B

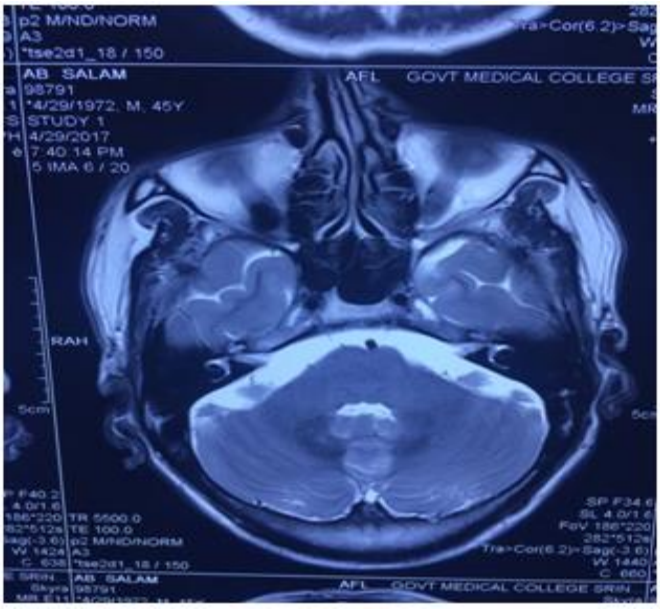

Image 2 C

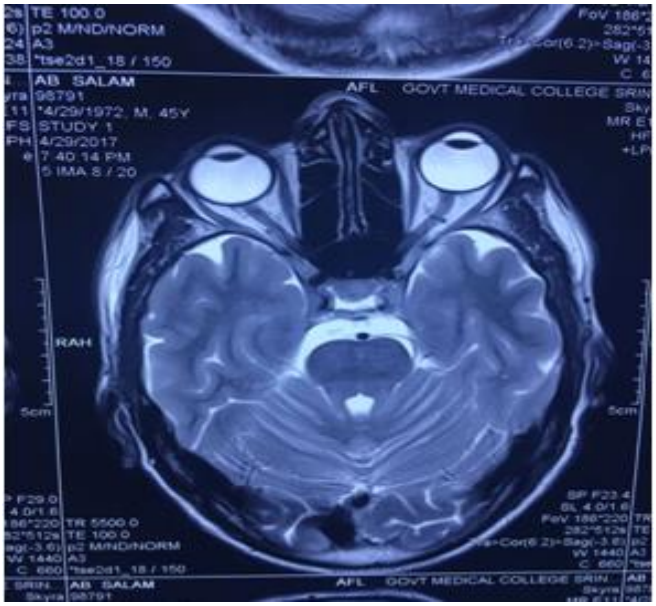

Image 2 D

Figure 2A & 2B showing MRI findings in vermis and both cerebellar hemispheres. The repeat imagining (MR) taken four weeks apart shows resolving MRI findings

Case 3

A 51 year male presented with gait instability and decreased level of consciousness. The detailed history revealed that patient had prior history of vomiting and was non-alcoholic with no underlying comorbid illness. No other symptomatology was found at the time of prestation. General examination showed that patient was hemodynamically stable with normal cardiopulmonary evaluation. Neurological examination revealed decreased level of consciousness amnesia, nystagmus, ophthalmoplegia and ataxia.

Lab investigations were carried out with haematological and biochemical parameters and CSF within normal limits. Imaging was done and CT brain was found to be normal and MRI brain showing T2W and FLAR hyperintensities involving cerebellar areas. NCV was done showing axonal demyelinating polyneuropathy. The patient was treated with injectable thiamine subsequently improved clinically and repeat imagining was showing resolved brain lesions.

