

> THE PATIENT

57-year-old woman

> SIGNS & SYMPTOMS

- Nausea and vomiting
- Sensitivity to smell
- History of hypertension and alcohol abuse

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> THE CASE

A 57-year-old woman presented to a family physician with acute encephalopathy and complaints of recent gastritis. She reported a 2-month history of nausea, vomiting, decreased oral intake, and extreme sensitivity to smell. The patient had a history of hypertension, and a family member privately disclosed to the FP that she also had a history of alcohol abuse. The patient was taking lorazepam daily, as needed, for anxiety.

On initial assessment, the patient was alert, but not oriented to time or situation. She was ataxic and agitated but did not exhibit pupillary constriction or tremor. The FP sent her to the emergency department (ED).

After being assessed in the ED, the patient was admitted. Over the course of several days, she showed worsening mentation; she persistently believed she was in Chicago, her childhood home. On memory testing, she was unable to recall any of 3 objects after 5 minutes. She exhibited horizontal nystagmus and dysmetria bilaterally and continued to be ataxic, requiring 2-point assistance. Her agitation was managed nonpharmacologically.

A work-up was performed, which included laboratory testing, a urinalysis, and computed tomography (CT) of the head. A comprehensive metabolic panel, complete blood count, and thyroid stimulating hormone test were unremarkable except for electrolyte disturbances, with a sodium level of 158 mEq/L and a potassium level of 2.6 mEq/L (reference ranges: 135-145 mEq/L and 3.5-5 mEq/L, respectively).

Her blood alcohol level was zero, and not surprisingly given her use of lorazepam, a urine drug screen was positive for benzodiazepines. The urinalysis results were consistent with a urinary tract infection (UTI), for which she was treated with an antibiotic. A carbohydrate-deficient transferrin test may have been useful to establish chronic alcohol abuse, but was not ordered. The head CT was negative.

After a few days with fluids and electrolyte replacement, the patient's electrolytes normalized.

THE DIAGNOSIS

The differential diagnosis included sepsis, metabolic encephalopathy, and alcoholic encephalopathy. Given that the patient's urine drug screen was positive, benzodiazepine withdrawal was also considered a plausible explanation for her continued cognitive disturbances. (It was surmised that she had likely taken her last lorazepam several days prior.) However, the lack of other signs of withdrawal prompted further investigation.

Since her encephalopathy, ataxia, and nystagmus persisted, magnetic resonance imaging (MRI) of the brain was performed on Day 3 of hospitalization (FIGURE). A lumbar puncture and an electroencephalogram were also considered but were not performed because the MRI results revealed bilateral enhancement of the mammillary bodies and mild signal

➤ Procedures such as gastric bypass and dialysis can precipitate Wernicke-Korsakoff syndrome.

FIGURE

Brain MRI reveals bilateral changes

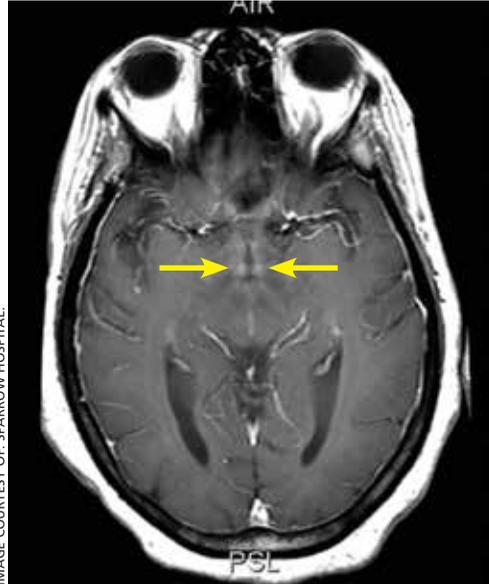


IMAGE COURTESY OF SPARROW HOSPITAL.

Mild enhancement of the mammillary bodies was seen bilaterally, as well as mild signal hyperintensity along the posteromedial aspect of the thalami bilaterally. Both of these findings are consistent with a diagnosis of Wernicke-Korsakoff syndrome.

hyperintensity, thus confirming a diagnosis of Wernicke-Korsakoff syndrome (WKS).

