Cerebellar Atrophy in Chronic Epilepsy

# An unexpected finding during pregnancy

## Medication effect, seizure burden, or both?

50th Annual Southeastern Neuroradiological Society Meeting

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# Clinical presentation

**34-YEAR-OLD WOMAN**

**25 weeks pregnant**

Fall concerning for seizure activity

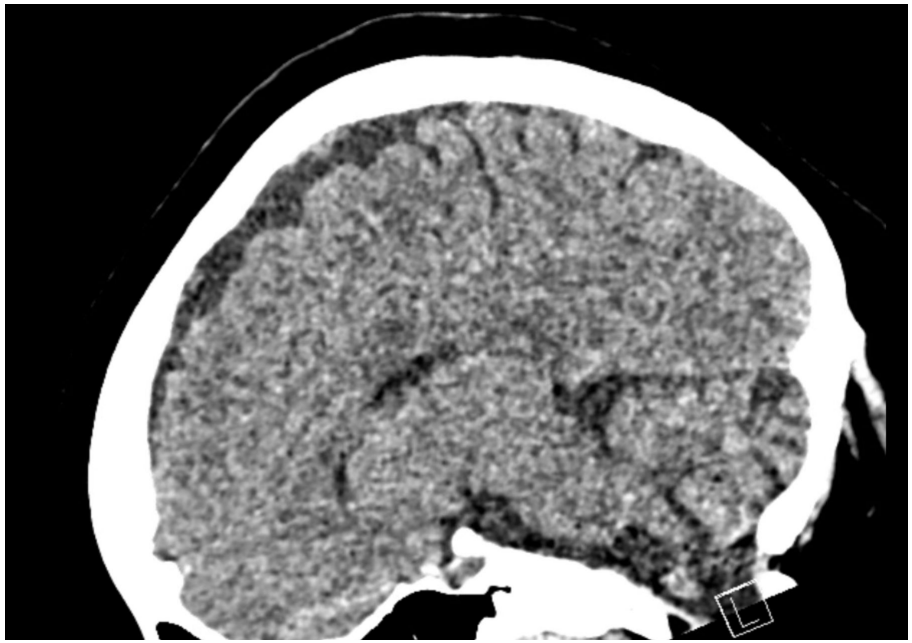
**HISTORY**

Left temporal focal impaired awareness seizures
Generalized tonic-clonic seizures

**AT PRESENTATION**

Undetectable lamotrigine and levetiracetam levels
Medication doses increased
MRI/MRV obtained to assess intracranial pathology

