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 α-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±7.4; Hemoglobin A1C 6.9%±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 (400Kcal) 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) 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 ≥20 mmHg or in systolic blood pressure <90 mmHg when previously ≥100 mmHg within 2 hours after meal) is common in institutionalized older adults (>75 years old) contributing to syncope, falls, cardiac events/ stroke, and increased mortality. Proposed mechanisms include blunted gastrovascular sympathetic reflex post-meal, or decreased incretin/gut vasoactive hormone.

Hypothesis
Acarbose, an α-Glucosidase inhibitor attenuates PPH in older adult patients with Diabetes Mellitus type 2.

Subjects
Subjects: 15 older adults (9 women, 6 men). Inclusion: Age ≥ 65 years; Diabetes Mellitus type 2 Exclusion: Parkinson’s disease; End-stage renal disease; intermittent hemodialysis; Fragile-X mutation

Methods

- **Overview fast (>8 hrs) Diabetes medications held**
- **20-min baseline measurement**
- **Standardized meal (400kcal) Acarbose or Placebo**
- **90-min data collection**

**Blood Pressure (BP): digital arterial Finometry**
**Middle Cerebral Artery blood velocity: Transcranial Doppler Sonogram with PD10000 (Spencer Technologies)**
**Heart Rate (HR): 3-lead EKG – Finometer**
**IV cannula: plasma glucose, norepinephrine, and dopamine (baseline, 0/30/60/90 min)**

Results
- Acarbose therapy significantly increased systolic 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.

Conclusion
Acarbose attenuates postprandial hypotension in older adults with diabetes.

References