DISCUSSION

WKS is the concurrence of Wernicke's encephalopathy (an acute, life-threatening condition marked by ataxia, confusion, and ocular signs) and Korsakoff's psychosis (a long-term, debilitating amnestic syndrome). WKS is a neuropsychiatric disorder in which patients experience profound short-term amnesia; it is precipitated by thiamine deficiency (defined as a whole blood thiamine level <0.7 ng/ml¹). The link to thiamine was confirmed during World War II, when thiamine treatment resolved symptoms in starving prisoners. If recognized early, treatment of thiamine deficiency can prevent long-term morbidity from WKS.

Etiology of thiamine deficiency

Our patient's alcohol abuse placed her at risk

for WKS, and her olfactory aversion to certain foods was a diagnostic clue. In this case, we inadvertently administered dextrose with antibiotics for the UTI prior to administering thiamine; this exacerbated the thiamine deficiency because glucose and thiamine compete for the same substrate.

Is alcohol abuse always to blame for WKS?

The quantity and type of alcohol that results in the development of WKS has not been well studied, but the Caine diagnostic criteria defines chronic alcoholism as the consumption of 80 g/d of ethanol (8 drinks/d).² While WKS is commonly associated with alcoholism, other causative conditions may be overlooked. Other associated illnesses include acquired immune deficiency syndrome (AIDS), cancer, hyperemesis gravidarum, prolonged total parenteral nutrition, and psychiatric illnesses such as eating disorders and schizophrenia. Procedures such as gastric bypass and dialysis can also precipitate WKS.³

Men and women are both at risk of developing WKS. A lack of consumption of thiamine-rich sources such as cereals, rice, and legumes puts patients at risk for WKS. The recommended dietary allowance of thiamine increases with age and may be higher for obese patients.⁴

Suspect thiamine deficiency and obtain a thorough history

A high index of suspicion for thiamine deficiency is essential for diagnosis of WKS. History of alcohol use should be obtained, including quantity, frequency, pattern, duration, and time of last use. Physicians should assess nutrition and ask about vomiting and diarrhea. It is important to collaborate with the patient's family and friends and inquire into other substance misuse.⁵

Since WKS targets the dorsomedial thalamus, which is responsible for olfactory processing, patients may complain of a distorted perception of smell.⁶ On physical examination, look for signs of protein-calorie malnutrition, including cheilitis, glossitis, and bleeding gums; signs of alcohol abuse, such as hepatomegaly; and evidence of injuries or poor self-care.⁵

CONTINUED

Varied presentation leads to under- and misdiagnosis

Diagnosis of WKS can be difficult due to the varied presentation; there is a broad spectrum of clinical features. The clinical triad of mental status change, ophthalmoplegia, and gait ataxia is present in as few as 10% of cases.³ Mental status changes may include a global confusional state ranging from disorientation, apathy, anxiety, fear, and mild memory impairment to pronounced amnesia. Ophthalmoplegia can include nystagmus, ocular palsies, retinal hemorrhages, scotoma, or photophobia; and ataxia can range from a mild gait abnormality to an inability to stand.⁷ This varied presentation ultimately leads to underdiagnosis and misdiagnosis.

■ **MRI findings** are also varied in WKS. However, the mammillary bodies are involved in many cases, where atrophy of these structures have high specificity. The dorso-medial thalamus is associated with the reported impairment in memory and can be identified antemortem on MRI.³ There is no quantifiable evidence of how much thiamine should be used to prevent WKS. However, thiamine should be given before the administration of glucose whenever WKS is considered.

■ **Our patient.** Despite the administration of thiamine (100 mg parenterally for 5 d, followed by oral thiamine 300 mg/d indefi-

nately), our patient's memory and cognition remained unchanged. She underwent intensive inpatient rehabilitation for 2 months and was eventually placed in long-term nursing care.

THE TAKEAWAY

A high index of suspicion is crucial to prevent possible long-term neurologic sequelae in WKS. Appropriate care starts at the beginning, with the patient's story. **JFP**

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➤ The clinical triad of mental status change, ophthalmoplegia, and gait ataxia is present in as few as 10% of cases of Wernicke-Korsakoff syndrome.

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