

# Postprandial Hypotension is Attenuated with Acarbose Treatment in Older Adults with Diabetes Mellitus type 2: a Randomized Controlled Crossover Cohort Study

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## Abstract

Postprandial hypotension (PPH) is common in older adults and those with autonomic dysfunction, commonly with Diabetes Mellitus (DM). This study proposed to demonstrate that Acarbose, an  $\alpha$ -glucosidase inhibitor, decreases the degree of PPH in an elderly DM cohort. 15 adults (9 women, 6 men) with average age of 76.06 years (range: 67-85.2) with DM type 2 (Duration: 8.7 years $\pm$ 7.4 ; Hemoglobin A<sub>1c</sub> 6.9% $\pm$ 0.8) attended a treatment and placebo session (separate days at least two weeks apart) in random double-blinded order. Subjects were fed a standardized meal (4°C) and then continuously monitored over 90 minutes for blood pressure by Finometry, heart rate by Electrocardiogram, and middle cerebral artery blood flow velocity by transcranial Doppler Sonogram (20-minute baseline recorded for all measurements), blood glucose and catecholamine measurements. The frequency of PPH occurring per study was 0.8 (range: 1-3) for Acarbose and 1.46 (range: 0-3) for placebo ( $p=0.0359$ ). The hemodynamic response of systolic blood pressure (SBP) and mean arterial pressure (MAP) (baseline as covariate) was significantly different by mixed-model repeated measures two-factor (time and treatment) analysis of variance (SBP:  $p=0.0295$ ; MAP:  $p=0.0354$ ). This is the first study to demonstrate Acarbose attenuates PPH in adults with DM. Our results suggest that acarbose is a potential therapy for PPH in older adults with DM type 2. The reported higher prevalence of PPH in our study warrants further investigation.

## Background

Postprandial hypotension (decreased systolic blood pressure  $\geq 20$  mmHg or in systolic blood pressure  $< 90$  mmHg when previously  $\geq 100$  mmHg within 2 hours after meal) is common in institutionalized older adults ( $> 75$  years old)<sup>1,4</sup> contributing to syncope, falls, cardiac events/stroke, and increased mortality<sup>2-8</sup>. Proposed mechanisms include blunted gastrovascular sympathetic reflex post-meal<sup>9,10</sup> or decreased Incretin/gut vasoactive hormone<sup>11</sup>.

## Hypothesis

Acarbose, an  $\alpha$ -Glucosidase inhibitor attenuates PPH in older adult patients with Diabetes Mellitus type 2.

## Subjects

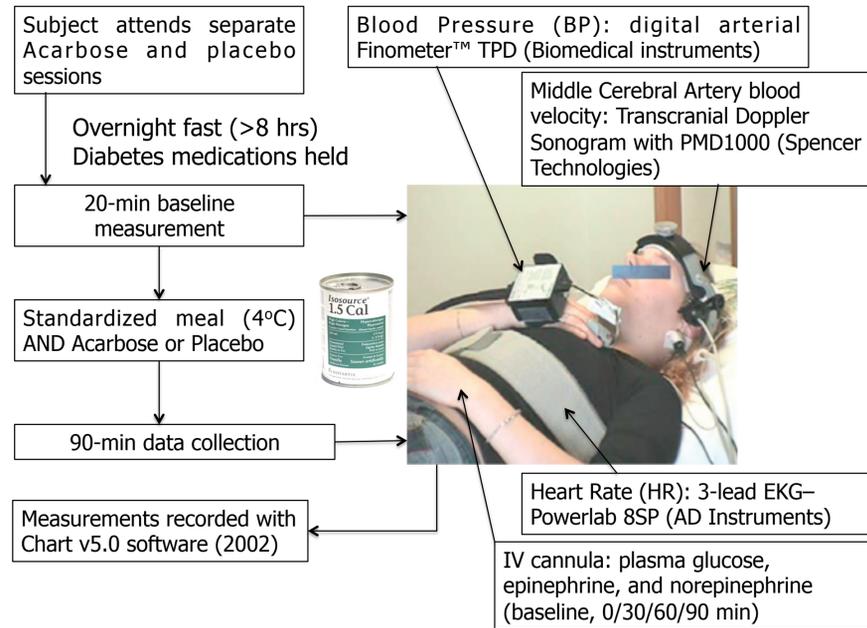
**Subjects:** 15 older adults (9 women, 6 men).

