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	Details
Chronic alcoholism	Most common cause; impairs thiamine absorption and storage
Malnutrition	Seen in eating disorders, cancer, AIDS
Hyperemesis gravidarum	Severe vomiting during pregnancy leading to nutritional deficiencies
Prolonged fasting or starvation	Increases risk of thiamine depletion
Gastric bypass surgery	Reduced thiamine absorption postoperatively
Glucose administration without thiamine	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 amnestic 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	Notes
Thiamine level	Often low, but not required to start treatment
MRI Brain	May show hyperintensities in mammillary bodies, thalamus, periaqueductal gray
Serum electrolytes	Often show low Mg^{2}?, which impairs thiamine utilization
Liver function tests	Rule out alcoholic hepatitis
Blood glucose	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	Recovery Time
Ocular signs	May improve within **hours to days** after thiamine
Ataxia	Improves slowly; often incomplete recovery
Confusion/apathy	Gradual improvement over **weeks**
Korsakoff's psychosis	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**