# Wernicke's Encephalopathy Induced By Hyperemesis Gravidarum Associated with Hyperthyroidism

## *HİPERTROİDİZM İLE SEYREDEN HİPEREMESİS GRAVİDARUM'A BAĞLI GELİŞEN WERNİCKE ENSEFALOPATİSİ*

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**Summary**

**Objective:** A Wernicke's encephalopathy case presentation, because of thiamine deficiency after severe hyperemesis gravidarum.

**Institution :** Osmangazi University Faculty of Medicine, Department of Obstetrics of Gynecology, Eskişehir.

**Materials and Methods:** A 24-year old case, initially diagnosed with hyperemesis gravidarum at 12th. weeks of gestation and being on long-term, intravenous fluid therapy, has been followed up in our clinic for one month.

**Findings:** In addition to severe hyperemesis gravidarum signs, a relevant clinical hyperthyroidism is noticeable, with a long-term iv fluid therapy on history. Upon the detection of acute onset of diplopia, loss of orientation, diplopia, vertical nystagmus and ataxic gait, a thiamine deficiency was suspected. Together with high dose, 600 mg/day parenteral thiamine replacement, appropriate fluid therapy with antiemetics were initiated and sustained until her discharge. Two weeks following thiamine supplementation, her neurologic signs were regressed. She then delivered a healthy female fetus of 3020 gram without any perinatal obstetric complications.

**Conclusion:** Thiamine supplementation is essential in hyperemesis gravidarum cases on long-term fluid therapy.

**Key Words**: Hyperemesis gravidarum, Thiamine, Wernicke's ensefalopathy

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**Özet**

**Amaç :** Şiddetli hiperemesis gravidarum olgusunda, nadir olarak gelişen, tiamin eksikliği ve sonucunda gelişen Wernicke ensefalopatisi olgu sunumu.

**Çalışmanın yapıldığı yer :** Osmangazi Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum AD, Eskişehir.

**Materyal ve Metod :** 24 yaşında, ilk olarak , 12. gebelik haftasında, hiperemesis gravidarum tanısı alan ve uzun süre parenteral sıvı replasmanı alan olgu, servisimizde, 1 ay süre ile izlendi.

**Bulgular:** Şiddetli hiperemesis gravidarum bulguları yanında, klinik olarak hipertiroidi saptanan olgunun özgeçmişinde, uzun süre ile, iv hidrasyon tedavisi aldığı öğrenildi. Akut başlangıçlı, diplopi, oryantasyon kaybı, vertikal nistagmus ve ataksik yürüyüş bulguları saptanan hastada, tiamine eksikliği düşünüldü. Günlük 600 mg, yüksek doz tiamin tedavisi yanında, uygun sıvı-elektrolit desteği, antiemetik ilaç kullanımı ile, taburculuğuna kadar olgu izlendi. Tiamine tedavisine geçildikten 2 hafta sonra, nörolojik bulgularda gerileme görüldü. Obstetrik takipte herhangi bir özellik göstermeyen hasta, termde, spontan vajinal yol ile, 3020 gram kız bebek doğurdu. Perinatal bir komplikasyona rastlanılmadı.

**Yorum :** Özellikle, uzun sıvı replasman tedavisi alan hiperemesis olgularında, tiamin replasmanı, Wernicke ensefalopatisi profilaksisi için önem kazanmaktadır.

**Anahtar Kelimeler:** Hiperemesis gravidarum, Tiamine, Wernicke ensefalopatisi

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Most cases of hyperemesis gravidarum are mild and do not require aggresive treatment. However, inadequate or inappropriate management, especially in patients on intravenous fluid therapies of long duration without any essential vitamins supplementation, result in life-threatening consequences such as chronic thiamine deficiency problems. Life-threatening consequences of thiamine deficiency states are being published as case reports in the various journals, as an incremental fashion.

The aim of this case report is to give insights to rarely encountered severe hyperemesis gravidarum induced cerebral function changes and to underline the importance of this clinical entity.

## Case Report

A 24-year-old woman (gravida:3, para:1,abortus:1) consulted our department from Social Security Hospital, 12 weeks into her third pregnancy, with a complaint of intractable nausea and vomiting of 50 days duration, associated with a weight loss of 21.4 lb.with oral nutrition intolerance. During this period, she had been on daily 3000cc intravenous fluid therapy, consisting of Na (40