Discussion

- Wernicke encephalopathy (WE) is an acute neurological condition characterized by a clinical triad of ophthalmoplegia, nystagmus, ataxia, and confusion [6]. This is a life-threatening illness caused by thiamine deficiency, which primarily affects the peripheral and central nervous systems. Thiamine deficiency is characteristically associated with severe alcohol use disorder. Although Wernicke encephalopathy mostly affects people who have a thiamine deficiency due to chronic alcoholism, various other causes include severe malnutrition, hyperemesis gravidarum, prolonged parenteral nutrition, malignancies, immunodeficiency syndromes, liver disease, hyperthyroidism, and severe anorexia nervosa[12,13,14]. Chronic alcohol consumption may cause thiamine deficiency due to impaired absorption of thiamine from the intestine, a possible genetic predisposition, inadequate diet, reduced storage of thiamine in the liver, and other nutritional deficiencies
- Prevalence data on Wernicke encephalopathy comes mainly from autopsy studies with rates ranging between 1% and 3% [7,8]. Several studies indicate that prevalence rates via analysis of clinical records are lower in comparison to necropsy studies, as the diagnosis is easily overlooked or missed. The incidence of Wernicke encephalopathy is believed to be higher in developing countries due to vitamin deficiencies and malnutrition. The female to male ratio for Wernicke encephalopathy is 1:1.7, and there are no studies that show a particular race predisposed to Wernicke encephalopathy
- Thiamine, one of the first B vitamins to be discovered also known as Vitamin B1, is a coenzyme that is essential for intricate organic pathways and plays a central role in cerebral metabolism. This vitamin acts as a cofactor for several enzymes in the Krebs cycle and the pentose phosphate pathway, including alpha-keto-glutamic acid oxidation and pyruvate decarboxylation.[9] Thiamine-dependent enzymes function as a connection between glycolytic and citric acid cycles. Therefore, deficiency of thiamine will lead to decreased levels of alpha-keto-glutarate, acetate, citrate, acetylcholine and accumulation of lactate and pyruvate. This deficiency can cause metabolic imbalances leading to neurologic complications including neuronal cell death. Neuronal death in the mammillary bodies and thalamus were implicated in multiple cases of Wernicke encephalopathy studied. Studies involving computed tomography (CT) and magnetic resonance imaging (MRI) of patients with Wernicke encephalopathy revealed lesions in the thalamus with dilated ventricles and volume loss in the mammillary bodies. The lesions are usually symmetrical in the midbrain, hypothalamus, and cerebellum
- Wernicke encephalopathy should be suspected in any patient with chronic alcohol abuse or any form of malnutrition and any of the following: acute altered mental status, ophthalmoplegia, ataxic gait, delirium, and hypotension. The classic triad of Wernicke encephalopathy is altered mental status, ataxic gait, and ophthalmoplegia. The diagnosis is made based on clinical presentation, and a definitive diagnosis is complicated as the clinical triad may not be present in up to 90% of patients.
- The hallmark sign of Wernicke encephalopathy is ocular abnormalities especially nystagmus. Other oculomotor symptoms include cranial nerve involvement of oculomotor, abducens, and vestibular nuclei causing conjugate gaze palsies. Gait ataxia is also a significant finding in Wernicke encephalopathy where patients will present with a broad-based gait. Also, gait can worsen, and in many

cases, patients are unable to walk. Physical examination may include a complete neurological exam with cerebellar testing. Disorientation and altered sensorium characterize encephalopathy. Some patient can present with hyperactive delirium secondary to possible alcohol withdrawal symptoms alongside Wernicke encephalopathy. Less than 5% of patients with Wernicke encephalopathy can present with the severely depressed level of consciousness that will eventually lead to coma and death. Some other warning signs could include hyperthermia and hypotension. The patient could also present with peripheral neuropathy and commonly includes the lower extremity, and an examination would reveal distal sensory loss

