



# Hyperglycemia is Associated with Reduction in Brain Tissue Perfusion as Studied by CT Perfusion

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## Introduction

Hyperglycemia at the time of ischemic stroke presentation has been shown to be associated with poor clinical outcomes; however, the effect of hyperglycemia on cerebral blood flow patterns has not been studied.

## Methods

The screening perfusion images of 75 patients who did not have a stroke were correlated with their blood glucose level at admission (BGA). 25 patients with BGA <100mg/dl served as the control group whereas 25 with BGA 100-140mg/dl constituted Group A and 25 patients with BGA >140 formed Group B. Each group was then studied in detail for the cortical and hypothalamic blood flow parameters (CBV, CBF, TTP) using the Vitrea software.

## Results

Cortical TTP increased by 17% in both groups A (p=0.019) and B (p=0.033) when compared with the control. Hypothalamic TTP also increased by 12% in group A (p=0.031) and by 1.8% in group B (p=0.386), when compared with the control group (BGA <100). There was no significant change in cortical or hypothalamic CBF or CBV.

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## Learning Objectives

Hyperglycemia decreases cerebral tissue perfusion

## Conclusions

In patients without stroke who underwent screening CT perfusion studies, a blood glucose >100mg/dl, was associated with significant increases in TTP in the cortex and the hypothalamus. Our study shows for the first time a reduction in cerebral tissue perfusion at glucose concentrations >100mg/dl. These observations have implications for the pathogenesis of adverse outcomes related to hyperglycemia in patients with ischemic stroke