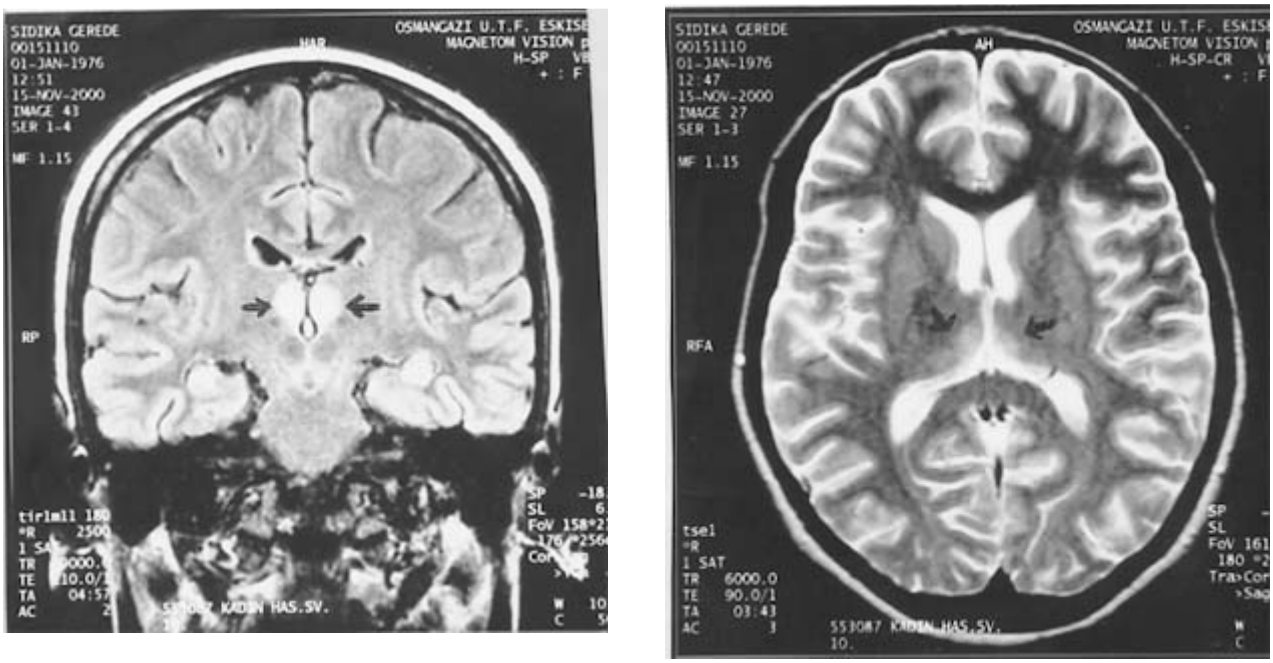


**Figure 1 (a +b)** Magnetic resonance imaging showing symmetric lesions at dorsomedial aspect of thalamic region on $T_2$-weighed sequences (straight arrows).

mEq/lt) K (35 mEq/lt), Cl (40 mEq/lt), acetate (20 mEq/lt) and phosphate (5 mEq/lt) combined with parenteral antiemetics. Her previous gestation ended with a spontaneous abortion at 8 weeks' gestation. On her physical examination, she was dehydrated and drowsy and cachectic in appearence. On admission, her sensory examination was normal. Initial serum electrolytes were in normal ranges (Na:133mEq/lt, K: 3.7mEq/lt, Cl:100 mEq/lt) and her complete blood count was Hb:13.3 gr/dl and Hct 38% and urine specific density of 1025 with +++ ketonuria. She had a fairly high pulse rate consistent with sinus tachycardia on (120/mn) and a palpable thyroid gland. Thyroid function test revealed elevated free $T_3$ and $T_4$ and suppressed TSH level. Liver function tests were slightly elevated (ALT:54, AST:44) with normal serum creatinine and blood urea nitrogen levels. Ultrasonographic scan revealed a live fetus of 12 weeks' gestation with a 1.4mm nuchal thickness (CRL: 53 mm). She had been planned for daily measurements regarding weight, blood pressure, pulse rate, total fluid intake and urinary output. Parenteral fluid total amount of 3500 cc parenteral fluid composed of 2000 cc %10 dextrose solution, 1000 cc Ringer's solution and one 250 mg vit C and 250 mg Vit $B_6$ per 1000 cc solution. Intravenous metoclopropamide (10mg q6hr, daily) and chlorpromazine (25 mg q6hr daily) constituted the antiemetic therapy. Clinical and laboratory confirmation of hyperthyroid state necessitated antithyroid therapy, consisted of peroral propylthiouracil, PTU, 300 mg/day. 10 days after the initiation of parenteral fluid therapy (2 months including her first admission to Social Security Hospital), her consciuous state became deteriorated with fairly acute onset of loss of orientation, diplopia, vertical nystagmus, ataxic gait, apraxia and moderate peripheral sensation loss. The tendon reflexes were observed to be normal during follow-ups. Neurologic evaluation required a cranial magnetic resonance imaging (MRI). MRI taken 16 days after admission showed spherical supratentorially located symmetric lesions at dorsomedial regions of thalamus on $T_2$-weighed coronal sections (shown in Figure 1a and 1b). By the day 14 following the admission, while reanalyzing ongoing fluid and electrolytes replacement therapy, an important finding that is a lack of thiamine content in the total rehydration fluid as vitamin supplements was found remarkable, which made the prior fluid therapy deemed inappropriate. Her periodic urine density measurements and hematocrit levels as well as elevated hepatic transaminases returned to their normal ranges. Hence, a clinic diagnosis of Wernicke's encephalopathy was made, and the patient was treated with 600 mg/day, high-dose parenteral thiamine supplements (Neurogriseovit$^R$ ampoule, 100 mg, DEVA, Turkey). 48 hours after thiamine supplements, her neurologic improvement was clinically apparent with ameliorated ataxic gait, speech disturbances, diplopia. Nevertheless, her vertical nystagmus persisted until her discharge with progressively minimal improvements. No fits were observed during her follow-ups. One week after thiamine supplementation and around one month following her