**Inclusion:** Age  $\geq 65$  years; Diabetes Mellitus type 2

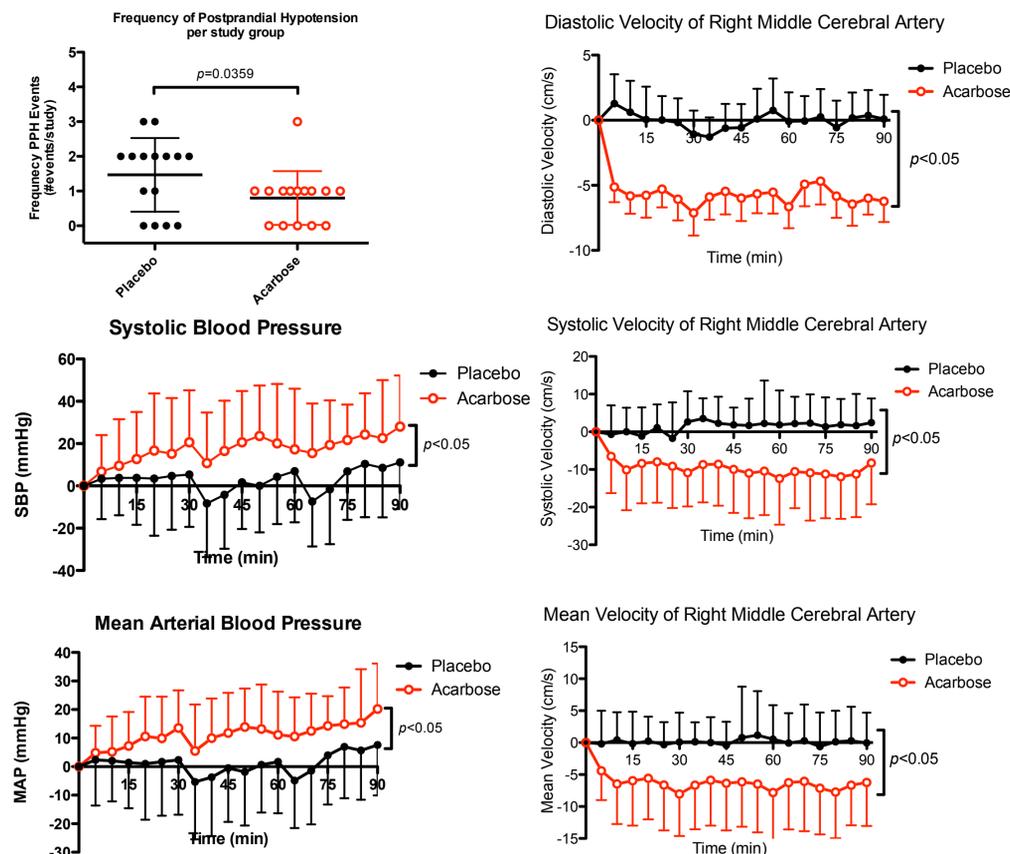
**Exclusion:** Parkinson's disease; End-stage renal disease  $\pm$  intermittent hemodialysis; Fragile-X mutation

Subjects provided written and informed consent and protocol was approved by the Vancouver Coastal Health clinical research ethics board

## Methods



## Results



## Discussion

- The prevalence of PPH in our study was high as 14 subjects (93.3%) experienced at least one episode of PPH during the Acarbose (10/15) or Placebo (11/15) sessions.
- This higher prevalence may be explained by the use of continuous Finometry to detect PPH as opposed to intermittent brachial sphygmomanometry<sup>11</sup>.
- Acarbose therapy attenuated the mean total frequency of PPH events (0.8 events/subject) as compared to placebo (1.5 events/subject).
- Acarbose therapy significantly increased systolic and mean arterial blood pressure by 15mmHg and 10.3mmHg, respectively as compared to placebo.
- Systolic, diastolic, and mean arterial middle cerebral artery velocities unexpectedly and significantly decreased with Acarbose therapy as compared to placebo; however, only 8 subjects completed transcranial sonographic analysis as 7 subjects had poor sonographic right temporal bone "windows".
- Administration of Acarbose as a single dose had no significant effect on post-prandial rise in plasma glucose and norepinephrine.
- Future considerations: Acarbose administration  $> 2$  weeks prior to conducting our protocol; Mesenteric artery sonographic blood velocity monitoring; inclusion of incretin analysis.

## Conclusion

Acarbose attenuates postprandial hypotension in older adults with diabetes.

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