Cinnamon Improves Glucose and Lipids of People with type 2 DM
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...IF DR. DEAN RETURNS TO PRIVATE PRACTICE...

...I'M GONNA CHECK YOUR HEART AND YOUR LUNGS AND YOUR VISION AND YOUR HEARING AND YOUR PROSTATE! YEEEARGG!!!
Background

- Spices such as cinnamon, cloves, bay leaves, and turmeric have in-vitro insulin enhancing activity.
- Aqueous cinnamon extract enhances glucose uptake and glycogen synthesis in vitro.
- Insulin factors into lipid regulation.
- Postulate that cinnamon would improve glucose and lipids in diabetics.
Patients

• Type 2 DM
  – Fasting glucose 140-200
• No insulin therapy
• No other medication
• 30 men, 30 women
Patient characteristics

<table>
<thead>
<tr>
<th></th>
<th>Cinnamon</th>
<th>Placebo</th>
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</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>52.0 ± 5.9</td>
<td>52.0 ± 6.9</td>
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<tr>
<td><strong>Duration of DM</strong></td>
<td>7.10 ± 3.29</td>
<td>6.73 ± 2.32</td>
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<tr>
<td><strong>M/F</strong></td>
<td>15/15</td>
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Study Design

• 1 capsule = 500mg of cinnamon or wheat flour
• Subjects randomized to 1 of 6 groups
  – 1, 3, 6g cinnamon/day or placebo
• Followed prospectively for 20 + 20 days, followed by washout of additional 20 days
• Close monitoring, ‘all capsules consumed’
• Capsules taken after meals
Measurements

• Blood samples drawn on day 0, 20, 40, 60
• Glucose
• Cholesterol/LDL
• Triglycerides
• No dose response noted
• No difference in placebo groups
• At day 60 only 1g/day group had significantly lower glucose
• Significantly lower at day 20 only in 6g/day group
• Lower in all cinnamon groups at day 40
• Maintained significance at day 60
• No significant changes in placebo groups
• No changes in placebo groups
• Significant decrease in all groups at day 20
• Maintained significance at day 60
- Significant decreases in 3 and 6g/day groups at day 40
- 1g/day group significant at day 60
Conclusions

• Low doses of cinnamon beneficial to reduce glucose, triglyceride, cholesterol, LDL in patients with DM 2

• No side effects noted
Limitations

• Limited sample size
  – Small study, 60 patients

• Strict inclusion criteria
  – Type 2 DM with NO OTHER MEDS
ANOVA
Analysis of variance

• Allows for analysis of independent variable while controlling for other independent variables

• May perform analysis of several variables while maintaining a constant $\alpha$ error level
  – No need for Bonferroni correction

• Typical use is for nominal independent variables with continuous dependent variables
  – Adaptation can convert continuous independent variables into categories
ANOVA

• General Omnibus Null Hypothesis
  – No difference among groups

• One way ANOVA tests if single independent variable groups are different from each other
  – Systolic BP among White, Black, Hispanic
  – Multiple comparison procedure must be done to identify which group is different

• Two way ANOVA / Factorial ANOVA breaks down groups into other factors; able to analyze more than one independent variable
  – Gender: SBP among Black Men, Black Women, White Men, White Women, etc
  – Can identify interactions
    • Eg Hispanic and Male has different SBP
Why I chose this study

• Translation of basic science to clinical practice
• Easy reading – only 4 pages!
• Good study design
  – Randomized, controlled, prospective trial with washout
• Serves as a pilot study
• ANOVA is a common test
• This is the type of study that can be done at GSH/VA