

## Wernicke's Encephalopathy (WE)

**Wernicke Encephalopathy (WE)** is an **acute, reversible neurological emergency** caused by **thiamine (vitamin B1) deficiency**, most commonly associated with **chronic alcohol use disorder**. It classically presents with a **triad of symptoms**:

? **Ophthalmoplegia**

? **Ataxia**

? **Global confusion**

However, this full triad is seen in only **1/3 of cases**.

### Etiology & Risk Factors

#### Cause

**Chronic alcoholism**

#### Malnutrition

**Hyperemesis gravidarum**

**Prolonged fasting or starvation**

**Gastric bypass surgery**

**Glucose administration without thiamine**

#### Details

Most common cause; impairs thiamine absorption and storage

Seen in eating disorders, cancer, AIDS

Severe vomiting during pregnancy leading to nutritional deficiencies

Increases risk of thiamine depletion

Reduced thiamine absorption postoperatively

Can precipitate WE in at-risk individuals

### Pathophysiology

Thiamine is a critical coenzyme for enzymes involved in **glucose metabolism**:

- **Transketolase** (pentose phosphate pathway)
- **Pyruvate dehydrogenase** (glycolysis ? TCA cycle)
- **?-Ketoglutarate dehydrogenase** (TCA cycle)

Thiamine deficiency leads to:

- ? **Cerebral glucose utilization**
- ? **Lactate and glutamate accumulation**
- **Mitochondrial dysfunction and oxidative stress**
- **Neuronal excitotoxicity and cell death**, particularly in the **mammillary bodies, thalamus, hypothalamus, and cerebellum**

### Clinical Features

**Classic Triad (only in ~33%)**

1. **Ophthalmoplegia** – Nystagmus, lateral rectus palsy, conjugate gaze palsies, ptosis (rare)
2. **Gait Ataxia** – Wide-based, shuffling gait due to cerebellar and vestibular dysfunction
3. **Confusion** – Global disorientation, apathy, inattentiveness

## Other Symptoms

- **Nystagmus** (horizontal, on lateral gaze)
- **Sixth nerve palsy** (bilateral lateral rectus weakness)
- **Apathy, drowsiness, stupor, or coma** in late stages
- **Peripheral neuropathy** – Burning sensation, decreased reflexes
- **Autonomic instability** – Hypothermia, postural hypotension, or tremors

? Pupillary responses are usually spared, but may become **miotic in advanced cases**.

## Korsakoff Syndrome (Chronic Phase)

If untreated, WE can progress to **Korsakoff Psychosis**, a **chronic, often irreversible amnesic disorder**, characterized by:

- **Anterograde and retrograde amnesia**
- **Confabulation** – Fabrication of memories
- **Impaired learning and executive function**
- **Disordered temporal sequencing**

? Korsakoff syndrome often follows or coexists with WE and is **rarely seen outside alcohol-related thiamine deficiency**.

## Diagnosis

**Clinical diagnosis** is critical—do **not delay treatment** for confirmatory testing.

### Investigations

**Thiamine level**

**MRI Brain**

**Serum electrolytes**

**Liver function tests**

**Blood glucose**

### Notes

Often low, but not required to start treatment

May show hyperintensities in mammillary bodies, thalamus, periaqueductal gray

Often show low  $Mg^{2+}$ , which impairs thiamine utilization

Rule out alcoholic hepatitis

Important to avoid giving glucose before thiamine

## Management

**WE is a medical emergency. Treatment must be initiated promptly.**

### Thiamine Replacement (Before Glucose)

- **Thiamine 100 mg IV/IM daily** for 5–7 days (can go up to 500 mg/day in severe cases)
- Administer **before glucose infusion** to prevent worsening of symptoms
- Follow with **oral thiamine supplementation** once stabilized

## Supportive Care

- **IV fluids** and **electrolyte correction**
- Treat **hypomagnesemia**, which impairs thiamine activation
- **Nutritional support**: high-protein, vitamin-rich diet
- **Multivitamin supplementation**
- Hospitalization for monitoring in moderate to severe cases

## Prognosis & Recovery

### Symptom

Ocular signs

Ataxia

Confusion/apathy

Korsakoff's psychosis

### Recovery Time

May improve within **hours to days** after thiamine

Improves slowly; often incomplete recovery

Gradual improvement over **weeks**

Often **irreversible**, may lead to long-term disability

## High-Yield NCLEX & USMLE Pearls

- Always give **thiamine before glucose** in patients at risk (e.g., alcoholics, malnourished)
- **Classic triad**: confusion + ophthalmoplegia + ataxia
- Wernicke's = **acute phase**; Korsakoff's = **chronic memory disorder**
- **MRI findings** support diagnosis but are not required to start treatment
- **Prompt thiamine therapy** can prevent permanent brain damage

## Nursing Priorities

- Administer **IV thiamine** before glucose
- Monitor **mental status, coordination, and ocular movements**
- Educate on **alcohol cessation** and **nutritional support**
- Prevent falls due to **ataxia**
- Watch for signs of **progression to Korsakoff's syndrome**