



## A Case Report: Non-Ketotic Hyperglycemia Hemichorea Hemiballism

### KEYWORDS

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**ABSTRACT** This case documents unique radiological findings of non-ketotic hyperglycemia hemichorea-hemiballism in a 76-year diabetic female who presented with involuntary movements right upper limb and one episode of convulsions. T1W images showed abnormal hyperintense signal in left lentiform nucleus, anterior limb of internal capsule and head of caudate nucleus, typical for non-ketotic hyperglycemia hemichorea-hemiballism.

### INTRODUCTION:

Non-ketotic hyperglycemia tends to affect patients with poorly controlled diabetes(1). It classically presents with hemichorea-hemiballism (HC-HB) and is associated with unique radiological features. It is thought to occur most frequently in the elderly, most commonly in the 7th decade(2).

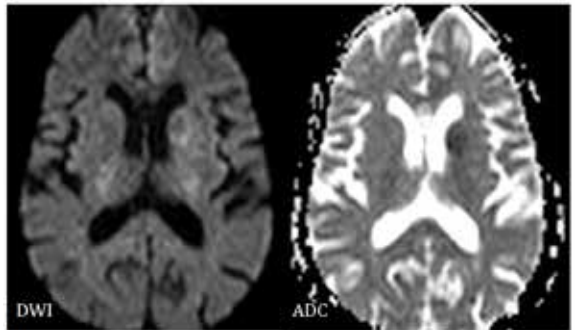
### CASE REPORT:

A 76-year female with diabetes mellitus, presented with involuntary movements right upper limb and one episode of convulsions. Laboratory tests revealed raised blood sugar levels (BSL >300 mg/dl).

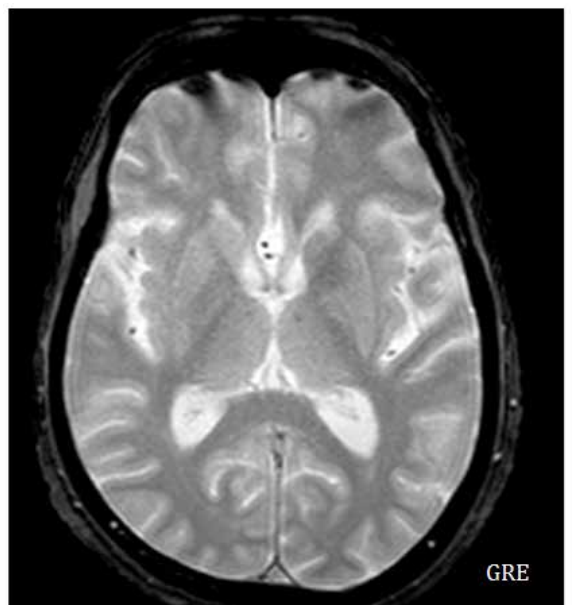
Non contrast MRI of the brain was performed, which showed abnormal signal intensity in the left lentiform nucleus, anterior limb of internal capsule and head of caudate nucleus, appearing hyperintense on the T1W images turning hypointense signal on the FLAIR images. There was a subtle area of restricted diffusion noted in the involved regions with no blooming on the gradient echo images.

CT scan performed on the same date showed hyperdensity in the left basal ganglia with no mass effect or perilesional edema.

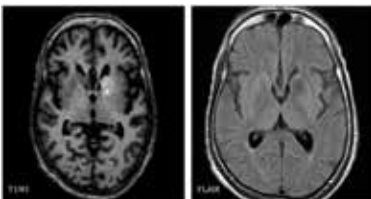
Follow up MRI scan done after 3 days showed slight reduction in T1W signal intensity as compared to the previous MRI with no significant change in signal abnormality on the T2W images.



