

Acute Confusion Revealing Uremic Encephalopathy: The Lentiform Fork Sign on MRI

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Abstract

Uremic encephalopathy is a rare but reversible neurological complication of severe renal failure. We report the case of a 64-year-old woman presenting with acute confusion whose initial brain CT was normal. Brain MRI revealed the characteristic lentiform fork sign, consisting of bilateral symmetric peri-lenticular and basal ganglia hyperintensities with imaging features of vasogenic edema. Laboratory investigations confirmed severe renal failure, establishing the diagnosis of uremic encephalopathy. Recognition of this characteristic MRI pattern is essential, as it facilitates early diagnosis, prompts timely metabolic treatment, and may improve clinical outcomes.

Keywords: Uremic Encephalopathy; Lentiform Fork Sign; MRI Brain; Basal Ganglia; Metabolic Encephalopathy

Introduction and Discussion

Uremic encephalopathy is a rare but severe neurologic complication of advanced renal failure, typically occurring in patients with end-stage kidney disease or acute severe uremia. Clinical manifestations include altered mental status, seizures, movement disorders, and less commonly focal neurologic deficits.

MRI is the imaging modality of choice for detecting cerebral involvement. A characteristic but non-specific imaging pattern is the "lentiform fork sign," which consists of bilateral and symmetric T2 and FLAIR hyperintensities involving the peri-lenticular white matter, external capsule, and basal ganglia. This appearance reflects vasogenic edema of the lentiform nuclei region.

On diffusion-weighted imaging, the lesions usually show mild hyperintensity without true diffusion restriction, with corresponding increased ADC values, supporting a vasogenic rather than cytotoxic mechanism.

This imaging pattern was first described in uremic encephalopathy and remains a helpful radiologic clue in the appropriate clinical context, although it is not pathognomonic. Similar basal ganglia involvement may also be seen in other metabolic and toxic encephalopathies, including hepatic encephalopathy, hypoglycemia, and various intoxications.

Recognition of this sign is clinically important because it may prompt urgent metabolic evaluation and dialysis, with potential reversibility of imaging abnormalities after correction of the underlying disorder.

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The “lentiform fork sign” was originally described on MRI as bilateral peri-lenticular signal abnormalities related to uremia-related metabolic derangement and vasogenic edema of the basal ganglia region [1]. Subsequent studies and case reports have confirmed its association with uremic encephalopathy and emphasized its value as an early imaging marker in patients presenting with acute neurologic symptoms in the setting of renal failure [1-3]. Reviews of metabolic brain disorders further highlight the differential diagnosis of basal ganglia signal abnormalities and reinforce the importance of clinical correlation [3].

Case Report

A 64-year-old woman with no known history of chronic kidney disease presented to the emergency department with acute confusion and altered mental status. Neurological examination revealed disorientation without focal neurologic deficit or seizure activity.

An initial non-contrast brain CT scan was unremarkable. Due to persistent neurological symptoms, brain MRI was subsequently performed. Axial T2-weighted and FLAIR images demonstrated bilateral symmetric hyperintensities involving the peri-lenticular regions and basal ganglia, outlining the characteristic “lentiform fork sign.” Diffusion-weighted imaging showed mild hyperintensity without significant ADC reduction, consistent with vasogenic edema rather than acute ischemia.

Given the imaging findings, a metabolic encephalopathy was suspected. Laboratory investigations revealed severe renal failure with marked elevation of serum creatinine and blood urea nitrogen levels, supporting the diagnosis of uremic encephalopathy.

The patient underwent appropriate metabolic management with subsequent clinical improvement.

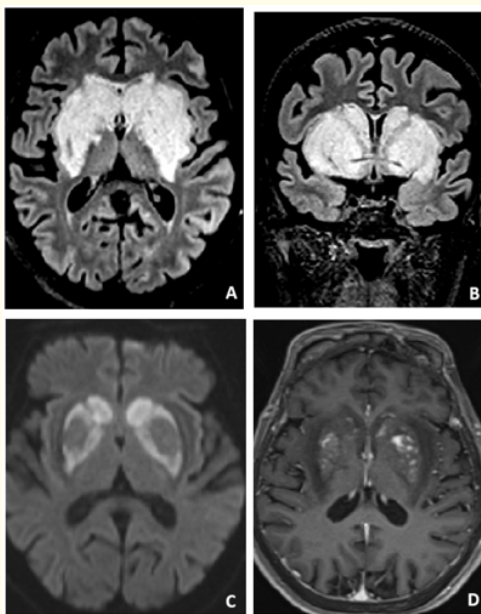


Figure 1: Axial (A) and coronal (B) FLAIR MRI images demonstrate bilateral symmetric hyperintensity involving the external capsule, peri-lenticular region, and globus pallidus, producing the characteristic “lentiform fork sign.” Diffusion-weighted imaging (C) shows mild hyperintensity without significant diffusion restriction, consistent with vasogenic edema. Post-contrast T1-weighted imaging (D) demonstrates mild enhancement.

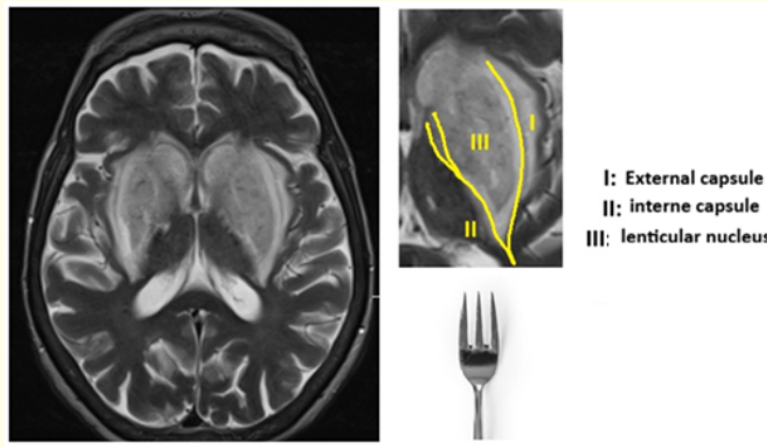


Figure 2: Axial T2-weighted MRI showing bilateral vasogenic edema surrounding the lentiform nuclei, outlining the characteristic "lentiform fork sign," composed of the lateral arm, stem, and medial arm.

Conclusion

The lentiform fork sign is a characteristic MRI finding that should raise suspicion for uremic encephalopathy in patients with acute neurological symptoms. Although not specific, its recognition in the appropriate clinical context facilitates prompt diagnosis and timely treatment, potentially leading to complete clinical and radiological recovery.

Bibliography

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