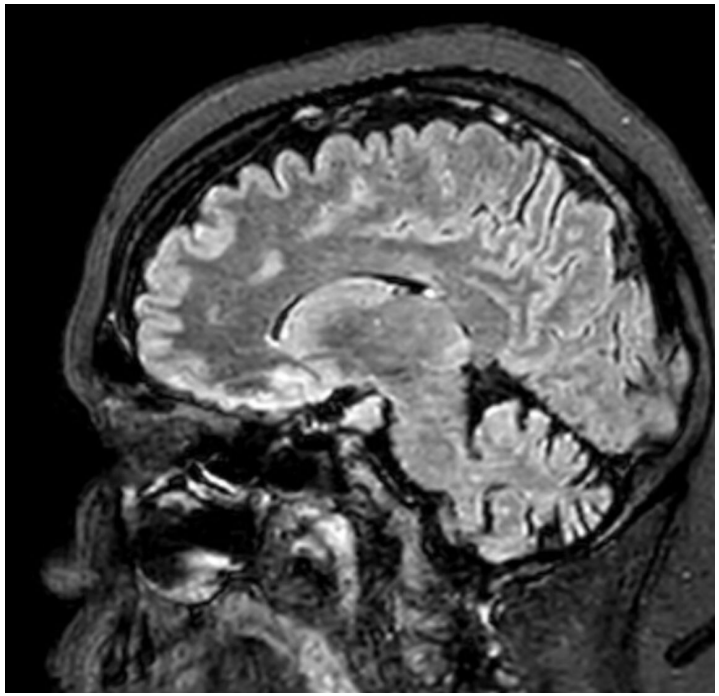
# Initial head CT

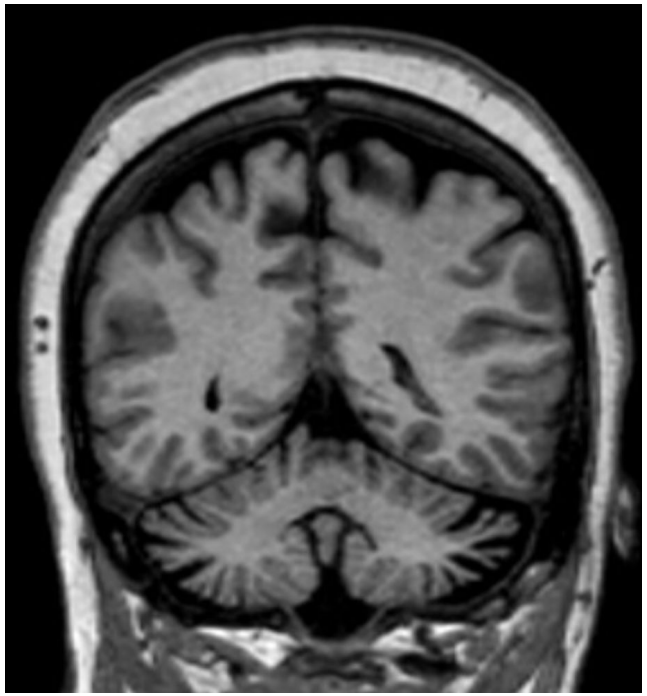




**Cerebellar volume loss with widened fissures. No acute abnormality.**

# MRI: vermian volume loss





**REPORTED PATTERN**

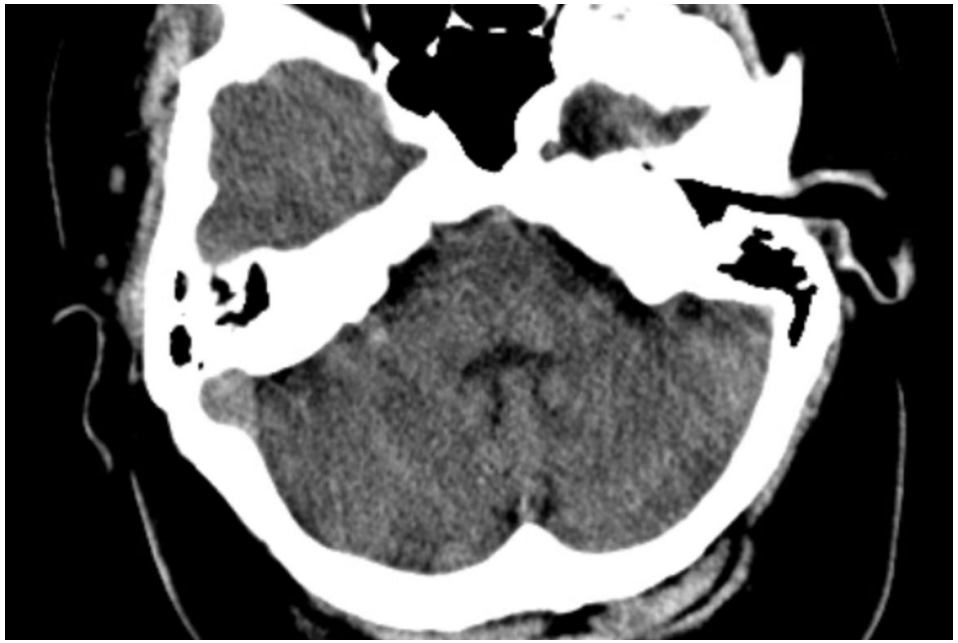
Reduced vermian volume

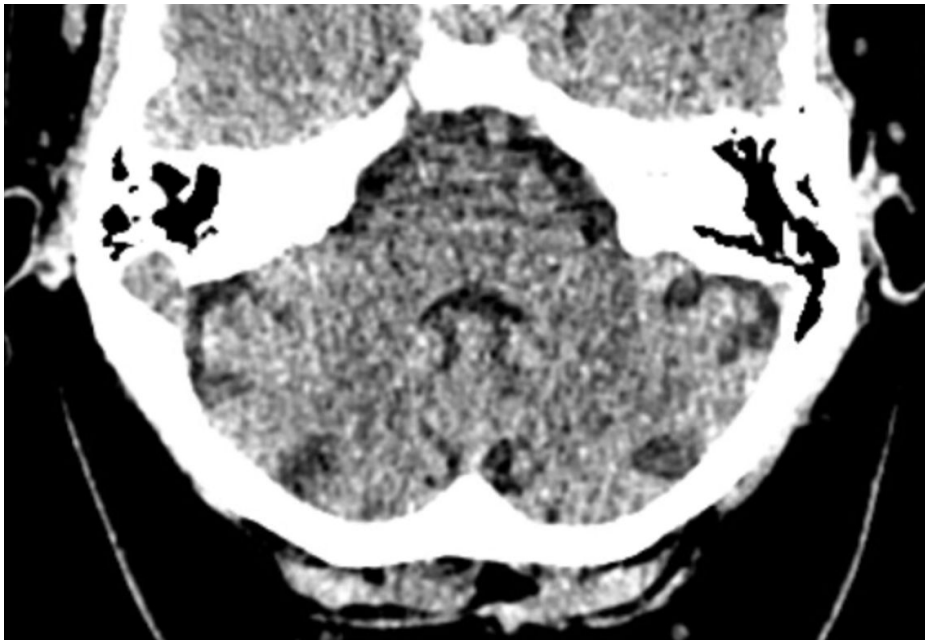
Prominent cerebellar fissures

No acute intracranial abnormality

**Sagittal imaging demonstrates the extent and distribution of vermian loss.**

# Prior imaging comparison





**Age 23**

**Age 35**

# Differential for cerebellar volume loss

## Medication / toxin

Prior phenytoin exposure
Alcohol or other neurotoxins

## Epilepsy / prior injury

Chronic epilepsy and seizure burden
Prior hypoxic or inflammatory injury

## Other causes

Hereditary cerebellar degeneration
Autoimmune / paraneoplastic disease
Metabolic or nutritional disorders

**Distribution, clinical course, exposure history, and prior imaging refine the differential.**

# Medication attribution: what can we conclude?

## ESTABLISHED ASSOCIATION

Chronic phenytoin exposure can accompany cerebellar atrophy and ataxia.

## THIS CASE

Long-term lamotrigine and levetiracetam use

Chronic epilepsy

Prior phenytoin exposure unknown

**Medication effect is a hypothesis. MRI alone cannot separate it from epilepsy-related injury.**

# Pregnancy and antiseizure medication levels

## DURING PREGNANCY

Increased drug clearance can lower lamotrigine and levetiracetam concentrations.

