

Wernicke's Encephalopathy from Hyperemesis Gravidarum. A Case Report

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Abstract

Introduction: Wernicke's encephalopathy is a rare neurological disorder due to thiamine deficiency in hyperemesis gravidarum, caused by administering glucose-containing fluids precipitating before thiamine supplementation.[1] It is an acute neuropsychiatric thiamine deficiency disorder associated with alcoholism and malnutrition. It was described by Carl Wernicke in 1881 in patients presenting with the triad of ocular signs, ataxia, and confusion seen in 60% of cases.[2]

This report aims to present a case of Wernicke's encephalopathy induced by hyperemesis gravidarum. The course of the disease, clinical signs, diagnostic tools, treatment, and results are presented.

39-year-old patient hospitalized in our clinic of Neurology after termination of pregnancy in the fifth month of pregnancy. The patient had slowed motor skills, blurred vision in both eyes, confusion, anxiety, disorientation, confusion, and delayed response to verbal communication.

Conclusion: As doctors, we should consider medical complications of hyperemesis gravidarum. If we do not treat it properly, it may lead to complications like Wernicke's. In our case, early recognition of the symptoms and signs of Wernicke's leads to early intervention and prevention of irreversible sequelae.

Keywords: Wernicke's encephalopathy, Hyperemesis gravidarum, Thiamine deficiency

Introduction

Wernicke's encephalopathy is a rare neurological disorder due to thiamine deficiency in hyperemesis gravidarum, caused by the administration of glucose-containing fluids precipitating before thiamine supplementation.[1] It is an acute neuropsychiatric thiamine deficiency disorder associated with alcoholism and malnutrition. It was

described by Carl Wernicke in 1881 in patients presenting with the triad of ocular signs, ataxia, and confusion seen in 60% of cases.[2]

Wernicke's encephalopathy is an easily treated but potentially fatal disease, and it is typically diagnosed among alcoholics (12.5%), but in non-alcoholics, prevalence varies from 0.04-0.13%. Many cases of pregnancy with hyperemesis gravidarum (HG) were first reported in 1914.[3]

Life-threatening conditions like central pontine myelinolysis can further complicate hyperemesis due to electrolyte fluctuations. Here, we present a case of Wernicke's encephalopathy induced by Hyperemesis gravidarum.

Case Report

39-year-old patient hospitalized in our clinic of Neurology after termination of pregnancy in the fifth month of pregnancy. The patient had slowed motor skills, blurred vision in both eyes, confusion, anxiety, disorientation,

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confusion, and delayed response to verbal communication. While she was pregnant, from her ^{sixth} gestational week, she had frequent vomiting, daily from 3-4 times a day to more than 20 times vomiting in the last 24h in her 12th week of pregnancy. She was hospitalized on several occasions and, after receiving intravenous fluid and electrolyte therapy, was discharged from the hospital. During her 15th gestational week, due to the appearance of neurological symptoms, the

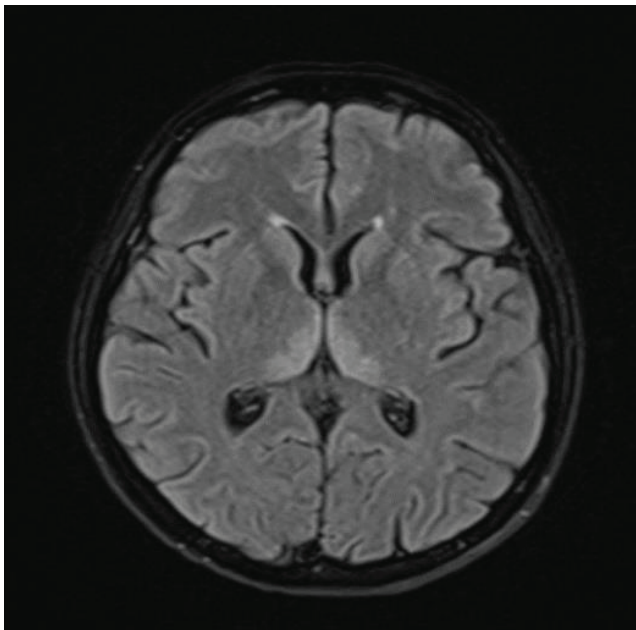


Fig.1. Bilaterally symmetric increased signal intensity of the posteromedial aspect of both thalamus on fluid-attenuated inversion recovery images suggestive of Wernicke's encephalopathy

MRI scan was performed and was suggestive of Wernicke's encephalopathy. (Fig 1, 2).

