# Appearance of Two Distinct Clusters of Glucose Dysregulation in Chronic Intractable Migraine

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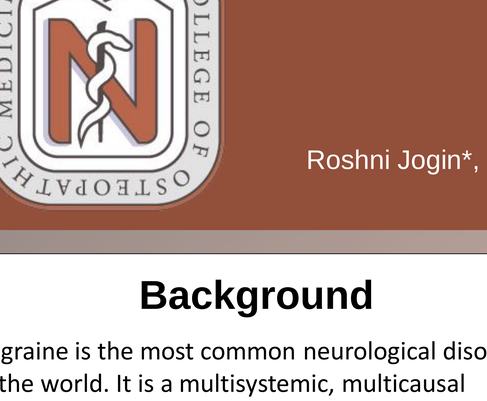
## Background

Migraine is the most common neurological disorder in the world. It is a multisystemic, multicausal condition characterized by increased neuronal activity in various brain regions including the hypothalamus and trigeminal nerve complex. Reactive hypoglycemia has not been previously characterized as a diagnostically or therapeutically relevant ancillary to chronified migraine. Previous reports have indicated an association between migraine and reduced insulin sensitivity leading to increased average blood glucose levels. Among the possible explanations, are the connections between the ventromedial nucleus of the hypothalamus, migraines, and glucose regulation. This case series presents four chronic migraine patients with co-occurring reactive hypoglycemia.




**Picture 1.** Components of the limbic system involved in visceral and somatic sensory information

## Methods

We evaluated 34 patients with severe, chronic migraine patient poorly responsive to traditional pharmacotherapy. Each of the patients received a complete blood count with differential, hemoglobin A1C (with estimate average glucose), oral glucose tolerance test (GTT), 10-days of continuous glucose monitoring and a comprehensive metabolic panel.

## Results

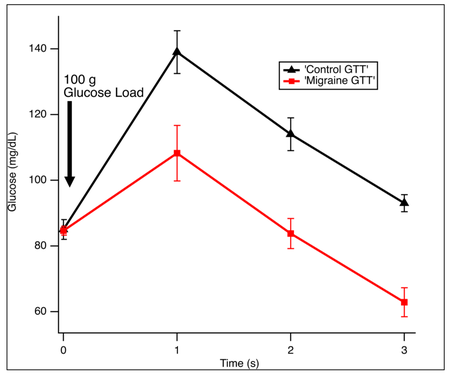



**Figure 1.** Glucose tolerance test in controls and individuals with chronic migraine.

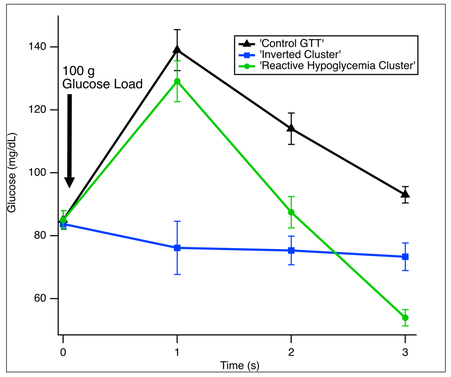



**Figure 2.** Glucose tolerance test in controls and individuals with chronic migraine stratified by outcome.

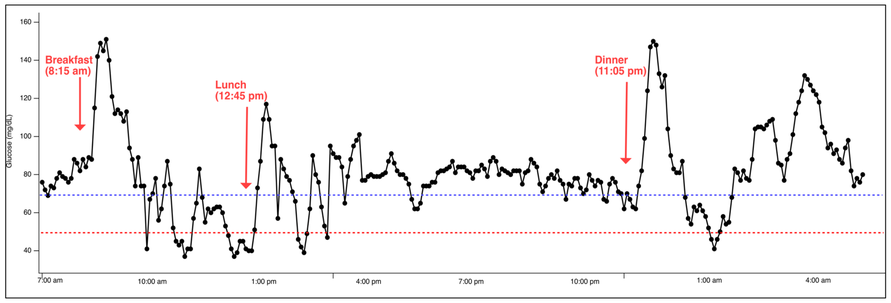



**Figure 3.** CGM Representative trace in a patient with 20+ migraine days per month.

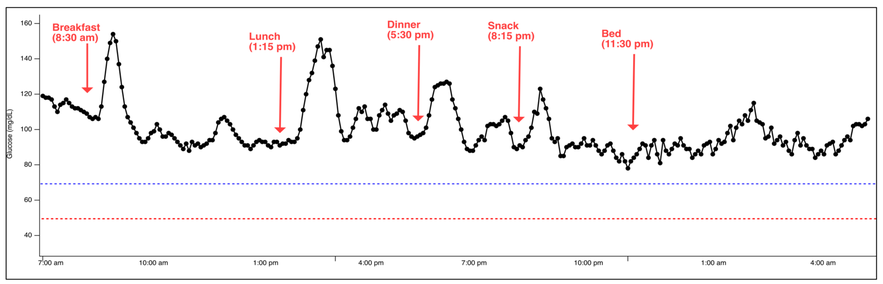



**Figure 4.** CGM Representative trace in the same patient after migraine treatment with 3 months of <3 migraine days per month.

## Results Continued

We have identified two distinct clusters of glucose dysregulation in this population. Cluster one demonstrates a normal initial response to glucose challenge and a severe reactive hypoglycemic drop at between 2-3 hours (53 mg/dL +/- 6 mg/dL). Cluster 2 demonstrates a blunted reaction with no appreciable increase in glucose levels at 1-hour post prandial tolerance exam (82 mg/dL +/- 12 mg/dL)

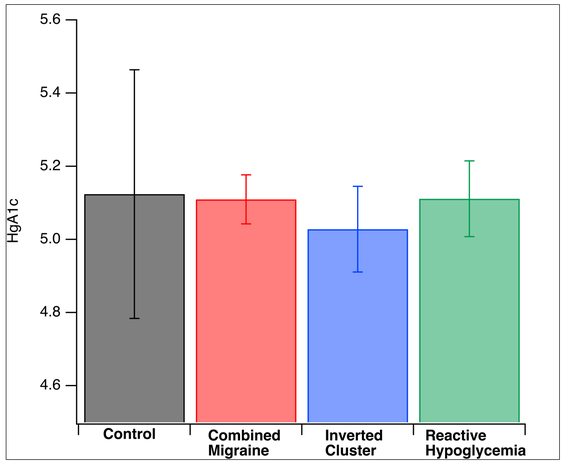



**Figure 4.** HbA1c averages for healthy control and migraine patients.

## Conclusion

The mechanistic pathophysiological causes of altered glucose regulation in migraine are poorly understood. There could be various aspects of the glucose profile that should be taken into consideration by the clinician until greater understanding of the extent to which this issue contributes to migraine is further elucidated.

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