Follow levels and seizure control to guide individualized dose adjustments.

## AFTER DELIVERY

Drug clearance returns toward baseline, creating a need to reassess pregnancy doses.

The medical record reports a return to pre-pregnancy dosing.

# Management and reported outcome

## REPORTED COURSE

Medication doses increased during pregnancy

Postpartum return to baseline dosing

Neurology / epileptology follow-up arranged

## CLINICAL CORRELATION

Assess gait, coordination, and speech

Review lifetime medication exposure

Compare prior imaging if available

# Take-home points

**1** **Recognize the pattern**

Reduced vermian and hemispheric volume with widened cerebellar fissures.

**2** **Keep causality qualified**

Medication exposure and chronic epilepsy may contribute. Prior phenytoin history matters.

**3** **Use the clinical timeline**

Prior imaging helps establish progression. Pregnancy changes drug levels and dose needs.

1. "Cerebellar Atrophy." *CPA Imaging,* https://cpaimaging.com/conditions/cerebellar-atrophy/
2. "Cerebellar Degeneration." *National Institute of Neurological Diseases and Stroke*, https://www.ninds.nih.gov/health-information/disorders/cerebellar-degeneration.
3. Eadie, MJ. "Can anticonvulsant drug therapy 'cure' epilepsy?." *CNS drugs vol. 15.9(2001): 679-90.*