Ophthalmic examination showed a visual acuity of counting fingers at 2m in both eyes. The intraocular pressure was within normal range. End gaze nystagmus was noted in terms of dextroversion and levoversion. There was no restriction in extraocular movements. Anterior segment examination of both eyes was regular. On dilated fundus examination, there was a bilateral swollen and hyperemic optic disk, more marked on the left eye. There was a retinal hemorrhage around the disc and along the superotemporal and inferotemporal arcade. There was no sign of vitreous, retinitis, or choroiditis. Blood vessels and macula had a standard configuration.

An expert collegium of gynecologists decided that in the interest of the patient's health, there is a medical indication for terminating the pregnancy.

The patient was immediately started on intravenous thiamine 500mg three times daily for three days, then continued with 200mg three times daily for five days, along with folate, magnesium, multivitamins, and other supportive treatment delivered intravenously. Her confusion and neurologic symptoms gradually began to improve after the treatment.

After the termination of pregnancy, the patient was hospitalized in our clinic of Neurology. Additional tests were done. VEP shows a defect in conduction through the central visual pathways, and EEG has a correct finding. Neuropsychological testing shows selective deviations in cognitive status, expressed in attention and concentration.

After seven days, a control ophthalmic examination was done. A resolution of nystagmus was noted, and retinal hemorrhages were in resorption. (Fig.3.) Ishihara test was