- Evaluation should include a thorough patient history with a focused physical exam and laboratory workup with appropriate imaging. There are no specific laboratory tests for diagnosing Wernicke encephalopathy as it is a clinical diagnosis with the above mentioned classic signs and symptoms. However, a complete blood count and the comprehensive metabolic panel can be completed to exclude other causes of central nervous system abnormalities. Moreover, normal brain imaging [(10)] cannot rule out Wernicke encephalopathy and therefore not very beneficial either. Caine et al [(11)]. criteria were established in 1997 which is now 85% sensitive if patients have two or more of the classic features that include: ataxia, confusion, and ophthalmoplegia. Also, looking for risk factors helps in evaluating the patient as Wernicke encephalopathy were classically thought of as a disease exclusively due to alcoholism. However, in recent years Wernicke encephalopathy is also seen in patients that are chronically malnourished, post-bariatric surgery[(12,13,14)], hyperemesis ([12,13,14])gravidarum, liver disease, hyperthyroidism, and severe anorexia nervosa.
- The aim of treatment is prompt and quick correction of the thiamine deficiency in the brain. Wernicke encephalopathy is a medical emergency and considered a reversible condition, therefore, requiring immediate emergent attention although the onset of the disease may be acute or chronic. Parenteral administration of thiamine is most effective and provides for rapid administration, however, in some cases, there are persistent neurological deficits, and the acute condition can progress to chronic Korsakoff syndrome. The preferred dose of thiamine treatment for Wernicke encephalopathy may be as high as 500 mg.[(15)] given one to three times daily parenterally. All malnourished patient may need higher doses of thiamine. There is some evidence that thiamine treatment can improve the confusional state, quick resolution of ataxia, ophthalmoplegia, and nystagmus. Thiamine is generally administered before or together with glucose solutions because the glucose oxidation can decrease thiamine levels thereby exacerbating the neurological symptoms of Wernicke encephalopathy. Patient with magnesium deficiency should also be treated as this can result in reduced recovery from Wernicke encephalopathy especially in patients with alcoholism.

References

1. Harper C Wernicke's encephalopathy
2. Dreyfus PM. Thiamine and nervous system : an overview . j nutr sci Vitaminol
3. Adams RD, Victor M. principles of neurology . New York: McGraw-Hill
4. Adams RD, Victor M. principles of neurology . New York: McGraw-Hill
5. Restivo A, Carta MG, Farci AMG, Saiu L, Gessa GL, Agabio R. Risk of thiamine deficiency and

Wernicke's encephalopathy after gastrointestinal surgery for cancer. Support Care Cancer.

6. Adams RD, Victor M. principles of neurology . New York: McGraw-Hill
7. Wernicke's encephalopathy : a more common disease than realised. A neuropathological study of 51 cases J.neurol Neurosurg psychiatry 1978.
8. The Wernicke's – Korsakoff syndrome: a clinical and pathological study of 245 patient's, 82 with post-mortem examination. Philadelphia: Davis 1971
9. Harper C Wernicke's encephalopathy :
10. Sechi G, Serra A.werncikies encephalopathy : new clicincal settings and recent advances in diagnosis and mangament . Lanct Neurol . 2007
11. Caine D, et al. J neurol Neurosurg psychiatry 1997
12. Rakici SY, Erdemli SD, Yazici ZA, Cengiz E, Acar OG, Tufan G. Case Report Wernicke's encephalopathy in a patient with unresectable gastric carcinoma and literature review. Int J Clin Exp Med 2015.
13. Jung ES, Kwon O, Lee SH, Lee KB, Kim JH, Yoon SH, et al. Wernicke's encephalopathy in Advanced Gastric Cancer. Cancer Res Treat. 2010
14. Restivo A, Carta MG, Farci AMG, Saiu L, Gessa GL, Agabio R. Risk of thiamin deficiency and Wernicke's encephalopathy after gastrointestinal surgery for cancer. Support Care Cancer. 2016
15. EFNS guidelines for diagnosis therapy and prevention of Wernicke's encephalopathy. R Galvin, G.Brathen ,A.Ivashynka, M.Hillbom.