admission, she began to tolerate oral nutrition. Her obstetric ultrasonographic scan, 2 weeks prior her discharge, was consistent with a live fetus of 16 weeks' gestation, that was considered to be of normal range, despite her suboptimal nutritious status. Her tachycardia regressed leading to diminishing PTU dose to 75 mg/day. She was discharged from the clinic with daily oral thiamine until the end of pregnancy. Her gait and speech were normalised. A female infant weighing 3020 gram was delivered vaginally in a good condition at term. No postpartum complication has been observed and the patient was discharged from the hospital, two days following the delivery.

## Discussion

Severe hyperemesis gravidarum, especially when anticipated with prolonged intravenous fluid therapy, results in a constellation of extrapyramidal neurologic symptoms and pathologic lesions in the brain, leading to Wernicke's encephalopathy (1). Thiamine (vitamin $B_1$) deficiency is the hallmark of this clinical entity, that could be missed at initial diagnosis.

Thiamine is a cofactor for several important enzymes including pyruvate dehydrogenase and transketolase. Its deficency leads to a decrease in use of cerebral glucose, neuronal dysfunction and eventually, neuronal loss, gliosis (2). Any delay in the recognition of this clinical entity, as described in index case, jeopardize the patients clinical condition, varying from mild dehydration, cachexia, weight loss to cerebral thrombosis, central pontine myenolysis due to severe hyponatremia and its speed of correction (3-5).

Although small amounts of thiamine (2-3 mg) is sufficient to modify ocular symptoms, much larger doses are needed to sustain necessary blood thiamine levels (6). The recommended daily dose is 50 to 100 mg thiamine, that is much lower amount of the dose given in the described case.

MRI findings, such as symmetric lesions around cerebral aqueduct, thalamic region and fourth ventricle, depicted in the figure, are usually suggestive for the diagnosis, especially when correlated with patients history, and clinical signs and symptoms (7). Thiamine supplements should be initialized as soon as a patient with prolonged nausea and vomiting and a history of fluid therapy of long duration. Intractable nausea and vomiting, unless properly recognized and treated, could lead to important electrolyte imbalances and their consequences, which sometimes are perpetuated by concomitant transient hyperthyroidism masking signs of dehydration and vitamin deficiencies.

In this case, the diagnosis of Wernicke's encephalopathy was not obvious and made only by retrospective evaluation of the findings and the awareness of thiamine lacking. A review in the literature have highligted a subtantial number of pregnancies complicated with Wernicke'e encehalopathy. Only half of these pregnancies resulted in a birth of a normal infant (8). However, in the index case, no relevant pathology was detected during antenatal and post discharge follow-ups. Severe hyperemesis gravidarum, refractory to conventional management with intravenous fluids and antiemetics is a rare, disabling condition, associated with multiple hospital referrals and admissions, as in this case, time away from work and the family, and psychological morbidity. Sometimes the clinical conditions is too severe to request the termination of pregnancy. Wernicke's encephalopathy constitutes a medical emergency, and its recognition (or even the suspicion of its presence) demand the immediate administration of thiamine. Any delay in the diagnosis, seen in our case, may make the recovery period slow and prolonged in time.

As a conclusion, rehydration of fluids comprising all vitamins including thiamine, oral fluid restriction, antiemetic drug therapy, and especially avoidance of stressful living conditions should be the initial measures for all pregnant women diagnosed as hyperemesis gravidarum, to avoid Wernicke's encephalopathy an its consequences on long-term periods, such as irreversible amnestic state and adverse perinatal outcome.

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