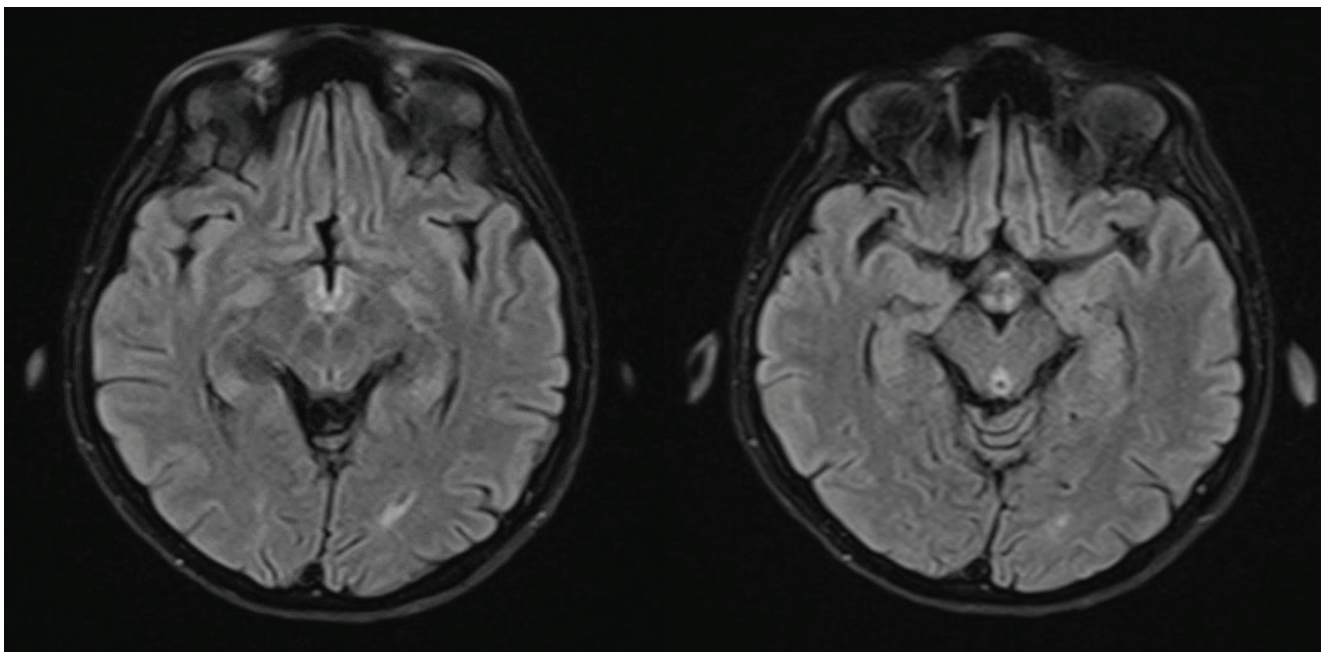


Figura.2. Increased signal intensity of the periaqueductal gray matter in the midbrain and mammillary bodies, no change in signal intensity seen on T1-weighted images suggestive of Wernicke's encephalopathy