Subtle area of restricted diffusion in the left caudate nucleus with signal loss on ADC images

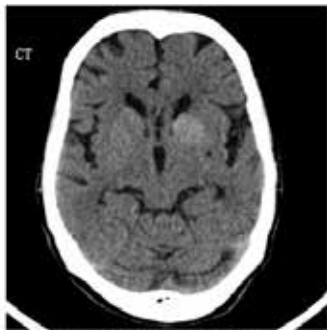


NO blooming is noted on the GRE images

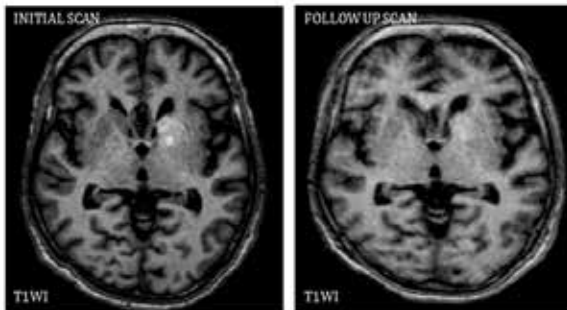


T1W images showing abnormal hyperintense signal in the left lentiform nucleus, anterior limb of internal capsule and head of caudate nucleus.

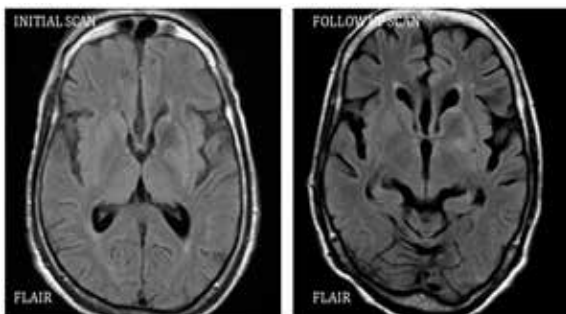
FLAIR images showing abnormal hypointense signal in the left lentiform nucleus, anterior limb of internal capsule and head of caudate nucleus.



CT scan done on the day of the initial MRI showed hyperdensity in the left basal ganglia



Comparative T1 weighted images of the initial and follow up scans images performed after 3 days when the BSL levels were around 130 mg/dl revealed slight reduction in abnormal T1W hyperintensity. The urine test for ketone bodies was negative at this stage



Comparative FLAIR images of the initial and follow up scans performed after 3 days reveal no significant change in abnormal hypointense signal in the left lentiform nucleus, anterior limb of internal capsule and head of caudate nucleus.

## DISCUSSION:

Hemi chorea generally occurs due to a stroke, neoplasm or granuloma affecting the contra lateral basal ganglia. Metabolic derangements especially hyperglycemia can also cause focal neurological dysfunction like hemiparesis, focal seizure.

## Radiological findings:

The unique radiological finding of non-ketotic hyperglycemia hemichorea-hemiballism is high signal intensity basal ganglia (BG) lesions on T1-weighted MRI and hyperdensity within the basal ganglia on NECT, contralateral to the side of the patient's presenting symptoms.

On T2-weighted images the findings are variable with the basal ganglia appearing either hypo-intense or iso-intense (2).

Restricted diffusion corresponding to the T1-weighted hyperintensity in the basal ganglia has been reported in literature(3-5).

Contrast was not performed in our study as most of the published papers did not report appreciable enhancement.

## Pathophysiology:

The abnormal hyperintense signal on T1 weighted images is thought to be due to the protein hydration layer in the cytoplasm of swollen gemistocytes (reactive astrocytes) (3,5). Some postulate that this signal abnormality may represent putaminal petechial hemorrhage(7).

## Differential diagnosis of T1W hyperintense basal ganglia lesions is:

1. Manganese toxicity in long-term parenteral nutrition,
2. Chronic liver disease,
3. Hypoxic-ischemic changes,
4. Disorders of calcium metabolism (i.e. hypo or hyperparathyroidism, etc),
5. Fahr disease,
6. Lupus,
7. Neurofibromatosis and
8. Wilson disease(5,8,9).

It is important to remember that non-ketotic hyperglycemia can also present with bilateral T1 hyperintense basal ganglia lesions. The characteristic finding of high signal intensity on T1W images may persist for months despite clinical improvement.

## CONCLUSION:

Hemichorea-hemiballism occurs in diabetes mellitus owing to non-ketotic hyperglycemia It is a rather benign condition with a good prognosis if the hyperglycemia is recognized early and corrected. It is important to be familiar with the imaging appearances of this condition so that it maybe promptly diagnosed and treated.

The imaging findings may take few months to resolve(2).

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