Neurobiological Role of Altered CCK Response in Bulimia Nervosa

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Objectives

- Describe the role of CCK response in satiety.
- Explain how an altered CCK response may effect binge eating behavior.
- Discuss how the results of this study can inform practice and future research endeavors.

Background & Significance

- Bulimia Nervosa (BN) 1% life-time prevalence
- 50% BN recover, 30% somewhat improve, 20% continue to meet full criteria of eating disorder of clinical severity
- Core behaviors include repeated binge eating/purging episodes
  - Alterations in hunger, fullness & satiety
  - CCK important in signaling termination of meal & satiety
  - Previous findings have found decreased CCK functioning

CCK Response in BN?

Trait vs. State

Normal Eating Behavior

Meal Termination → Satiety

Hypotheses

**H1:** BN will have a significantly blunted postprandial plasma CCK response compared to RBN and CON groups.

**H2:** Postprandial plasma CCK response will be significantly positively correlated with postprandial visual analog measures of satiety in RBN and CON groups.

Research Design & Methods

Design
- Comparative

Subjects
- Convenience sample of women:
  1-BN
  2-RBN
  3-Healthy controls

Setting
- Boston College and or
- Outpatient NIH / Clinical Research Center,
  Beth Israel Deaconess Medical Center

Study Visit - Timeline

Results

Overall Sample (N=37) Females

| Age (years) | 22.5 ± 5 |
| BMI (kg/m²) | 22.5 ± 2.2 |

Racial Ethnic Composition

<table>
<thead>
<tr>
<th>Race</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>71%</td>
</tr>
<tr>
<td>Asian</td>
<td>18.4%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>7.9%</td>
</tr>
<tr>
<td>American Indian</td>
<td>2.6%</td>
</tr>
<tr>
<td>Hispanic, Latino or Spanish</td>
<td>7.9%</td>
</tr>
</tbody>
</table>
Clinical Characteristics

<table>
<thead>
<tr>
<th>MEASURES</th>
<th>BN</th>
<th>RBN</th>
<th>Control</th>
<th>F (df)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI-II</td>
<td>15.5±11.4</td>
<td>1.7±2.7*</td>
<td>1.3±1.1</td>
<td>17.65</td>
</tr>
<tr>
<td>Hermand &amp; Polivy Restraint *</td>
<td>21.4±9.5</td>
<td>14.3±8.9*</td>
<td>5.6±3.3</td>
<td>18.20</td>
</tr>
<tr>
<td>Binge/Purge (per week)</td>
<td>4.9±2.7</td>
<td>6.6±4.6</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Illness Duration (years)</td>
<td>4.6±3.9</td>
<td>3.9±4.7</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Remission (years)</td>
<td></td>
<td>2.0±1.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. BDI-II = Beck Depression Inventory-II
*Significantly different than BN group: p < .05, two-tailed.
*The RBN group is also significantly different than CON group: p < .05, two-tailed, after Bonferroni adjustment.

*Group mean values of CCK concentrations (mean standard error of estimates) at each time point before and after the standardized liquid test meal.

H1: Mean CCK Response (AUC)

- Planned contrasts, significant linear trend, F(2,34) = 3.87, p < .05 (two-tailed)
- BN group’s CCK response, t(34) = 1.87 (p=.032, one-tailed, n=26), in comparison to the RBN and CON.
- As expected, the second planned comparison, t(34) = 1.87 (p=.27, one-tailed) revealed no significant difference between the RBN and the CON groups.
CCK Response RBN & CON

- RBN and CON groups did not differ
- CCK response may normalize following remission of binge and vomit behavior

\[ \text{Eating Behavior} \rightarrow \text{Meal Termination} \rightarrow \text{CCK Response Normalizes} \]

\[ \text{Satiety} \rightarrow \text{CCK Response} \]

\[ \text{H2: RBN GROUP} \]

Those that had a more robust CCK response rated higher levels of satiety \((r = .59, p < .05, \text{ two-tailed})\).

\[ \text{BN GROUP} \]

New Finding

Those with larger CCK responses reported the greatest urge to vomit \((r = .86, p < .01, \text{ two-tailed})\).
BN GROUP- In Review

- Eating Disorder Pathology
- Depressed
- CCK Response
- CCK Response / Urge to Vomit

RBN GROUP- In Review

- Eating Disorder Pathology
- Ø Not Depressed
- N.S. CCK Response and CON= Normalization
- CCK Response / Satiety

Limitations

- Small sample size
- Due to the lower frequency of b/p episodes, findings may not generalize to a more symptomatic population.
- Participants self-reported frequency of b/p behavior, unable to verify accuracy
- Answered identical VAS and SEC at 4 time points during the study visit
Discussion

Remit  #1 normal cck = state  #2 satiety response
BN  #3 increased cck ➔ greater urges to vomit.

Normalization of CCK

PROTECTIVE OR LIABILITY FACTOR?

How to get from there to here....

Implications for Practice

BN
- frequency of binge and vomit episodes
- psycho-education
  - factors (e.g., cck) that may perpetuate or maintain this behavior

Remitted
- current urge to binge/vomit
- personal triggers
- residual eating disordered thinking and abnormal eating patterns
- psycho-education
Future Directions

References

- ** Images retrieved from Google Images on the World Wide Web

QUESTIONS?

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