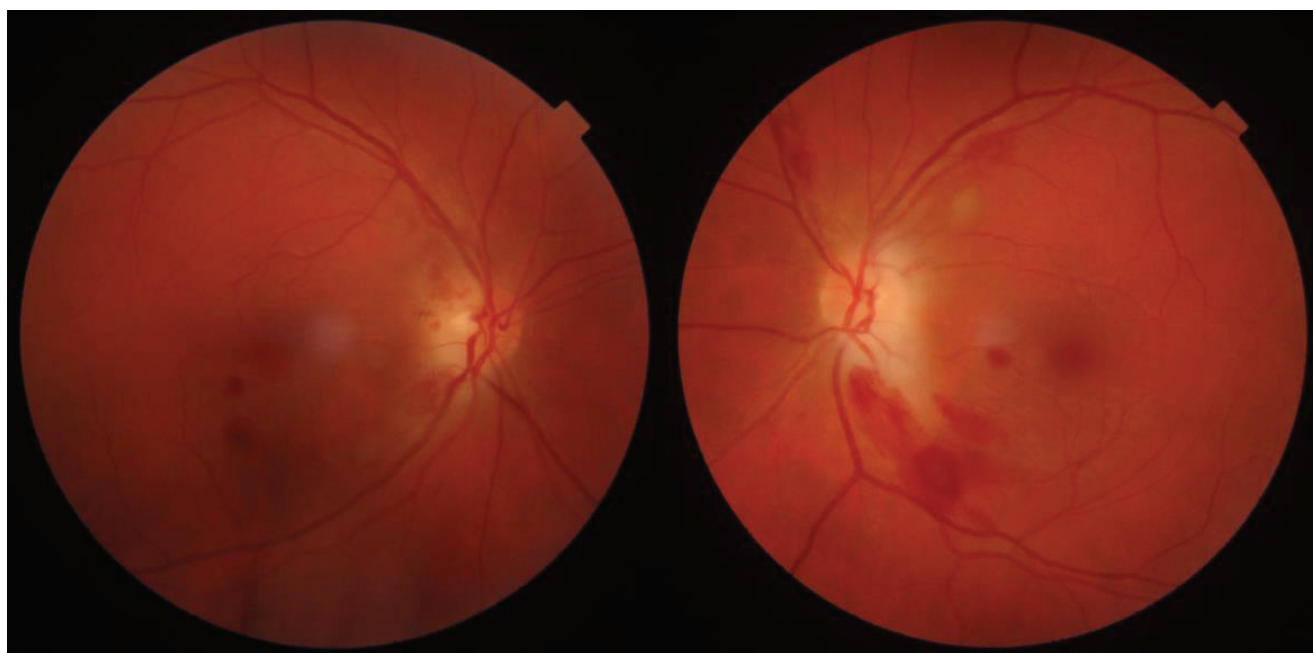


Fig.3. Fundus photo of retinal hemorrhages

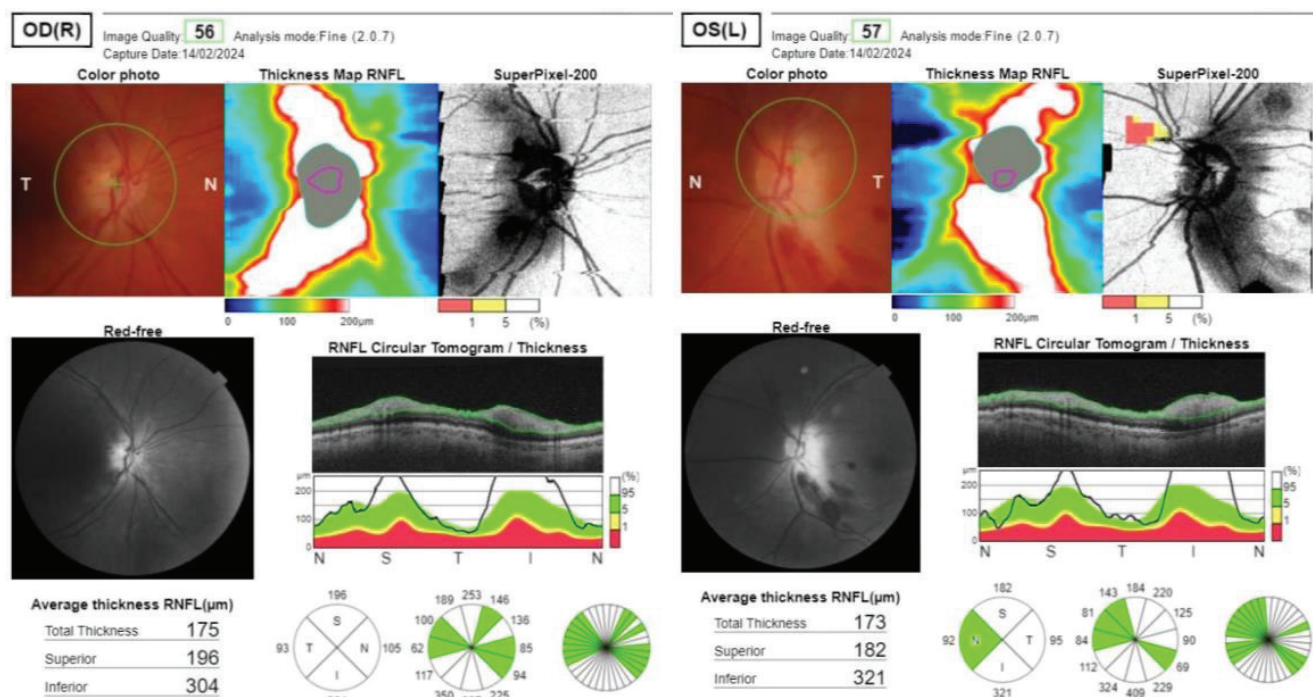


Fig.4. OCT - increased retinal nerve fiber layer (RNFL) thickness.

regular. Optical coherence tomography of both eyes showed increased retinal nerve fiber layer (RNFL) thickness with no detectable macular edema. The RNFL thickness in the right eye was 175μm, and in the left eye was 173μm. (Fig.4.)

The control brain MRI showed a reduction of previously described hypersignal changes posteromedial in both the thalamus and periaqueductal gray matter in the midbrain and mammillary bodies.

She continued with IV fluids and an injection of 150 mg of thiamine three times daily for five days, followed by

oral supplements for the rest of the hospital admission. After discharge, the patient was in a better condition regarding movement, vision, and concentration.

Discussion

WE are due to a deficiency of thiamine (B1), an essential cofactor for several critical enzymes like transketolase, alpha-ketoglutarate dehydrogenase, and pyruvate dehydrogenase, essential in carbohydrate metabolism. The

body stores 25 to 30 mg of vitamin thiamine for 18 days.[4]

In pregnancy, thiamine deficiency will be due to excessive vomiting, poor intake, increased metabolic demand, and sequestration of the vitamin by the fetus and placenta. If the cells with high metabolic requirements have inadequate thiamine stores, energy production drops, and neuronal damage occurs. Thiamine-dependent enzymes are essential in cerebral energy utilization, which is why thiamine deficiency can cause brain tissue injury.[5]

The encephalopathy is usually precipitated by a carbohydrate load, whether with nasogastric feeding, intravenous administration of dextrose, or total parenteral nutrition. Intravenous dextrose administered before correction of thiamine will aggravate the condition further, as the consumption of left-out thiamine leads to the WE, which was the case with our patient. [6]

Neurologic symptoms in WE induced by hyperemesis gravidarum usually occur between the 14th and 20th weeks of pregnancy, after at least three weeks of persistent vomiting, which was the case with our patient who presented at 15 weeks and six days with a history of vomiting for over one month.[7]

The classical triad of WE includes encephalopathy, oculomotor dysfunction, and gait ataxia.[8]

However, in most patients, only one or two features will be present. Confusion will be the most common presenting symptom, followed by staggering gait and ocular problems. In our report, our case presented with giddiness and blurred vision, followed by chronic vomiting.

Encephalopathy is characterized by profound disorientation, indifference, and inattentiveness. Nystagmus is the most common ocular finding typically evoked by horizontal gaze to both sides. Ataxia primarily involves stance and gait and is likely due to a combination of polyneuropathy, cerebellar involvement, and vestibular dysfunction.

WE is primarily a clinical diagnosis as lab tests could be more convincing, and there is no specific laboratory test to diagnose it. The gold-standard treatment is to replace thiamine, which results in the resolution of symptoms in a few hours to a few days, depending on the severity of the disease. If left untreated, WE can progress to Korsakoff's syndrome, which results in more chronic symptoms and irreversible damage.[9]

That is why it is essential to be diagnosed and treated as fast as possible to result in less severe damage. MRI is the imaging modality of choice because it is peculiar (93%) and comparatively safer than computed tomography scans in pregnancy. Reversible cytotoxic edema is the most distinctive lesion in WE, and the most valuable sequences to detect it are T2, FLAIR, and DWI.[10]

Periventricular regions of the diencephalon, mesencephalon, brainstem, and superior vermis of the cerebellum are sensitive to thiamine deficiency due to cellular dependence on oxidative metabolism that causes T2W hyperintensities in the region. Typical findings include

areas of increased T2 and FLAIR signals, decreased T1 signal, and diffusion abnormality surrounding the aqueduct and third ventricle and within the medial thalamus, dorsal medulla, tectal plate, and mamillary bodies (Figure 2).

In our case report, she has a hyperintensity area around the periaqueductal area, third ventricle, and thalamus. Patients with Wernicke's encephalopathy should be treated immediately with a minimum of 500 mg of thiamine dissolved in 100 mL of saline administered intravenously three times per day for 2–3 days. After assessing the response, 250 mg of thiamine per day should be given intravenously for 3–5 days or until the clinical signs resolve.[11] Glucose supplementation without thiamine can increase the thiamine requirement, so care is needed.[12]

Guidelines by the European Federation of Neurological Societies (EFNS) recommend that thiamine be given 200 mg thrice daily via intravenous route, started before any carbohydrate, and continued until there is no further improvement in signs and symptoms.[13]

In non-alcoholic patients, an intravenous dose of thiamine 100–200 mg once daily could be enough, whereas in alcoholic patients, higher doses may be required. All reported cases recovered completely after treatment with parenteral thiamine, followed by oral thiamine supplementation. This shows that the timely diagnosis and treatment with thiamine reverses the condition. [14]

Conclusion

As doctors, we should consider medical complications of hyperemesis gravidarum. If we do not treat it properly, it may lead to complications like Wernicke's. In our case, early recognition of the symptoms and signs of Wernicke's leads to early intervention and prevention of irreversible sequelae. Thorough knowledge of IV fluids is essential to treat the condition, as dextrose may precipitate it.

An ophthalmological examination should be part of evaluating patients with risk factors. Early prediction of Wernicke's is important to treat the condition and prevent irreversible sequelae. That is why we would like to highlight the importance of thiamine supplementation in pregnant women with prolonged vomiting, especially before starting intravenous or parenteral nutrition.

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